



**The United States Army
Concept Capability Plan
for**

**Combating Weapons
of
Mass Destruction**

**for the
Future Modular
Force**

2015-2024

Version 1.0

25 March 2009



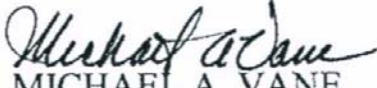
Foreword

*From the Director
U.S. Army Capabilities Integration Center*

TRADOC Pam 525-7-19 provides amplification to the Army's capstone and operating concepts and nests with the joint publication, *Joint Integrating Concept for Combating Weapons of Mass Destruction* (WMD). It describes capabilities required for the future Modular Force to implement effectively the *National Military Strategy to Combat Weapons of Mass Destruction* (NMSCWMD) during the 2015–2024 timeframe. This concept incorporates the guiding principles active, layered defense in depth and situational awareness and command and control from the NMSCWMD. It serves as a reference guide for future combat development efforts designed to provide relevant and ready land power that is neither coerced nor attacked by enemies using WMD; able to rapidly mitigate effects of WMD across full spectrum operations.

TRADOC Pam 525-7-19 is the outcome of a collaborative effort involving subject matter experts from throughout the Army, and the product of a detailed study of strategic guidance, current doctrine, and lessons learned. It represents an attempt to address requirements across six of the eight military mission areas as set forth in the NMSCWMD holistically. The Army has clear roles in the WMD interdiction, WMD offensive operations, WMD elimination, active defense, passive defense, and consequence management mission areas. The Army's lesser roles in security cooperation and partnership activities and threat reduction and cooperation are generally excluded as a matter of scope even though Army assets will play a supporting role in these more diplomatic mission areas. The broad approach taken with this concept is presented here as acknowledgment of the crosscutting nature of combating WMD capabilities requirements. Army input to future studies should have a consistent starting point. It is not the intent of this document to serve as the enduring and final Army input to future revisions of the various joint capabilities based assessments dealing with WMD, but is meant to provide a common starting point and context for Army staff officers providing input to future joint combating WMD efforts.

In developing further the ideas found in this publication we must also strive to understand the enormity of the problem in context of a whole of government approach. There are multiple activities conducted throughout the federal government, which are related to and impacted by this subject. The Army will both gain and share relevant information across the whole of government, and maintain dominance as the world's premier land force regardless of threat or use of WMD.


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Executive Summary

Introduction

The purpose of TRADOC Pam 525-7-19 is to provide a conceptual framework to guide the conduct of United States (U.S.) Army tactical and operational combating weapons of mass destruction (CWMD) missions in the future joint operating environment (JOE). In addition to providing this framework, TRADOC Pam 525-7-19 also identifies the capabilities that will be required to enable the concept. It underpins development of capabilities based analyses that will define doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) solutions to deficiencies in the CWMD mission area.

Operational Problem

The future Modular Force CWMD military objectives are to proactively dissuade, defeat, deter, or mitigate the rogue behavior of WMD networks. The Army lacks the full range of capabilities required to support the joint force commander (JFC) in the tactical and operational CWMD missions expected in the future JOE. The thrust of current Army CWMD capabilities in such missions is to protect against and recover from WMD attacks. The Army is deficient in the capabilities required to proactively detect, identify, track, and engage threat WMD networks before they can launch an attack. Additionally, Army mission planning does not always fully integrate the breadth of relevant CWMD considerations.

Solution Synopsis

The Army, as part of the joint force, must deter and prevent WMD development and proliferation and deny adversaries the opportunity to use WMD. As part of the joint force or in support of civil authorities, they must provide rapid mitigation of WMD effects in the event of their employment. To succeed, the Army must fully integrate CWMD into its functional concepts for warfighting at both the operational and tactical levels.

Key Ideas and Critical Enablers

- a. The Army's future CWMD concept is based upon two key ideas and three supporting critical enablers described below.
- b. Key idea 1. Take a proactive approach to CWMD. The Army's CWMD concept must center on proactive engagement of WMD threat networks before they can obtain or use WMD against the U.S., its allies, and its partners.
- c. Key idea 2. Take a layered approach to CWMD. The Army must layer its approach to engaging threat WMD and WMD networks. The concept of a layered approach applies to counterforce operations, sensors, protection, and training.
- d. Critical enabler 1. Network-enabled battle command (NEBC). Commanders will rely on NEBC for information management that supports all combat decisions. Commanders must gain situational understanding to enable effective operations inside the adversary's decision cycle. The U.S. Army CWMD planners must fully utilize capabilities provided by NEBC, which will provide a network that rapidly links tactical to operational to strategic levels.

e. Critical enabler 2. Leverage new technologies. Many of the required capabilities presented in this CCP will be possible only through applications of new technology. The Army must leverage these new technologies.

f. Critical enabler 3. Enhance training. Unit training is currently more flexible and quickly adaptive than institutional training, but often lacks valuable consistency and standardization. Institutional training content updates, approval, and resourcing is tied to processes too slow to remain current. Future training will prepare Soldiers and leaders to exercise sound judgment in the analysis of data and information, to understand cultural impacts on operations, and to act in periods of uncertainty.

Department of the Army
Headquarters, United States Army
Training and Doctrine Command
Fort Monroe, Virginia 23651-1046

TRADOC Pamphlet 525-7-19

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Military Operations

**THE U.S. ARMY CONCEPT CAPABILITY PLAN FOR COMBATING WEAPONS
OF MASS DESTRUCTION FOR THE FUTURE MODULAR FORCE 2015-2024**

FOR THE COMMANDER:

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History. This publication is a new United States Army Training and Doctrine Command (TRADOC) concept capability plan (CCP) developed as part of the Army Concept Strategy for the future Modular Force and as part of the capabilities based assessment (CBA) process.

Summary. TRADOC Pamphlet (Pam) 525-7-19, *The U.S. Army Concept Capability Plan for Combating Weapons of Mass Destruction for the Future Modula Force 2015-2024* provides amplification to the Army's capstone and operating concepts and nests with the joint publication, *Joint Integrating Concept for Combating Weapons of Mass Destruction* (WMD). It describes capabilities required for the future Modular Force to implement effectively the National Military Strategy to combat WMD (NMSCWMD) during 2015–2024. This concept incorporates the guiding principles active, layered defense in depth and situational awareness and command and control from the NMSCWMD. It serves as a reference guide for future combat development efforts designed to provide relevant and ready land power that is neither coerced nor attacked by enemies using WMD; able to rapidly mitigate effects of WMD across full spectrum operations.

Applicability. This pam applies to all TRADOC, non-TRADOC Army proponents, and Department of the Army (DA) activities that identify and develop DOTMLPF solutions to field required NMSCWMD capabilities. Active Army, Army National Guard, U.S. Army Reserve operating forces, and U.S. Army Materiel Command may use this pamphlet to identify future

CWMD operations trends. This pamphlet may also serve as a reference document to agencies within the joint community that are planning or are concerned with CWMD operations and initiatives.

Proponent and supplementation authority. The proponent of this pamphlet is the TRADOC Headquarters, Director, Army Capabilities Integration Center (ARCIC). The proponent has the authority to approve exceptions or waivers to this pamphlet that are consistent with controlling law and regulations. Do not supplement this pamphlet without prior approval from Director, TRADOC ARCIC (ATFC-ED), 33 Ingalls Road, Fort Monroe, VA 23651-1061.

Suggested improvements. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, TRADOC (ATFC-ED), 33 Ingalls Road, Fort Monroe, VA 23651-1046. Suggested improvements may also be submitted using DA Form 1045 (Army Ideas for Excellence Program Proposal).

Distribution. This publication is only available on the TRADOC Homepage at <http://www.tradoc.army.mil/tpubs/pamndx.htm>.

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Chapter 1

Purpose

1-1. Introduction

a. The Joint Capabilities Integration and Development System (JCIDS) mandates the process for developing new military capabilities. The capabilities based analysis (CBA) is the first step in the JCIDS process. A necessary precursor to beginning the CBA is a conceptual framework that describes how the United States (U.S.) Army will conduct mission operations in the future and identifies the associated far term required capabilities. A concept capability plan (CCP) establishes this future framework and its required capabilities. The CCP is the most descriptive of the Army concept formats.

b. An integrated capabilities development team (ICDT) was chartered by the U.S. Army Training and Doctrine Command (TRADOC) Army Capabilities Integration Center (ARCIC) to develop TRADOC Pam 525-7-19. The ICDT must ascertain the existence of both a commonly understood and accepted conceptual framework for future Army combating weapons of mass destruction (CWMD) operations and a set of required Army CWMD capabilities that are specific enough to inform possible CBAs for CWMD. This chapter presents the ICDT analysis and findings leading them to conclude that a CWMD CCP is necessary.

1-2. Analysis of Combating Weapons of Mass Destruction (CWMD) Concept Capabilities Plan (CCP) Need

a. The CWMD ICDT performed an analysis to determine whether existing joint and Army concepts and National strategy provide a sufficient conceptual framework for identifying future CWMD required capabilities. The analysis consisted of three main efforts.

b. Literature search. ICDT subject matter experts (SMEs) reviewed national, joint, Army, and other documents providing CWMD or CWMD related guidance, concepts, and required capabilities. The document research included authoritative sources describing the future joint operating environment (JOE). The literature search also included mining the online capabilities needs analysis database. Appendix A lists all significant documents and other sources reviewed during the literature search. Appendix B provides additional detail on literature search findings.

c. The chemical, biological, radiological, and nuclear (CBRN) seminar. The second main effort was a weeklong seminar in January 2008, involving senior CBRN unit commanders and staff and representatives from other ICDT member organizations. In this seminar, limited in scope to CWMD missions not in the homeland, the SMEs discussed future CWMD concepts and required capabilities. The main purpose of this seminar was to inform CWMD CCP development.

d. Army support to civil authorities seminar. The third effort was a weeklong seminar in April 2008, similar to the CBRN seminar but examining only Army support to civil authorities in homeland weapons of mass destruction (WMD) consequence management (CM) and other homeland emergency response missions.

1-3. CWMD CCP Need Analysis Findings

a. The literature search and CBRN seminar revealed that some of the conceptual detail required to support far term required capabilities analysis for CWMD is already in place. However, there is no published Army concept, specifically focused on CWMD, treating the subject in a holistic manner and providing an approved, integrated conceptual basis upon which to analyze future required capabilities.

b. National CWMD strategy. The two published national strategies most specifically dealing with CWMD are the *National Strategy to Combat Weapons of Mass Destruction* and the *National Military Strategy to Combat Weapons of Mass Destruction* (NMSCWMD). These documents define a national framework for combating WMD that consists of strategic objectives and their supporting military missions that will lead to the desired strategic end states. They provide the azimuth for joint and Army concepts but do not identify specific required capabilities.

c. Operating environment. The U.S. Joint Forces Command (USJFCOM), *Joint Operating Environment—Trends and Challenges for the Future Joint Force Through 2030*, is an excellent source for developing an understanding of the future JOE. Additionally, many national, joint, and Army publications provide information relating to the JOE. The threats of WMD proliferation and WMD use, especially involving non-state actors, are expected to increase. Adversary attempts to develop and employ biological weapons are a particular concern due to the relative low cost and ease of concealing such programs. These and other potential aspects of the future operating environment require an enhanced capability to engage the threat in order to protect the U.S., its allies, and partners. To be successful the Army must leverage the continuing advances in technology in areas such as sensors, intelligence fusion, and unmanned systems. The Army must ensure that its CWMD concept provides sufficient conceptual detail to identify capabilities needed to conduct future operations.

d. Joint CWMD concepts. Numerous joint concepts and doctrinal publications address the military roles in CWMD but do not define specific service roles. The *Joint Integrating Concept for Combating Weapons of Mass Destruction* (JICCWMD) describes in detail the approach to defeating an enemy's WMD network functions. It then derives eleven CWMD required capabilities and further breaks them out into effects, required tasks, and standards. The joint operating concept (JIC) provides excellent detail on national, interagency, and multipartner required CWMD capabilities and strongly influences TRADOC Pam 525-7-19 at the strategic level.

e. Army concepts. Aspects of the future Army CWMD concept, as well as numerous required capabilities, are included in TRADOC Pam 525-3-0 and in all operating and functional concepts subordinate to it. As an example, TRADOC Pam 525-3-5, *Protect*, states a goal to “protect the fighting force to preserve combat power.” It views the goal of protection as preservation of the Army's other five functional concepts, TRADOC Pam 525-2-1, *See*; TRADOC Pam 525-3-3, *Battle Command*; TRADOC Pam 525-3-4, *Strike*; TRADOC Pam 525-3-6, *Move*; and TRADOC Pam 525-4-1, *Sustain* (for comparisons see table 4-1, below). It includes required capabilities, by doctrine, organization, training, materiel, leadership

and education, personnel, and facilities (DOTMLPF), to protect Soldiers, platforms, systems, and facilities from many threats, including those encountered in a CBRN environment. TRADOC Pam 525-3-5 calls for proactive efforts to stop the proliferation of WMD and to eliminate WMDs before they can be used against the U.S., its allies, and military forces.

f. During the CBRN seminar conducted at the U.S. Army Maneuver Support Center (MANSCEN) January 2008, senior Army CWMD staff members and other SMEs examined the Army's future CWMD roles by stepping through the eight mission areas defined in the NMSCWMD. They found that the Army requires a better integrated approach in its concept and framework for CWMD to mesh with the modular structure of the future force and to ensure the Army can properly support the joint force. The seminar SMEs discussed a more detailed vision of future Army CWMD operations than found in current Army concept publications. This additional detail nests within elements of existing national, joint, and Army concept publications and is tied to the evolving JOE and to potential friendly and Threat military adaptations of future technologies. Seminar discussions also identified future required capabilities that existing published concepts did not document fully.

1-4. Intent for Future CCP Application

a. Although a CCP is generally narrowly focused, TRADOC Pam 525-7-19 attempts to capture thinking across the very broad, but inseparably interconnected mission areas of the NMSCWMD. The intent is for this document to serve as a common reference point from which future Army staff officers can draw input to various current and future CBAs.

b. Other documents. There are numerous authoritative documents listing many CWMD required capabilities. However, these capabilities are not integrated into a holistic conceptual framework enabling analysis to assess whether they represent a comprehensive list of those capabilities required to successfully conduct CWMD in the future JOE. Below, in an abbreviated form, are some of the features corresponding to the key ideas and critical enablers underpinning the TRADOC Pam 525-7-19 CCP concept gleaned during the CCP needs analysis. Chapter 4 presents the Army CWMD conceptual framework in more detail.

(1) Key idea: Be proactive. The future Army must engage the WMD threat early in the spectrum of CWMD military mission areas. Historically, the Army has focused attention on passive defense and, to a lesser degree, CM. These two mission areas, designed to deny an enemy the benefit of a WMD attack, are reactive in nature. Emphasized proactive engagement in the security cooperation, threat reduction, WMD interdiction, weapons of WMD offensive operations, WMD elimination, and active defense mission areas represents a paradigm shift. Rules of engagement (ROE) changes may be required to accommodate these actions.

(2) Key idea: Layer the approach. The Army, in support of the joint force, must combat WMD through layered application of military capability in time, space, and function in coordination with other elements of national power. This layered approach directs actions at key nodes and links of a threat WMD network to produce a system shock that causes the targeted network, node, or link to fail catastrophically, rendering it incapable or unwilling to perform its

WMD enabling function. This layered approach also relies on layering of Army CBRN assets such as sensors and protective equipment that respond to the actual threat.

(3) Critical enabler: Network-enabled battle command (NEBC). The future Army CWMD concept must integrate CWMD missions and operations into the commander's planning and decision cycle. The common operational picture (COP) must be attack resistant, fed by intelligence from the highest National assets down to tactical level sensor and individual Soldier reports. Army CWMD information must be fully integrated into the commander's decision cycle and be supported by Soldiers that have a broad CBRN knowledge base at all echelons to produce situational understanding (SU).

(4) Critical enabler: Leverage technology. The Army must better leverage new technologies such as nanotechnology, micro-encapsulation, unmanned systems, and sensor fusion, and must be more flexible in its procurement process to capitalize on new technologies sooner. Technology advances may not be fully available in during the 2015-2024 timeframe to achieve an end state answer for every challenge facing the Army; however, efforts should focus on such things as producing real time hazard awareness versus over-reliance on hazard prediction modeling tools and personal protective equipment (PPE) that is adaptive and scalable to actual hazards while accommodating faster, safer unmasking. In addition to these related areas of study, the Army should invest in effective decontamination that is less labor and resource intensive.

(5) Critical enabler: Improve training and leader development. CWMD training must produce Soldiers and leaders able to react to and solve complex technical problems. The Army, within the joint community must develop a strategy to maintain and retrain highly perishable CBRN skills. Unit training is currently more flexible and quickly adaptive than institutional training, but often lacks valuable consistency and standardization. Institutional training content updates, approval, and resourcing are tied to processes too slow to remain current.

c. Future required capabilities. Historically, CBRN operations have been of a responsive and reactive nature. The Army's mission has emphasized passive defense, for example, looking for and responding to CBRN use via the sense, shape, shield, and sustain roles. The CCP needs analysis highlighted several current CWMD capability shortcomings with implications for future required capabilities. A full, more detailed listing of future required capabilities appears in table 5-1. The following are representative examples.

(1) CBRN sensors have point and limited standoff detection capability and are either not networked or poorly networked to the COP.

(2) Tactical and operational units performing CBRN operations do not have an assured, rapid interactive information linkage with pertinent entities up to and including joint, interagency, intergovernmental, and multinational (JIIM) assets.

(3) Improved data fusion and knowledge management tools are required to enable more rapid and accurate SU.

(4) ROE that are sufficiently detailed, tailored, and rapidly amendable to take advantage of fleeting opportunities to conduct counter-CWMD actions, especially WMD interdiction and WMD offensive operations, are required.

(5) Soldier PPE is cumbersome and can severely degrade Soldier performance.

(6) Soldiers often must use PPE longer than necessary because of conservative hazard area predictions and time consuming procedures to make the all-clear determination required before unmasking.

(7) Decontamination processes are characterized by a significant logistics burden and low throughputs, and are ineffective for certain classes of equipment.

d. Chapter 5 presents the results of an analysis to identify a great majority of the future required CWMD capabilities, within the scope of TRADOC Pam 525-7-19, that enable TRADOC Pam 525-7-19.

1-5. Conclusion

While the Army understands its future CWMD roles and responsibilities, it must develop an approved conceptual framework for Army CWMD operations. Before proceeding into CBAs for CWMD, it must also derive a set of future required capabilities that enable effective joint CWMD mission support. TRADOC Pam 525-7-19 serves to meet the objective.

1-6. References

Required and related publications and prescribed and referenced forms are listed in appendix A.

1-7. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the glossary.

Chapter 2

Scope

2-1. Scope Parameters

a. The NMSCWMD defines eight CWMD mission areas. Two of the missions relate to non-proliferation. The threat reduction mission is primarily strategic in nature and includes tasks such as inspections, monitoring, verification, and enforcement support for treaties. The other non-proliferation related mission area is security cooperation and partner activities. This mission is also primarily strategic in nature and includes a broad scope of military engagement tasks with like-minded countries to dissuade WMD proliferation.

b. Five of the remaining six mission areas are more closely related to counter-proliferation. They are WMD offensive operations, WMD elimination, WMD interdiction, active defense, and passive defense.

(1) Offensive operations involve lethal or nonlethal attack of WMD or WMD related targets to deter or defeat the threat or subsequent use of WMD.

(2) The WMD elimination mission area includes operations to secure, disable, or destroy an adversary's WMD programs or related capabilities in hostile or uncertain environments. WMD elimination missions can include requirements to locate, characterize, secure, and neutralize WMD materials as well as the collection of forensic evidence and intelligence to enable later attribution. An example of a WMD elimination operation could be to remove equipment in a dual-use facility being used to produce WMD materials, while leaving intact other equipment being used for peaceful commercial purposes.

(3) WMD interdiction missions involve interdicting or intercepting the transit of WMD or WMD related materials between state actors or between a state and non-state actor in permissive (as when transiting through a partner nation) or non-permissive environments. Note the JICCWMD uses the term counterforce operations to refer to operations that identify and select WMD targets such as leadership, expertise, acquisition, weaponization, facility preparation, production, infrastructure, exportation, deployment and delivery systems. Counterforce operations also entail matching the means (for example, lethal or nonlethal), conducting the attack, and assessing effects to include any consequences from collateral damage. Throughout TRADOC Pam 525-7-19, the term counterforce operations is used to refer collectively to the CWMD mission areas of offensive operations, WMD elimination, and WMD interdiction.

(4) Active defense missions include air defense, special operations, and operations to defend against conventionally and unconventionally delivered WMD after activation of the delivery means (missile, rocket, artillery, and mortar launch).

(5) Passive defense missions include measures to minimize or negate the vulnerability and minimize effects of WMD use against U.S. and partner and allied forces, as well as U.S. military interests, installations, and critical infrastructure. Mission task examples include hazard prediction, detection and warning, use of personnel and collective protection equipment, decontamination, and engineered system survivability against WMD effects such as electromagnetic pulse.

c. CM is the last mission area the NMSCWMD identifies. CM missions include actions taken to reduce the effects of a WMD attack or event, including toxic industrial materials (TIM), and to assist in the restoration of essential operations and services at home and abroad.

2-2. Scope Limits

a. TRADOC Pam 525-7-19 addresses CBRN aspects of WMD for during the 2015-2024 timeframe (see figure 2-1). WMD is a term with many different and evolving definitions. The *Joint Publication (JP) 1-02* and *Field Manual (FM) 1-02*. One contentious issue during the writing of this document has been the question of whether or not to include high yield explosives, or explosives in general as points of discussion. Whether or not the definition of WMD, or a definition of CWMD, will eventually include explosives, it is appropriate to

acknowledge that future solutions developed in response to CWMD capabilities requirements should consider cross-utility for such things as explosives detection and forensic analysis of trace chemical residue. Any analytical capability developed for CBRN applications ought to consider the chemical nature of explosives as part of the requirement. The ability to locate and identify standard explosives, homemade explosives, and precursor materials for their manufacture will presumably benefit from chemical analytical tools developed for CWMD purposes. The issue of high yield explosives and explosives in general are outside the scope of TRADOC Pam 525-7-19.

b. The scope addresses future Army CWMD operations across a broad spectrum of tactical and operational CWMD related missions. TRADOC Pam 525-7-19 does not incorporate strategic conceptual elements except as they affect tactical and operational capabilities (such as availability of strategic reachback).

c. The scope’s organizational focus is units of the operating force and special purpose organizations from the generating force. The operating force unit scope includes the unique aspects imposed upon mission tasks by the potential presence of WMD materials, exploitable WMD intelligence, delivery means, and similar WMD related items that require the involvement of the Army to apply collective CBRN related skills (see figure 2-1).

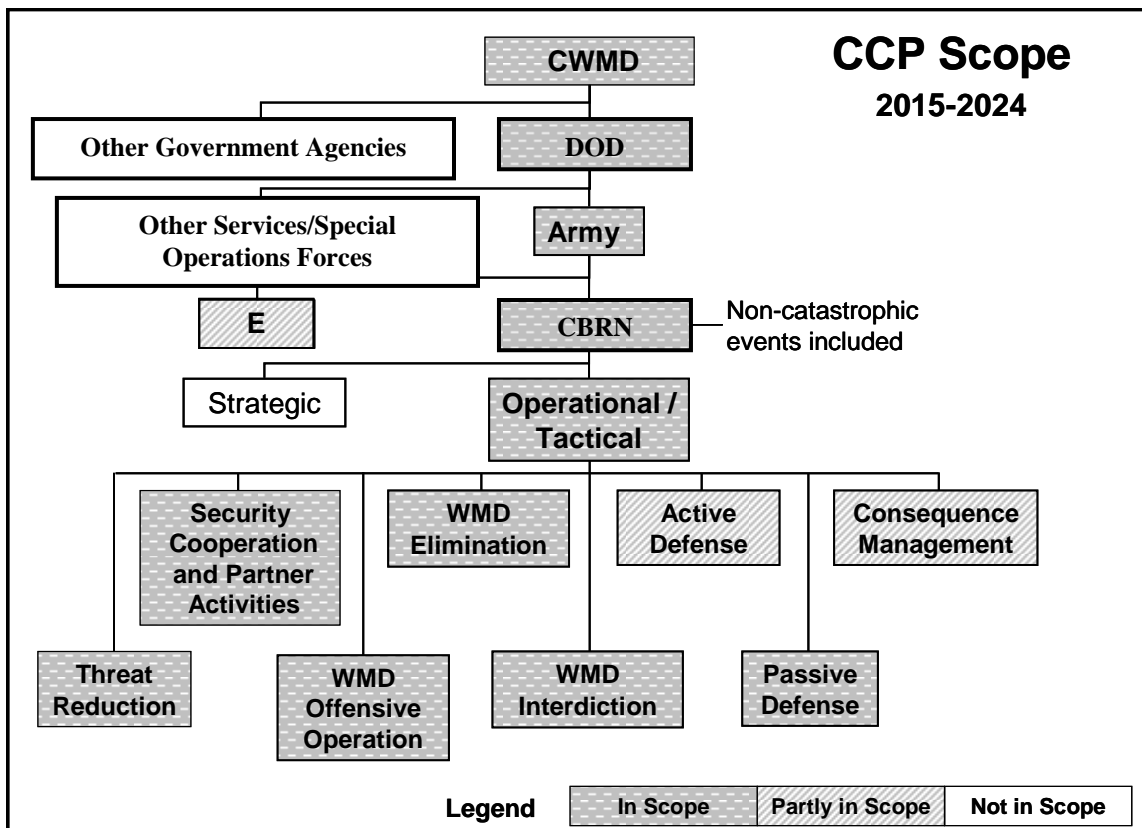


Figure 2-1. CCP Scope

d. The scope does not include the totality of tactical and operational aspects of all eight CWMD mission areas. The scope of each mission area follows.

(1) The threat reduction and the security cooperation and partner activities CWMD missions are primarily strategic in nature. However, all operational or tactical aspects of those two mission areas are included within the CCP scope. For example, JIIM training implications of security cooperation and partner activities are within the scope, as such training, while often conceived at a strategic level, often is conducted at a tactical level. The Army therefore needs the ability to export this training to partner nations. Such engagement also sends a message to potential adversaries that pursuing WMD is not advantageous.

(2) The operational and tactical aspects of WMD offensive, WMD elimination, WMD interdiction, and passive defense missions are fully within the CCP scope.

(3) Active defense missions counter an en route WMD attack prior to its reaching its target. The delivery means could be as diverse as a missile with a WMD payload, a spray canister containing chemical or biological agents, or a truck carrying a radiological dispersion device to its intended target. However, in this CCP the tactical and operational scope of active defense missions excludes all WMD attack delivery means except those an adversary conducts over land. Except for a required capability to distinguish rocket, artillery, and mortar delivered WMD payloads from conventional payloads, active defense via air defense is not within scope. Even so, such passive defense and CM missions as may be required in association with active defense missions against conventionally delivered WMD are within the CCP scope.

(4) The WMD CM mission area includes actions that respond to the immediate effects of a WMD attack and the eventual restoration of essential operations and services at home and abroad. This mission area has an especially broad scope. Normally the Department of Defense (DOD) will not be the lead federal agency in domestic CM operations unless the incident takes place on a DOD installation. There are possible limited exceptions outside the continental U.S. In the continental U.S., the Army provides capabilities in accordance with the National Response Framework under which the Army is never the lead federal agency. The Director, Accelerated and Capabilities Developments Directorate, ARCIC is the lead agency. MANSCEN is a core member of the Army homeland defense and civil support ICDT whose charter includes the direction to provide input to the DOD homeland defense and civil support CBA. Northern Command is leading that CBA development.

(5) As with the other mission areas, the aspects of CM within the CCP scope are tasks requiring application of CBRN related collective skills. This CCP addresses aspects of the CM mission area as they pertain to tactical and operational planning for CM missions and for conducting the immediate response to a WMD incident. The immediate response to a WMD incident is to assess, coordinate operations, provide logistics, and provide emergency decontamination. The scope includes those immediate, emergency CM activities for which the Army provides the preponderance of capabilities, but excludes follow-on, long term recovery and restoration efforts and the transition to civilian authority and eventual redeployment. The initial assessment could include tasks such as containment, reconnaissance, survey, and surveillance.

2-3. Scope Extensions

The scope addresses the survivability of the global information grid (GIG) together with associated data, information, tools, and network capabilities. The scope also addresses the impact of network-enabled collaborative command and control (C2) on operational and tactical CWMD operations. The C2 treatment includes the commander's cognitive process, specifically, the future of collaborative C2 and importance of cultural awareness. TRADOC Pam 525-5-500 was an influencing document in considering GIG capabilities required to enable collaborative C2.

2-4. Relationships to Existing Guidance and Joint Capability Areas

a. Chapter 4 addresses the linkage of the CCP concept to existing national strategic guidance, and joint and Army concepts. Appendix B presents the linkages in more detail.

b. The capabilities required to enable CWMD in TRADOC Pam 525-7-19 span all tier 1 joint capability areas. The following lists an example of CWMD capabilities for each joint capability area.

- (1) Force application: Conduct WMD counterforce missions.
 - (2) Battlespace awareness: Observation and collection of CWMD related intelligence.
 - (3) Net-centric: Access and share information relating to adversary WMD capabilities.
 - (4) Building partnerships: Army support to civil authorities in CM.
 - (5) Protection: CWMD defense operations in general.
 - (6) Force support: Collective CBRN related training.
 - (7) Corporate management and support: Basic research at Army laboratories to explore application of new technologies to address CWMD capability gaps.
 - (8) Logistics: Control decontamination operations logistics footprint.
 - (9) C2: Employ flexible ROE, rapid approval processes, and cross boundary and cross jurisdictional coordination to conduct a CWMD operation of fleeting opportunity.
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Chapter 3

The Military Problem

3-1. Operational Environment

a. Characteristics of the future JOE directly influence TRADOC Pam 525-7-19 statement of the military problem. Numerous approved joint and Army concepts and other documents provide information describing the future JOE. Those descriptions underpin some of the statements in this chapter characterizing the future JOE.

b. In the future JOE, multiple threat networks with members sharing common radical ideologies or criminal intent may acquire the ability to use (or credibly threaten to use) WMD. These groups will attack U.S. military, economic, and cultural power bases in an attempt to weaken the U.S. and to cause Americans to lose the will to fight an enemy who remains in shadows. The greatest threat is that such actors will use WMD against deployed forces, U.S. military installations, or the homeland.

c. Threat networks will be dispersed, with major cells operating in failing or failed states unable to counter the threat operation. Other clandestine cells will operate in major cities around the world. They will use phone, internet, and other global communication networks to plan operations and attract new members. Of particular concern are networks with members who are willing to use themselves as expendable weapons. Their radical beliefs make them capable of relatively indiscriminate mass murder.

d. The threat of transnational threat networks using WMD against the U.S. and its interests will grow. However, stable nations and regions will have a heightened interest in controlling WMD proliferation. This will increase the value of partnerships with like-minded nations in alliances and coalitions.

e. A stable regional alignment or advanced nation could emerge as a peer adversary. However, realizing the U.S. reserves the right to a nuclear response to WMD use, a peer adversary would have a stake in refraining from first use. A radical alignment of states with a shared commitment to sponsoring terrorist network activity, especially targeting the U.S. and its interests, would be particularly apt to employ WMD.

f. Continued urbanization and industrialization, access to information, and growing international discontent on a global scale contribute to increasing the likelihood that WMD will be used against the U.S. and its allies in the future. Proliferation of the ability to produce mass casualties for a relatively small financial investment will provide a significant challenge at the tactical and operational level of land warfare. CWMD will become even more challenging if members of threat networks resort to the spread of biological pathogens using people or animals as vectors. Some other specific challenges include the those below.

(1) Dual-use technologies. The dual-use nature of many WMD components and WMD related equipment hampers efforts to deter WMD proliferation. Nuclear power plants will increase in numbers as fossil fuels become scarce. They will produce radioactive waste products

that may not be adequately safeguarded. Other legitimate scientific and engineering technologies, used in areas as diverse as vaccine development and pest control, also have deleterious dual use potential. By replicating themselves after introduction into a target population, a small quantity of biological pathogens can produce mass casualties. Small quantities of biological toxins also have the potential to produce mass casualties. Thus, research laboratories used to develop militarily significant quantities of pathogens or toxins will be much smaller than industrial facilities manufacturing or using toxic chemicals or materials. Further, laboratories engaged in biological weapon research will be hard to distinguish from those engaged in legitimate research programs.

(2) Uncontrolled WMD materials. Nuclear materials, including weapons grade materials, such as spent nuclear fuel are abundant. These materials are stored in locations around the world. Some stockpiles lack sufficient security. International terrorist organizations may attempt to steal or secretly buy such materials. There are protocols in effect to help control nuclear material and technology proliferation; however, conventions to control materials used to develop biological and chemical WMD will prove harder to construct due to the plethora of beneficial dual uses.

(3) Potential advanced technologies. Bio-engineered weapons will become more virulent and possibly could target specific ethnic groups, perhaps after having remained dormant for a time in a non-affected carrier to complicate detection and attribution. Threat actors will continue to seek development of chemical agents capable of defeating PPE. Nanotechnology can facilitate production, concealment, delivery, and activation of chemical and biological threats. For example, the encapsulation of genetically altered pathogens in carbon nanotubes for storage and delivery may be possible in the latter stages of the 2015-2024 planning timeframe.

(4) Forensic signatures. Certain TIM, future genetically altered biological pathogens, and other WMD materials may not present forensic signatures that are unique to a single manufacturer or threat network. A terror organization's use of such materials would hamper efforts to establish responsibility.

(5) Failed states. If a state that possesses nuclear weapons were to fail, the weapons could fall into the hands of transnational terrorist organizations or hostile factions within the state.

g. WMD will remain a threat to the future Modular Force. Chemical weapons, including terrorist attacks employing dual use TIM may become the most common due to their availability. Biological weapons may present the most challenging threat because they are low cost and easily produced, transported, and dispersed. Such weapons could also be used to infect or poison crops, domesticated animals, and water supplies. Early detection of use is problematic due to varying incubation times when passed from individual to individual. The radiological threat is mostly due to the technological simplicity of building radiological dispersion devices. Nuclear weapons are the most destructive. Because of their catastrophic effects, we must account for the possibility they might be used even though the probability of its use may be less than for other classes of WMD.

h. Most threat actors will not be able to match the U.S. conventional warfare capability and will adopt unconventional solutions for their military requirements. These solutions may include WMD. Potential adversaries train on techniques to counter our superior sensing capabilities and will attempt to hide their acquisition or production of WMD. Adversaries will become even more skilled in using camouflage, cover, concealment, denial, and deception to hide their WMD activities. This will seriously challenge the friendly force's ability to locate WMD and WMD precursors. Combined with force dispersion, camouflage, cover, concealment, denial, and deception will impede intelligence gathering, including space-based national assets whose contribution to CWMD operational planning is critical.

i. The threat will target communications systems with information attack operations and computer network attacks. Adversaries may develop the capability to defeat electronic warfare protection. Threat networks may develop a capability to degrade U.S. satellite signals that provide positioning, navigation, and timing data, severely affecting intelligence collection operations.

j. The physical characteristics of a future theater of war will also prove more challenging. Continuing global urbanization increases the probability that U.S. forces will be conducting operations in cities. Early entry operations, support systems, and facilities will be more vulnerable to direct attack because of the proliferation of hostile communications; sensor, missile, and night vision capabilities; precision munitions; special operations forces (SOF); and insurgent or terrorist capabilities. The increased vulnerability, together with a growing threat of CBRN use against Soldiers from the ubiquitous hidden locations in developed urban areas, will complicate CWMD counterforce operation planning.

k. In summary, projections for the future operating environment indicate an unsettled world in flux. The WMD danger will increase in scope and scale, mainly due to multiple rogue networks seeking, possessing, or proliferating WMD. The networks can include state and, increasingly, non-state actors. They will be adaptive, often transnational, and will operate in relative secrecy and often in the realm of dual-use products and technologies to avoid detection and counter-action.

3-2. Problem Statement

a. The Army lacks the full range of capabilities required to support the joint force commander (JFC) in tactical and operational CWMD missions expected in the future JOE. TRADOC Pam 525-7-19 addresses the challenges that the Army will face in combating WMD in the JOE of the future. While not a radical departure from the current JOE, the major trend of the future JOE is the escalating threat in both scope and scale of development, proliferation, and use of WMD by networks of hostile state and rogue non-state actors. The future Modular Force CWMD military objective is to proactively and comprehensively dissuade, defeat, deter, or mitigate the rogue behavior of these multiple networks. Hence, the Army, as part of the joint force or in support of civil authorities, must deter and prevent WMD development and proliferation, deny adversaries the opportunity to use WMD, and provide rapid mitigation of WMD effects in the event a WMD is employed.

b. Deficiencies have been identified by examining how the Army implements the Army Concept Strategy in the various NMSCWMD mission areas. The following list includes representative CWMD deficiencies in each of the Army's functional concept areas.

(1) Battle command deficiencies:

(a) The commander cannot adequately gain SU inside the adversary decision cycle to proactively prevent attack and allow for mission planning and engagement.

(b) The planners do not have near or real time WMD intelligence from the tactical to the strategic level.

(c) The force does not have an effective system of harmonizing differences between Army and partner capabilities for multinational operations.

(d) The force does not have adequate ability to rapidly gain, share, and apply an understanding of cultural differences and their impact on tactical through strategic level operations.

(2) See deficiencies:

(a) The force lacks adequate pervasive capability (no or minimal Soldier exposure potential) to detect and identify WMD threats in depth in order to proactively interdict and eliminate them.

(b) The force is unable to fuse multiple disparate data sources adequately (sensor and others) at the strategic, operational, and tactical levels to operate in a layered, networked manner.

(c) The force lacks the ability to detect and identify both militarized and industrial chemical, biological, and radiological material, with sufficient speed, specificity, range and accuracy of concentration measurement, to enable commanders to balance force tactical risk against force health risk. That is, to balance the increased tactical risk associated with impaired fighting effectiveness while encumbered by PPE versus the potential for increased health risk associated with fighting at less encumbered levels of protection.

(d) The force possesses insufficient capability to establish timely positive attribution for threat actor WMD related activity.

(3) Strike deficiencies:

(a) The commander lacks the ability to fuse WMD network intelligence in sufficient time to plan and execute counterforce operations against fleeting WMD network node targets transcending geographic and JIIM jurisdictional and political boundaries.

(b) The force lacks the ability to rapidly discern a WMD attack in progress in order to counter it and return fire on the source with minimal collateral damage.

(4) Move deficiencies:

(a) The JFC lacks the ability to refine hazard-modeling predictions with actual information in real or near real time to aid in contamination avoidance.

(b) The JFC lacks the ability to maintain operational tempo and standards of task performance while employing protective equipment (PPE and platform integrated protection systems).

(c) The JFC lacks adequate capability to communicate contamination boundaries to multinational forces, civilian populations, nongovernmental organizations, and other non-network connected entities.

(5) Protect deficiencies include the lack of the force's the ability to protect Soldiers and systems against the full range of CBRN hazards (warfare agents as well as dual use industrial hazards) while maintaining Soldier and system performance.

(6) Sustain deficiencies:

(a) The force lacks the ability to mitigate CBRN exposure of sensitive computer and electronic equipment effectively.

(b) The JFC lacks adequate ability to reduce logistical requirements and Soldier workload to perform decontamination in a timely manner.

(c) The force lacks both the standards and ability to decontaminate selected priority equipment sufficiently for continental U.S. return.

Chapter 4

Future Army Operational and Tactical CWMD Operations

4-1. Introduction

This chapter describes future Army CWMD operations that will enable the Army to deter and prevent WMD development and proliferation, to deny adversaries the opportunity to use WMD, and to provide rapid mitigation of WMD effects, if employed, in the JOE of the future.

4-2. Conceptual Framework

a. The Army operational concepts, TRADOC Pam 525-3-1 and TRADOC Pam 525-3-2 characterize combat activities in terms of the six Army functional concepts. This CCP uses those functional concepts as its taxonomy for developing the future CWMD concept. It derives CWMD required capabilities by examining capabilities the Army will require in each of these functional areas as it engages in the various CWMD mission areas set forth in the NMSCWMD.

b. It is appropriate to derive required capabilities from the functional concepts for two reasons: the Army's functional concepts have a one-to-one correspondence with the Army warfighting functions detailed in FM 3-0. For conceptual work, TRADOC uses these functional concepts as the basis for future doctrinal evolution. The second reason is the Army's warfighting functions parallel exactly the joint functions; hence, Army CWMD deficiencies and required future capabilities are directly linked within the joint context. Table 4-1 shows this alignment of joint and Army functions.

Table 4-1
Relationship of U.S. Army Functional Concepts to the Warfighting Functions

Army Functional Concepts	Army Warfighting Functions (FM 3-0)	Joint Functions (JP 3-0)
TRADOC Pam 525-3-3, <i>Battle command</i>	C2	C2
TRADOC Pam 525-2-1, <i>See</i>	Intelligence	Intelligence
TRADOC Pam 525-3-4, <i>Strike</i>	Fires	Fires
TRADOC Pam 525-3-6, <i>Move</i>	Movement and maneuver	Movement and maneuver
TRADOC Pam 525-3-5, <i>Protect</i>	Protection	Protection
TRADOC Pam 525-4-1, <i>Sustain</i>	Sustainment	Sustainment

4-3. Solution Synopsis

a. The future Modular Force, as envisioned in TRADOC Pam 525-3-0, will execute simultaneous, distributed operations within a noncontiguous battlefield. It will be capable of conducting sustained full spectrum operations while controlling operational tempo. The future Modular Force will be network enabled to facilitate SU of the entire operational area. These requirements serve as underpinning for the capability statements 55 through 57, see table 5-1.

b. The Army will, as part of this future Modular Force, work in concert with partners to deter WMD proliferation; conduct counterforce CWMD operations to engage threat WMD actors and networks before they can obtain or use WMD; provide Soldier, platform, equipment, and facility CBRN protection as part of passive and active defense operations; and mitigate WMD effects in CM missions. The Army will also expand and or refine the roles and capabilities of Army unique resources such as the Army laboratories and the U.S. Army Chemical, Biological, Radiological, and Nuclear School. These requirements serve as underpinning for the following capability statements 4, 5, 6, 8, 9, 14, 20, 21, 25, 32, 43, 45, 47, 68, and 69, see table 5-1.

c. To develop the Army future CWMD operational concept, the ICDT examined operations that typify the CWMD missions that the Army future Modular Force will conduct in support of joint operations. These operations appear as sample vignettes later in this chapter. Using as a framework the Army's six functional concepts that support the warfighter, TRADOC Pam 525-7-19 was derived by examining the Army's CWMD role in each. Where CWMD

actions were not explicitly described in the concepts, the ICDT developed the CWMD related capabilities based upon inputs from the CBRN seminar, SMEs, key joint concepts, and national policy.

(1) CWMD in TRADOC Pam 525-3-3, *Battle Command*. TRADOC Pam 525-3-3 describes how future Modular Force commanders will exercise C2 of operations in the future JOE.

(a) Current Army CWMD missions focus on protecting and recovering from WMD attacks. In future CWMD operations, the commander will proactively engage enemy WMD threats to deter and prevent WMD attacks. Forces will rapidly locate, identify, and assess potential WMD threats before entering the combat area; neutralize, destroy, or avoid these threats during maneuver through the area; and detect, assess, and mitigate WMD hazard areas where attacks have occurred. For greatest effect, a commander must gain SU inside the adversary's decision cycle to proactively prevent attack and allow for mission planning and engagement. These requirements serve as underpinning for capability statements 2, 8, 10, 12, 14, 15, 16, 19, 22, 23, 26, 32, 36, 38, 41, 42, 50, 52, 54, 57, 67, 68, and 69, see table 5-1.

(b) The JFC and staff, including CWMD planners, will rely on capabilities provided by NEBC linkages among tactical, operational, and strategic levels to achieve rapid collaborative C2 and permit access to the required compartments of information in the GIG. The network and GIG enable rapid intelligence feeds to and from tactical levels; issuance of time-critical go and no-go decisions from higher echelons to brigade combat team (BCT) level or other tactical levels; and continuous battle assessment and incremental adjustment to operations during execution. Because the threat situation can change rapidly, CWMD planners will rely on access to near-real time WMD intelligence. Tactical through strategic echelons and sensor and data source networks will continuously update the COP via NEBC automation, enabling tactical maneuver formations to self-synchronize their execution of mission orders. These requirements serve as underpinning for capability statements 1, 3, 7, 8, 11, 12, 16, 22, 30, 32, 35, 37, 39, 42, 47, 50, 52, 60, and 71, see table 5-1.

(c) The JFC and staff, including CWMD planners, will rely on a robust set of CBRN data analysis and decision support tools, COP visualization tools, and collaborative planning tools. These tools assist in processing the volumes of data received and convert it to real time intelligence and SU on threat intent and activities and real time information of the battle. Commanders at all levels will have effective decision support tools to aid in recognizing the implications of seemingly unrelated WMD network activities. These requirements serve as underpinning for capability statements 3, 7, 9, 11, 12, 16, 51, and 52, see table 5-1.

(d) All echelons are likely to incorporate multinational force elements in major combat, as well as in irregular warfare campaigns, and will encounter cultural differences of friends, combatants, and noncombatants alike, the understanding of which will be essential. Effective harmonization of multinational operations may be more difficult if significant differences exist between Army capabilities and those of its potential partners. Integration efforts will be especially beneficial in the areas of information sharing; however, requirements for multilevel security, collaborative planning, and common data standards must be resolved. These

requirements serve as underpinning for capability statements 1, 9, 11, 13, 14, 15, 30, 40, 44, 48, 49, 50, 60, and 63, see table 5-1.

(2) CWMD in TRADOC Pam 525-2-1, *See*. TRADOC Pam 525-2-1 includes the tasks and systems that facilitate understanding of the enemy, terrain, weather, and civil considerations. Future tactical commanders, staffs, and unit personnel of a fighting force who understand this complex tactical environment will achieve a significant advantage over their adversaries. Better SU and reduced uncertainty in future battle will enable commanders to act more decisively, precisely, and prudently, thus optimizing the application of all other tactical functions and capabilities. These requirements serve as underpinning capability statements 1, 2, 7, 8, 14, 22, 31, 34, 35, 39, 40, 48, 49, and 50, see table 5-1.

(a) The WMD threats of the future JOE will be adaptive, transnational, dispersed, skilled at concealment, and operating in urban areas. Current Army sensor systems operate mainly as stand-alone platforms offering only limited detection ranges and are incompletely fused with intelligence from other data sources. The future Modular Force will tap the capabilities of military and civilian space platforms for pervasive and persistent surveillance of the enemy. The force will employ the ability to sense from a distance whether through standoff or remote practices in hostile locations. This will improve our ability to detect and identify WMD threats in order to proactively seize, interdict, or eliminate them. These data feeds will be linked to the COP to provide rapid situational awareness (SA) and to enable improved force warning, mission planning, and force protection. These requirements serve as underpinning for capability statements 1, 2, 7, 8, 9, 11, 12, 22, 31, 32, 33, 35, 37, 39, 46, 47, 50, 52, and 54, see table 5-1.

(b) Timely intelligence will improve SA at all levels and greatly assist engagement of fleeting CWMD targets. It will also enable improved cross-cueing of platforms and Soldiers to develop more responsive and comprehensive CWMD targeting information. Improved SA will also enhance survivability and force protection, allowing the force to maintain freedom of action. Future commanders will have the capability to modify intelligence collection plans rapidly as conditions, missions, and environments change over time. In particular, the data requirements may radically change when transitioning between offensive, defensive, and stability operations. These requirements serve as underpinning for capability statements 1, 2, 7, 8, 9, 11, 12, 16, 22, 31, 32, 33, 35, 37, 39, 46, 47, 48, 50, 52, and 54, see table 5-1.

(c) In an operation where WMD are expected to be encountered, the commander must rapidly locate, identify, and assess the potential WMD threat before entering the combat area. This will require the integrating of disparate sensors at different levels of fidelity and echelon, linked together and cueing each other. Current Army CBRN sensors do not link to the GIG or to each other. Such a layered approach to sensor utilization will permit broad coverage, low fidelity sensors to cue higher fidelity systems when detecting a suspected WMD threat. These requirements serve as underpinning for capability statements 1, 2, 7, 8, 9, 11, 12, 16, 22, 31, 32, 33, 35, 37, 39, 46, 47, 48, 50, 52, and 54, see table 5-1.

(d) Once forces move into a hostile area, the commander's CWMD objectives are to neutralize, destroy, or avoid CBRN threats during maneuver through the area and to detect,

assess, and mitigate hazards from any CBRN releases. While specialized CBRN personnel will use equipment to detect, identify, and mitigate hazards, it will be vital to train all Soldiers to, at a minimum, recognize potential CBRN and TIM sites and materials to avoid contamination and to prevent the loss of valuable evidence required to establish attribution for a WMD attack or activity. These requirements serve as underpinning for capability statements 8, 12, 13, 17, 18, 19, 22 through 26, 28, 29, 30, 32 through 37, 43, 45, 46, 47, 51 through 55, 57, 58, 59, 62, 63, 64, 66, 67, 70, 71, and 72, see table 5-1.

(3) CWMD in TRADOC Pam 525-3-4, *Strike*. TRADOC Pam 525-3-4 describes how future Modular Force commanders will employ fires, both lethal and nonlethal, in support of full spectrum operations and will integrate fires with information capabilities and operations. This concept includes positive targeting identification and tracking, an integrated network to ensure timely and accurate assessment, force capability interfaces (including hybrid, joint, and multinational forces), and continuous access to the COP. The future force's strike capabilities will be enabled by the NEBC that provides integrated communication and computer interfaces between joint fires, C2, and knowledge networks. These requirements serve as underpinning for capability statements 2, 10, 16, 22, 23, 25, 26, 32, 35, 36, 37, and 38, see table 5-1.

(a) The NMSCWMD considers CWMD as much more than passive defense and CM missions in the aftermath of a WMD attack. It stresses the proactive nature of CWMD, with nonproliferation and counter proliferation roles. A major Army role will be counterforce operations (WMD offensive operations, WMD elimination and WMD interdiction and active WMD defense). Future Army commanders will conduct counterforce missions, both lethal and nonlethal, against enemy WMD networks and capabilities such as laboratories, stockpiles, and industrial sites involved in WMD activities. They will rely on continuous access to the COP to enable the near real-time SA required to for accurate assessments and precise targeting to exercise force capability interfaces in CWMD missions. Strike operations planning also will benefit from continuous updates from Army and Air Force weather assets and collaborative forecasting tools. These requirements serve as underpinning for capability statements 10, 16, 22, 23, 32, 35, 40, and 47, see table 5-1.

(b) Army forces will detect, identify, and track enemy ground-based WMD delivery systems to defeat delivery of the payload with minimal collateral effects and to enable enemy launch site and launch asset targeting. These requirements serve as underpinning for capability statements 25 and 26, see table 5-1.

(4) CWMD in TRADOC Pam 525-3-6, *Move*. TRADOC Pam 525-3-6 describes how the future Modular Force will be characterized by superior speed and dispersed movement over complex terrain, allowing it to execute actions in contact with significantly higher levels of tempo, lethality, survivability, and endurance. The commander will rely on maneuver enhancement functions to aid force protection and security during movement through early warning, standoff detection and neutralization of hazards and obstacles, and defeat of improvised threats to mobility. These requirements serve as underpinning for capability statements 8, 9, 12, 19, 28, 29, 43, 52 through 57, see table 5-1.

(a) The future Modular Force will rely on CWMD operations to sustain its tactical and operational tempo when confronted with situations when they either must identify and avoid contaminated areas or detect and maneuver within them. The commander's ability to develop SU will be critical to guiding operational and tactical maneuver. Battle command and see capabilities will be exercised to develop this SU, which will begin prior to deployment and continue throughout deployment, including early operations to establish assured access. The goal is to establish entry conditions and a sufficient knowledge base to ensure strategic maneuver is executed as a deliberate introduction of force packages tailored and ready for immediate operations. These requirements serve as underpinning for capability statements 8, 12, 17, 18, 19, 29, 43, 51 through 57, 62, 64, 66, and 71, see table 5-1.

(b) Once in theater, the future Modular Force must be capable of maintaining high operational tempo and continuous pressure to overwhelm and paralyze the enemy. The future Modular Force must be able to conduct tactical maneuver by exploiting the ability to develop and effectively act on information. Enemy elements will attempt to deny movement through tactics such as the employment of WMD attacks and intentional TIM contamination. The COP will make detailed information on contaminated areas (developed from the layering of diverse sources such as remote sensors, national assets, and ground reconnaissance units) immediately available to all units to enable contamination avoidance. Improved, more accurate hazard area prediction methodologies will minimize the number of Soldiers who must don PPE and minimize the time spent in PPE. Rapid tactical maneuver in itself will quickly position future Modular Force units near the enemy, thus deterring or dissuading the enemy's use of WMD to avoid fratricide. These requirements serve as underpinning for capability statements 7, 8, 9, 10, 12, 16, 17, 19, 31, 34, 37, 40, 46, 52, 57, and 66, see table 5-1.

(c) Soldiers will maneuver through contaminated areas wearing lightweight PPE that allows the Soldier mobility and flexibility while providing protection from CBRN hazards. Mounted crews will be fully protected within their platforms and suffer no performance degradation. Platforms will negotiate contaminated areas, detecting, marking, destroying, and neutralizing CBRN and TIM hazards. In support of movement, all Soldiers will train to recognize indications of CBRN hazards in order to avoid exposure to hazards. These requirements serve as underpinning for capability statements 4, 5, 6, 7, 8, 9, 12, 18, 19, 21, 22, 30, 34, 35, 36, 37, 43, 50, 51, 53, 56, 57, 61, 66, 67, and 70, see table 5-1.

(5) CWMD in TRADOC pam 525-3-5, *Protect*. TRADOC Pam 525-3-5 defines protection as a process, a set of activities and capabilities by which the joint force protects people (combatant and noncombatant), assets, and information against the full spectrum of threats. The future Modular Force will utilize advanced protection capabilities for maneuver, maneuver support, and maneuver sustainment units; fixed and semifixed locations; and information systems and infrastructure. The future Modular Force may also be required to provide protection related capabilities to interagency and multinational partners. It categorizes protection tasks in terms of detect, assess, decide, act, and recover. This is similar to the *Protection Joint Functional Concept's* tasks of detect, assess, warn, defend, and recover. These requirements serve as underpinning for capability statement 45, see table 5-1.

(a) Protection capabilities will be integrated and operate seamlessly with each other via networked C2, communications, computers, and lethal and nonlethal systems. Automated systems, improved sensors, and robotics are examples of some future integrated capabilities that will provide active protection. These requirements serve as underpinning for capability statements 7, 8, 31, 37, and 46, see table 5-1.

(b) CWMD staffs will rapidly detect, locate, assess (identify), track, and mark CBRN contamination in the air, water, food, and soil and on personnel, human remains, equipment, and facilities in all environments within a joint operations area (JOA) to produce actionable intelligence. The phrase CBRN contamination used here is but one element of WMD. WMD materials include CBRN agents, TIMs, WMD precursors and dual use materials, weapons, equipment used in WMD manufacture, CBRN WMD related industrial capabilities, WMD delivery systems (including pathogen vectors), adversary WMD experts, criminal or terrorist networks with WMD hostile intent, and other materials such as documents and records of interviews. Commanders will access and analyze WMD hazards data via NEBC and the COP in order to enable hazard prediction and warnings, contamination avoidance, site assessment, WMD elimination, and attribution of WMD network activity. These requirements serve as underpinning for capability statements 7, 8, 9, 12, 19, 22, 25, 30, 34, 35, 36, 37, 50, 51, 52, 57, and 66, see table 5-1.

(c) Soldiers and units will employ protection in CBRN and TIM environments that allow mobility and physical flexibility. The PPE will protect against the respiratory, percutaneous, and ocular trauma associated with exposure to a wide range of CBRN and TIM hazards and oxygen deficient atmospheres. The PPE will be disposable or easy to decontaminate (such as uniforms, gloves, masks, and mask filters) and will minimize heat stress, flexibility and dexterity impairment, bulkiness and weight, and not pose an extensive logistics burden. Protection will also be available to Soldiers in convoys, casualties unable to wear standard PPE, evacuees, and detainees. Soldiers will be trained and equipped to prevent or minimize internal contamination of vehicles and platforms. These requirements serve as underpinning for capability statements 6, 18, 43, 51, 53, and 61, see table 5-1.

(d) The Army will support WMD elimination missions by locating, identifying, securing, rendering safe, disabling, and destroying an adversary's WMD programs and related capabilities. JFCs use unmanned systems to search for and handle hazardous materials. The Army will be prepared to support operations to interdict the transit of WMD, its delivery systems and associated components, technologies, and expertise. Often this will be part of a joint operation requiring a rapid reaction to a fluid situation. These requirements serve as underpinning for capability statements 15, 22, 23, 32, 35, and 41, see table 5-1.

(e) The Army will support recovery operations after a WMD attack or incident by planning, preparing, coordinating, and conducting CM operations. Using NEBC, commanders will rapidly identify CM requirements and priorities and monitor progress of CM operations to minimize loss of life and property in the initial crisis response stage of a WMD incident. This will enable the development of effective plans for tactical mitigation and domestic and foreign CM operations. This will also provide effective CM C2. Forces will conduct reconnaissance,

survey, and sampling operations to assess WMD effects. Tasks include searching for, recovery, decontamination, treatment, evacuation of casualties, and mortuary affairs; decontamination of personnel, clothing, equipment, platforms, weapons, cargo, facilities, and terrain; determination of efficacy of decontamination and monitoring hazard areas with sensors to provide indications of hazard abatement automatically and safely. New clothing, platforms, and systems will be easier to decontaminate. These requirements serve as underpinning for capability statements 13, 17, 18, 24, 28, 37, 54, and 63 through 72, see table 5-1.

(6) CWMD in TRADOC Pam 525-4-1, *Sustain*. TRADOC Pam 525-4-1 describes the necessary supply and service capabilities required to sustain the force or prolong operations through mission completion, but it does not include CM. The *Protection Joint Functional Concept* considers sustain requirements includes the critical operations during an attack and the actions after an attack to sustain operations and to restore personnel and equipment to pre-attack conditions. The Army's sustain missions include several CBRN considerations.

(a) Electronic equipment will be able to withstand CBRN exposure while maintaining functionality and will be able to withstand any decontamination processes required with minimal or no loss of performance. These requirements serve as underpinning for capability statement 27, see table 5-1.

(b) To minimize the decontamination logistics burden, future Modular Forces will utilize state of the art decontaminants and decontamination procedures that minimize dependence on scarce resources. These requirements serve as underpinning for capability statements 29, 43, 57, and 65, see table 5-1.

4-4. Key Ideas and Critical Enablers

a. TRADOC Pam 525-7-19 is derived from the Army's functional concepts and is based upon an extensive literature research, as well as SME input, CBRN and Army support to civil authorities seminar discussions, and analysis of several stylized CWMD vignettes. Underpinning the philosophy of this CWMD CCP are two key ideas and three critical enablers woven throughout the solution synopsis.

b. Key Idea 1: A proactive approach to CWMD.

(1) The NMSCWMD calls for a proactive strategy to defeat the CWMD threat of the future. The National Security Strategy calls for proactive counter proliferation efforts to defend against and defeat WMD and missile threats before they are unleashed. The JICCWMD reinforces the proactive strategy, stating that a key element of success for the JFC's CWMD campaign is engaging early.

(2) The entire philosophy of CWMD is changing from one of passively reacting to a WMD attack (the passive defense and CM mission areas of the NMSCWMD) to proactively and aggressively target and engage WMD threat networks before they can mount an attack. Under the battle command functional area, the commander will plan counterforce missions such as offensive operations, WMD elimination and WMD interdiction, and active defense to engage

enemy WMD threats to deter and prevent WMD attacks proactively. The commander and staff will receive support via see capabilities with sensors that operate from a distance or that are emplaced in hostile locations remotely to enable detection and identification of the networks in order to launch proactive strikes.

(3) A proactive approach addresses the importance of engaging actual or potential WMD actors as early in the stages of WMD capability development as possible. Compared to later engagement, when actors are actively attempting to acquire WMD capability or already have the capability or actually use WMD, earlier engagement results in improved security against the threat of WMD employment and reduced cost to achieve that security. From an Army operational and tactical CWMD operations perspective (and using the NMSCWMD mission area construct), engaging early means to invest first in non-proliferation missions (threat reduction, security cooperation, and partner activities) when possible.

(4) If nonproliferation efforts fail and strategic interests dictate removal of a WMD threat, the next engagement priority is in counterforce missions (offensive operations, WMD elimination, WMD interdiction). The Army may have a role in any of these three types of counterforce missions but is currently and will likely continue to be the JFC's primary capability provider for WMD elimination operations. In the event an adversary attempts to use or actually uses WMD, the missions of active defense, passive defense, and CM come to the forefront. However, at this advanced stage of WMD capability development, the cost of engagement is relatively steep, and it points to a failure to engage early enough, whether due to insufficient intelligence or some other cause. Early engagement includes working with partners and allies. Developing increased cooperation and an improved ability to conduct multinational CWMD operations not only produces tangible benefits in mission execution, it also increases the strength of the message to potential adversaries that their development or use of WMD will not achieve desired effects. At the operational and tactical levels, actions to plan and conduct multinational training exercises, provide technical assistance, and plan sharing of responsibilities and equipment are all aspects of engaging early with partners and allies. Achieving increased levels of interoperability within multinational battle command systems and specialized CWMD sensors and equipment assists this aspect of engaging early.

c. Key Idea 2: A layered approach to CWMD.

(1) The second key idea underpinning TRADOC Pam 525-7-19 is to layer the approach used to engage threat WMD networks. The concept of a layered approach is found in multiple national, joint, and Army concepts. One of the guiding principles in the NMSCWMD is an active, layered defense in depth. One of the four key elements of the JICCWMD is to layer the approach by applying military capabilities in time, space and function in coordination with other elements of national power. In the joint concept of layering, the emphasis is on integration of multiple operations to generate combinations of direct and indirect effects. The JFC also must consider the optimal layered set of WMD network functions to target.

(2) Army forces will apply layering in the conduct of individual CWMD missions. Examples of such tasks include protecting the force (through layering of CBRN agent detection,

force warnings, PPE, decontamination, and other capabilities); employment of CWMD assets such as Soldiers, sensors, and systems; and Soldier education and training.

(3) Layered operations. Layering the approach provides the potential to eliminate single points of failure and increase effectiveness against WMD actors that operate across multiple domains and are multifunctional. The JICCWMD provides an example in which the JFC would use interdiction to dissuade an adversary from a particular path, while launching offensive operations to attack its physical and human domains via lethal options and its virtual and human domain via nonlethal options, such as information. At the same time, the JFC might simultaneously employ influence operations to shape perceptions of the local populace or partner governments, interdiction operations to stop flows of money to WMD actors, and offensive operations to destroy key expertise and technology centers.

(4) Layered sensors. The Army will develop and employ layered sensors, which will be networked to collect data that, when fused within the COP, improves SU. In this context, sensor connotes a materiel solution that performs a given specialized technical function. However, holistically the Army must possess the capability to gain SU fusing such things as human intelligence, signal intelligence, and document exploitation with traditional technical sensor inputs. The sensor network will incorporate layers of sensor fidelity ranging from numerous, relatively non-specific, inexpensive sensors to a limited number of highly sensitive, specific, and costly sensors. Lower fidelity sensors will detect hazards to tip or cue higher fidelity sensors. Highest fidelity levels will provide confirmation/identification detection capabilities. Sensors will include layers of JIIM assets; point and standoff sensors; and static, mobile and remotely emplaced sensors; as well as intelligence feeds. Mobile sensors include Soldiers and sensors mounted on a variety of platforms including Soldiers, manned platforms, and unmanned ground and aerial platforms. Disparate (non-CBRN specific) sensors will compose another layer. Their purpose is to provide additional indicators to increase the level of confidence in detections by other sensors or to cue CBRN sensors and other disparate sensors to focus their search area.

(5) Layered protection. The layered sensor concept will enable the layered, scalable protection concept. The force will use scalable levels of protection based upon the perceived threat and risk analysis. This could include use of tailorable, less cumbersome PPE providing short term protection until sensors indicate the need either to switch to a higher level of PPE or to remove PPE clothing and masks. It will apply to passive defense contingency planning measures for many counterforce missions and to passive defense and CM operations in CBRN environments. Layered protection also includes medical surveillance, warnings, prophylaxis, decontamination, antidotes, medical treatment, and other measures.

(6) Layered training. The future Modular Force will perform many and varied CWMD tasks. These tasks will include CBRN-specific actions performed by CBRN specialists, but will also include capabilities as appropriate from other military occupational specialties, such as explosive ordnance disposal, preventive medicine, nuclear research and operations, and general purpose CBRN units. They will also include CBRN related actions performed by Soldiers with little to no collective CBRN training and CBRN staff support to commanders. Therefore, training programs of varied complexities will be required. One layer of training will equip the more general-purpose CBRN force units, such as those whose purpose is to provide

reconnaissance and surveillance or obscuration, with a wider array of specialized capabilities, perhaps incorporating capabilities currently found in specialized units, such as technical escort. Another layer of training will be provided to assure that highly specialized force elements in the future Modular Force have the requisite skill sets to counter an increasingly sophisticated WMD threat. Still another layer of training must provide the additional skills required to prepare non-CBRN force elements to recognize items of WMD interest and to take appropriate actions such as reporting, isolating, and securing them. Important elements of the layered training concept:

(a) All Soldiers will receive some training on how to recognize potential WMD materials, equipment, facilities, and precursors, and to report findings and receive instructions on actions that may be required.

(b) All CBRN Soldiers will receive training on how to conduct CWMD missions in the networked environment; how to access feeds from other operational and tactical assets such as unmanned aerial systems (UASs), unmanned ground systems (UGSs), and SOF; and how to use reachback to strategic assets (such as SMEs and satellite imagery).

(c) CBRN units will be trained how to recognize and preserve WMD evidence for later crime scene investigation and attribution.

(d) Military police will be trained to recognize, secure, and protect sites of WMD network activity as a potential crime scene.

(e) CBRN officers and noncommissioned officers will be trained in CBRN battle damage assessment.

(f) CBRN units will cross train with multinational partner forces.

d. Critical enabler 1: NEBC.

(1) The first critical enabler underpinning TRADOC Pam 525-7-19 is the requirement for NEBC, which will provide a network linking tactical to operational to strategic levels. The requirement for NEBC is throughout the Army concept strategy documents and is essential to enable collaborative C2, permit access to the required compartments of information in the GIG, and enable commanders to gain SU needed for effective operations inside the adversary's decision cycle.

(a) NEBC is a major tenet of the future Modular Force. Fully linked networks will result in commanders developing improved SU that will increase the likelihood of successful conduct of their CWMD missions while reducing uncertainty (note that the JICCWMD lists coping with uncertainty as one of its key elements for campaign success). Commanders will use the network to conduct collaborative staff planning and to assure that Army tactical and operational missions align with the orders and guidance.

(b) NEBC provided via the GIG and LandWarNet is essential to enabling the integration of CWMD into the commanders planning and decision cycle at all operational and tactical

echelons. LandWarNet is the Army contribution to the GIG. It includes all globally interconnected, end-to-end sets of Army information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating, and managing information on demand supporting warfighters, policy makers, and support personnel. It includes all Army (owned and leased) and leveraged DOD and joint communications and computing systems and services, software (including applications), data security services, and other associated services. LandWarNet exists to enable the warfight through battle command.

(2) The Army will assist the joint force in identifying opportunities for and effects of counterforce and other CWMD operations by using advanced, highly secure C2 and information networks for collaborative staff planning and information sharing, enabled by state of the art knowledge management (such as fusion, filtering, and others), data analysis, and visualization tools. The networks will provide a horizontally and vertically integrated COP with the following capabilities.

(a) Intelligent, low-latency C2 and information networks incorporating hierarchical, data fusion capabilities to support unified action of all instruments of national and multinational power.

(b) Most active networked CBRN sensors providing near real time detection updates to tailored unit COPs as appropriate.

(c) Access to JIIM assets.

(d) Software tools with advanced predictive algorithms that enable generation of a sensor deployment plan (including disparate sensors) that enhances the likelihood of identifying WMD related targets, especially in support of counterforce operations.

(e) Data fusion tailored to each class and level of COP user.

(f) Data fusion algorithms that effectively reduce uncertainty in the presence of potentially duplicative feeds, diverse feed latencies, and even conflicting sensor feeds.

(g) Adaptive data fusion based on unique mission requirements and decisionmaker styles.

(h) Enhanced COP visualization and decision support tools to provide improved and faster SU.

(i) The above COP characteristics will enable reduced mission planning and execution times, especially for counterforce and active defense missions, and enable more rapid alerts and warnings.

(3) The CWMD decisions and actions at the tactical and operational level may have strategic implications and require strategic level input or approval. A cueing event in the operational environment normally highlights an opportunity to conduct a counterforce operation.

The cueing event could be a change in operational conditions that creates an unanticipated vulnerability in a known WMD network or a change in rogue actor behavior or capability. A BCT's organic reconnaissance and surveillance activities or by U.S. or other military or civilian agencies performing strategic monitoring may detect this cue. The requirement for participation at the strategic level is particularly necessary when a WMD actor achieves or approaches WMD capability because of the increased risk of potentially catastrophic consequences resulting from military operations. Thus, leadership must assess the cueing event against strategic level decision criteria before approving specific CWMD operations. When the available time window of opportunity for the mission is short (as is often the case in WMD interdiction and active defense missions) the C2 network must have low latency from the time the situation is developed at the tactical level until the strategic level decision is returned to the executing unit. Other means to reduce uncertainty of short mission lead times may include special ROE and capabilities to enable rapid planning and conduct of such missions.

e. Critical enabler 2: Leveraged new technologies.

(1) Many of the future capabilities identified in TRADOC Pam 525-7-19 will be possible only through applications of advanced technology. The Army must leverage these new technologies. Revised Federal and DOD acquisition policies and procedures may help streamline the process to move new technologies from the laboratory to the Soldier or even from commercially available items to the Soldier. In addition to computer and communications technologies, several other especially promising new technologies exist.

(a) Unmanned systems could conduct reconnaissance, surveillance, decontamination, and other CWMD related tasks if equipped with an ability to work cooperatively. This would enable them to act as a robot team able to adjudicate task responsibilities in a manner that adapts to dynamic changes in the environment (for example, changing communications connectivity networks as robots maneuver in hilly terrain). Such systems would serve as semi-autonomous members of manned and unmanned teams. Applications of these robot teams could require advanced sensor technologies, constellations of loitering aerial communications relays, advanced sensor fusion algorithms, and other technological advancements.

(b) Nanotechnology advancements could significantly improve performance of certain CWMD related tasks. Potential examples include implantable chemical or biological agent antidote delivery systems to replace injected drugs that cause blood concentrations to rise rapidly (increasing the risk of a toxic response); more sensitive, quicker reacting, and more versatile biological agent detectors; and nanocomposite coatings with embedded antimicrobial agents to protect equipment and uniforms from biological hazards.

(c) Numerous other emerging technologies such as biotechnology may have a significant role in providing enhanced future CWMD capability solutions. Now that scientists have sequenced several genomes, including humans, studies are underway to determine which genetic differences between individuals of a species are the key for predisposition to certain diseases and efficacy of special drugs. This could lead to innovative means of protecting Soldiers and citizens against certain types of WMD attack.

(2) Army CBRN units and others may benefit from new technologies that will make it possible to reduce the time in PPE, reduce PPE performance degradation impact, and reduce the logistics footprint of decontamination operations. Other potential examples:

(a) Faster, more accurate contamination warnings provided early enough to minimize trauma and faster all-clear determinations to preserve the combat ready force and minimize time spent in PPE.

(b) Scalable and tailorable levels of PPE employed to minimize task performance degradation while providing a protection level matched to the actual threat (as determined by improved detection capabilities).

(c) Smart PPE that indicates where it is contaminated.

(d) Use of unmanned systems for missions in hazardous environments, such as decontamination operations and reconnaissance in confined spaces.

(e) Faster, more efficient, less labor-intensive decontamination to reduce operational downtime.

f. Critical enabler 3: Enhanced training.

(1) Leadership education and training that prepares leaders to exercise sound judgment in the analysis of data and information, to understand the impact on operations of various cultures in the region, and to act in periods of uncertainty is just as important as the NEBC environment to the objective of gaining SU.

(2) New technologies to enhance training will be required to help identify, at the individual Soldier level, the best combination of ways to present material to enhance learning. When refresher training is needed, or new training for which there is not sufficient time in an institutionalized program of instruction, Soldiers will use portable systems to conduct self-paced learning and to link to learning assessment tools to determine their level of mastery and the areas where they need additional study. These same portable training systems may incorporate data sets and automated tools that Soldiers can use during operations to enable identification of potential WMD materials and equipment, help them execute a series of steps required in using advanced equipment, provide an en route mission rehearsal tool, or assist in other difficult tasks. These systems should be capable of tailoring their interface to the Soldier based on individual Soldier learning styles and levels of existing competency.

4-5. Vignettes

a. TRADOC Pam 525-7-19 presents three vignettes to illustrate this CCP's key ideas and demonstrate how the concept supports derivation of required capabilities. The vignettes are built upon the foundation of the ARCIC approved multilevel scenario module 1. Multilevel scenarios aid in the development of future system requirements. Use of scenarios is not intended to restrict innovative thinking about a wide range of possible future threats and desired capabilities. A

scenario depicts a major combat operation against an opposing force capable of conventional and asymmetric operations. It uses fictitious countries to avoid political sensitivities often associated with naming real countries and organizations as scenario adversaries or allies.

b. The multilevel scenario adversary country is Attica. U.S. forces and allies conduct simultaneous full spectrum operations to swiftly defeat an Attican corps attack against a neighboring country in 2014. The Attican objective is to gain regional dominance by asserting its conventional and unconventional military strength. Attican forces have been equipped, trained, and prepared to conduct operations with modern military technology across the entire spectrum of conflict.

c. Coalition forces conduct a multiple corps offensive over several terrain categories including mountains, open desert, and urban areas. The scenario focuses on the operations of one of the fictitious corps. In multilevel scenario documentation, the military objectives for coalition forces include elimination of Attican CBRN production and use capability.

d. The multilevel scenario is designed to be a flexible tool, so the scenario documentation identifies several scenario parameters which can be varied within a specified range according to the situations analysts want to examine in their effort to derive or illustrate the use of required capabilities. In the case of the vignettes presented, scenario parameters were modified within allowed ranges. The parameters include, the terrain, which is urban operations; the military objective, which is the removal and neutralization of WMD threats; and adversary CBRN capability: Attican has the ability to employ weaponized chemical agents, although agent release in the vignette is caused by collateral damage from a friendly airstrike against a suspected Attican chemical agent storage site; and missions, which includes WMD CM operations.

e. One of the key aspects of the Army mission in the scenario is to neutralize Attican CBRN capability. One of the key tasks in achieving that is to exploit and neutralize that capability.

f. Shape and enter operations vignette.

(1) The future Modular Force is conducting shape and entry operations to prepare for possible military operations against an enemy known to possess a WMD capability during the 2015–2024 timeframe. The JFC leverages all available assets to assess the enemy's WMD capability and gain SU before committing units to the area of operation. This requires interoperability between CBRN assets and other intelligence assets plus networking of these assets to populate the COP with accurate and timely information. This includes accessing data from strategic assets such as satellites and airborne warning and control systems, operational assets such as UAS, and SOF to identify CBRN areas of interest (figure 4-1).

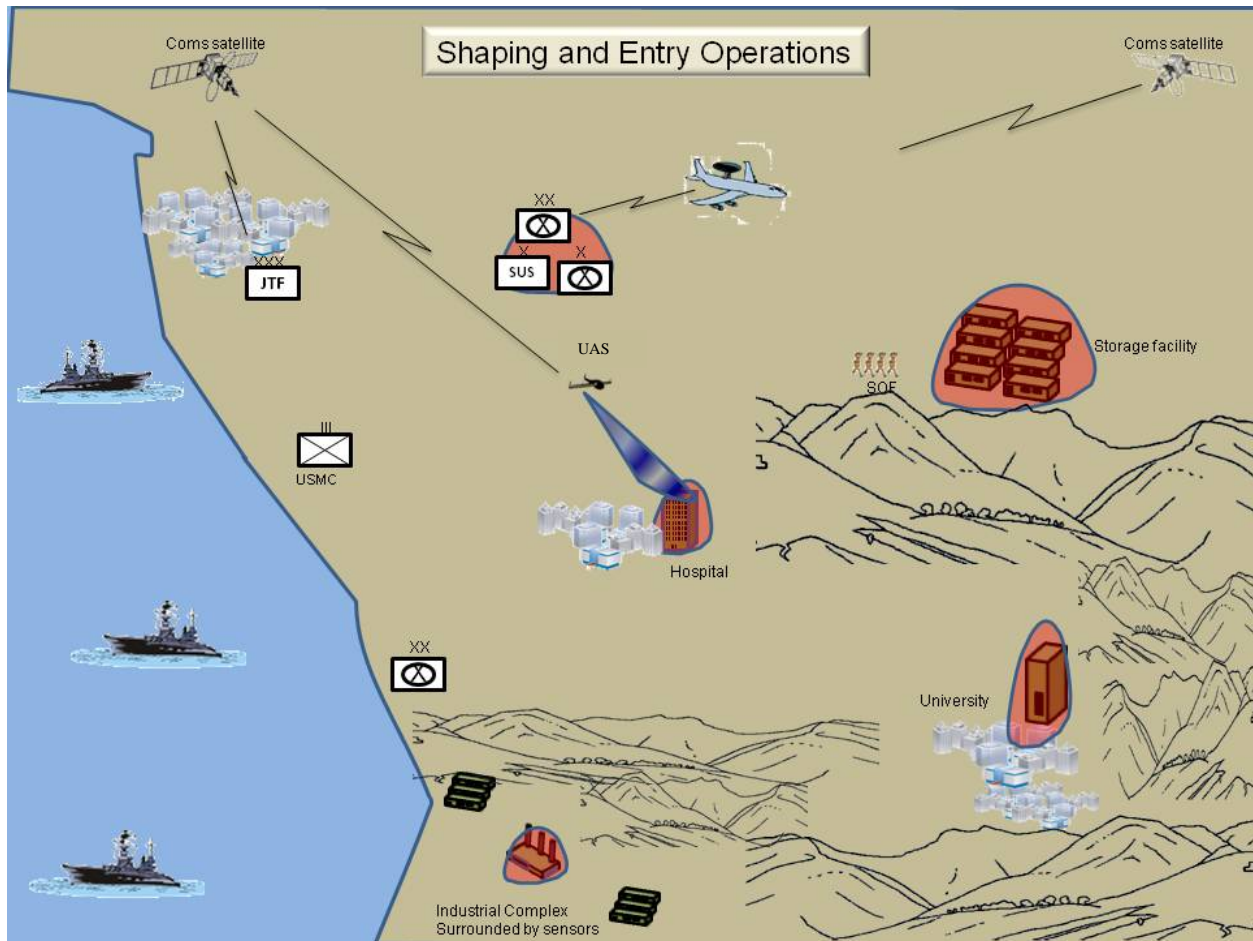


Figure 4-1. Strategic and Operational Assets

(2) These assets are capable of cueing certain CBRN capabilities. CBRN staff advises the JFC on the capabilities and employment of CBRN assets, including UAS and UGS, and on the deployment of an array of layered sensors, networked to the COP that provide persistent surveillance of CBRN areas of interest throughout the area of operation (see figure 4-2). The JFC uses other means to deploy the unmanned sensors, as well. The deployed sensors have the capability to detect a wide range of CBRN agents and TIM that pose a threat to friendly forces. The networked sensors are small, hard to detect, and capable of remote activation (for example, staff turns off sensors to conserve energy and to reduce signature when not needed).

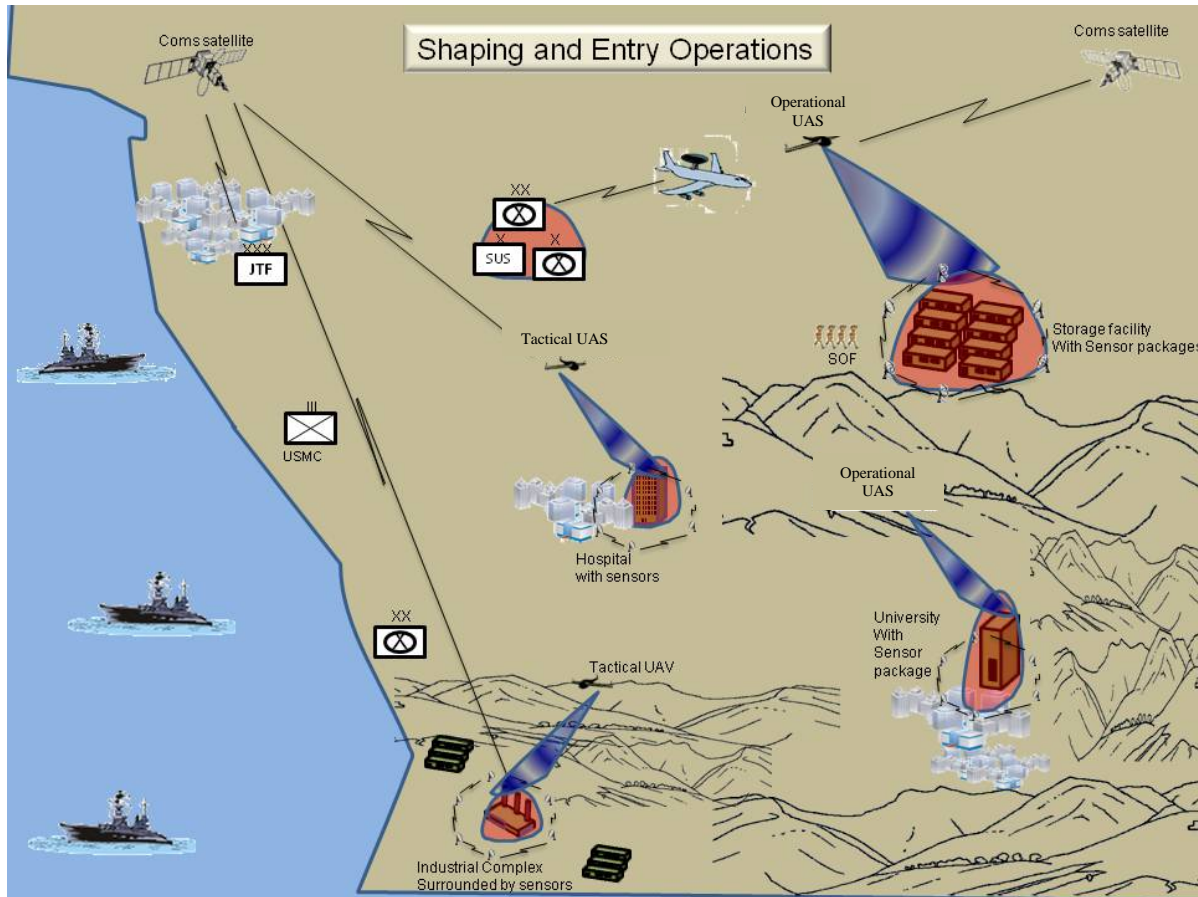


Figure 4-2. Deployment of Unmanned CBRN Sensors

(3) Upon detection of a CBRN agent, other assets are deployed to interrogate the area of interest to verify and identify the agent. CBRN assets available to the JFC include tactical unmanned aerial vehicles with visual and CBRN detection capability, ground platforms with visual and CBRN sensors, manned reconnaissance systems with point and standoff detection capability, and a dismounted reconnaissance capability (figure 4-3).

(4) When sites or activities are determined to be possible WMD threats, JFCs may determine one of several missions (elimination, interdiction, offensive operations) is required. Where WMD sites are not confirmed before combat operations begin, areas of interest are identified for further monitoring or avoidance during combat operations.

(5) This future force is well trained and equipped to identify WMD threats within the planned area of operation before transitioning to decisive operations. These collective assets help the JFC achieve CBRN threat SA across the area of operation, which leads to optimal resource allocation to develop SU. This reduces risk to the forces during combat operations.

(6) Despite the emphasis on preventing force exposure to WMD through actions associated with the first six of the eight NMSCWMD mission areas, the JFC must possess capabilities to prepare for and execute passive defense and CM operations.

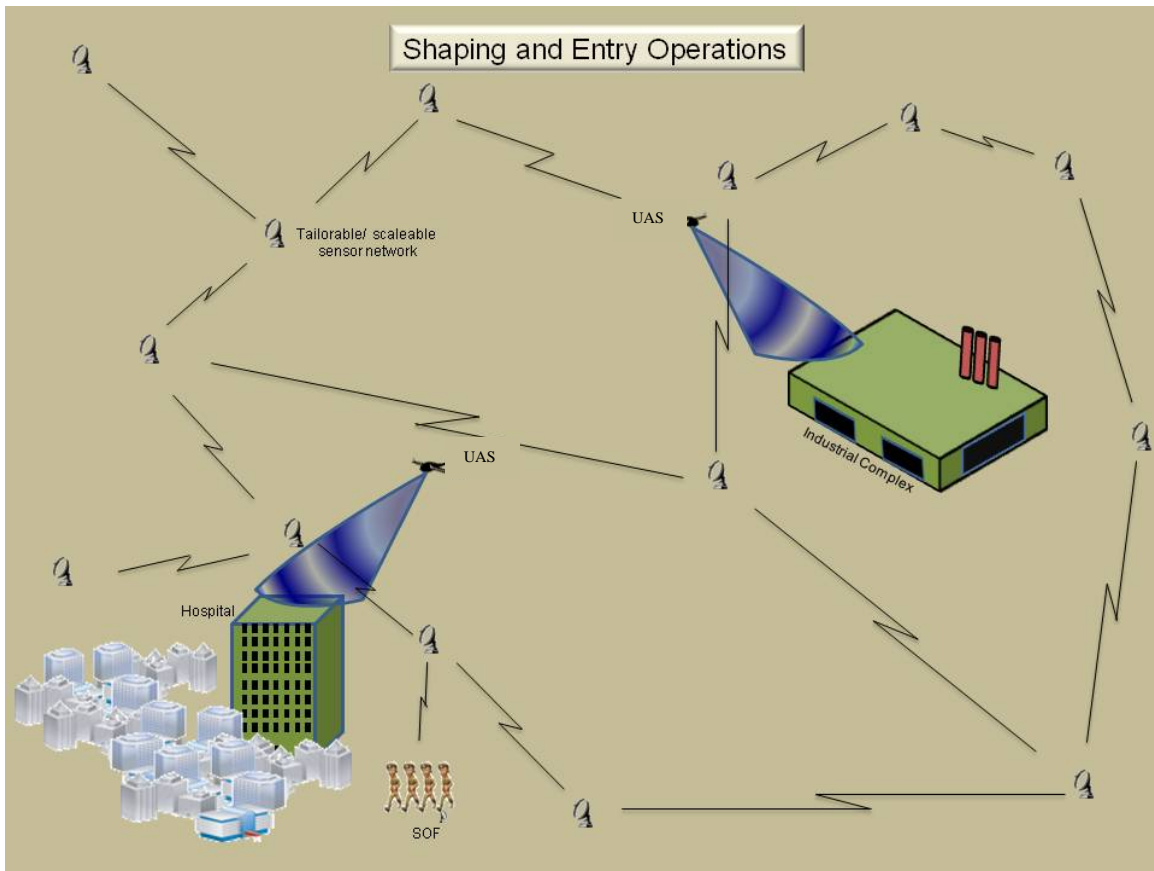


Figure 4-3. Cueing of Reconnaissance Assets

g. Sensitive Site Assessment and Exploitation Vignette

(1) Continued industrialization has resulted in the accumulation of an intellectual and manufacturing capability to produce WMD. There are numerous industrial plants and medical laboratories with capabilities to function in a dual-use capacity, producing chemicals and medicines for commercial purposes and at the same time producing weapons grade chemical and biological agents.

(2) The JFC develops SA using integrated and networked information systems that allow reachback to access information from strategic intelligence assets, such as satellite imagery and intelligence information from other Federal agencies, and leveraging of available operational (UAS and SOF) and tactical intelligence gathering assets (such as, UGS). Analysis of this SA has produced a list of areas of interest that may produce or store WMD weapons or delivery systems. One of these sites is an industrial complex that manufactures and stores industrial chemicals including fertilizers and pesticides. Intelligence has confirmed that this plant has the expertise and potential to operate in a dual-use mode. Prior to initiating combat operations U.S. and allied forces detect increased levels of activity at the plant. Traffic, especially cargo vehicles, increases significantly. While the cargo traffic appears to be primarily of a commercial nature, the JFC is still concerned that this could be the enemy's way of disguising their intentions. An additional indication of the plant's military use is the presence of some military troops and lightly armored vehicles.

(3) Once hostilities begin, enemy forces retreat north of the city from their positions just south of the city. This leaves the city and the industrial site without a visible military security force. Elements such as a pre-established CBRN headquarters are attached to the future Modular Force and are selected to conduct sensitive site assessment and exploitation. They move in with military police security forces to interrogate the industrial site. Intelligence gathered from tactical unmanned aerial vehicles indicates that workers are still entering and exiting the site regularly. The team surrounds the facility, detains personnel attempting to enter and exit, and establishes a decontamination site upwind of the facility. Interrogation of workers fails to reveal if the facility is used for military purposes.

(4) The team decides to order the workers to vacate the facility. Workers determined to have a position of authority or who arouse suspicion through their actions are detained and interrogated. Not knowing exactly what danger is still present inside the site (such as TIM, booby traps, snipers, and others) the sensitive site exploitation, sensitive site assessment team, and elements of the security force approach the site cautiously. The team dispatches a small UAS carrying a suite of CBRN and visual sensors to loiter over its target area to canvas the site. This UAS will rapidly investigate this large compound because of its speed and ability to loiter while having the payload capacity to carry visual as well as CBRN sensors. The team also uses unmanned ground platforms, which are slower but have the capacity to carry heavier payloads and can enter buildings. These unmanned ground platforms carry visual and CBRN sensors and can identify a wide range of CBRN agents, including TIM. Additionally, they can take liquid, solid, air, and soil samples. These systems enable the team to interrogate the site without putting friendly troops at risk (figure 4-4). These actions allow the security forces to limit the time they must wear PPE and allow the team to tailor its protective level to meet the demands of the task. Those not in the immediate vicinity of the manufacturing facility wear a PPE ensemble that is lightweight, less encumbering, and allows much greater dexterity.

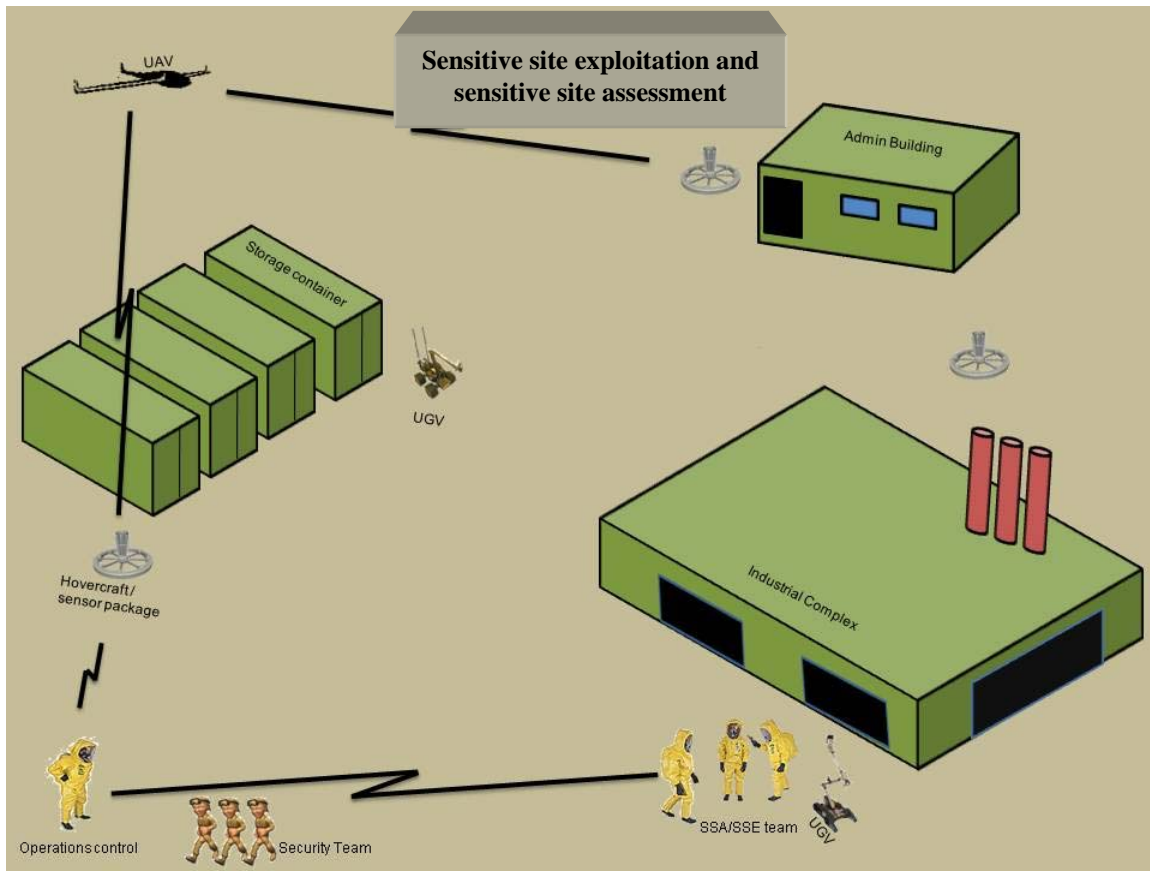


Figure 4-4. Initial Sensitive Site Assessment

(5) After interrogating the site with the unmanned systems without detecting any hazards on the exterior of the facility or the presence of enemy combatants, the team decides to move onto the site in their manned reconnaissance systems. Once on site, the team uses UGS to enter buildings to check for CBRN agents and other hazards. Employing UGS visual sensors, the team examines the labeling on containers. Some are labeled in the host nation language, some in English, some in yet other languages, and some are not labeled at all. The CBRN detectors on the UGS record indicate the presence of toxic chemicals, so the team moves into the manufacturing and storage area in level A protective equipment. The team takes readings from containers to validate markings and from areas where chemicals have been spilled. They use their reachback capability to obtain translations of the non-English labels. Finally, they take samples of any toxic substances that appear to have been manufactured or stored that could potentially be used for military purposes (figure 4-5).

(6) Others elements of the team investigate the administrative area in a lesser level of protective posture because when the UGS were sent into that area they did not detect any toxic substances or an oxygen deficient environment. The PPE ensemble consists of lightweight outer garments that change color when exposed to toxic chemicals and other toxic materials and that permit greater maneuverability and dexterity. This PPE enables the team to operate more freely while photographing and collecting documentation. When needed, the team uses its reachback capability to clarify issues or translate documents allowing the team to take only documents that appear to have intelligence value.

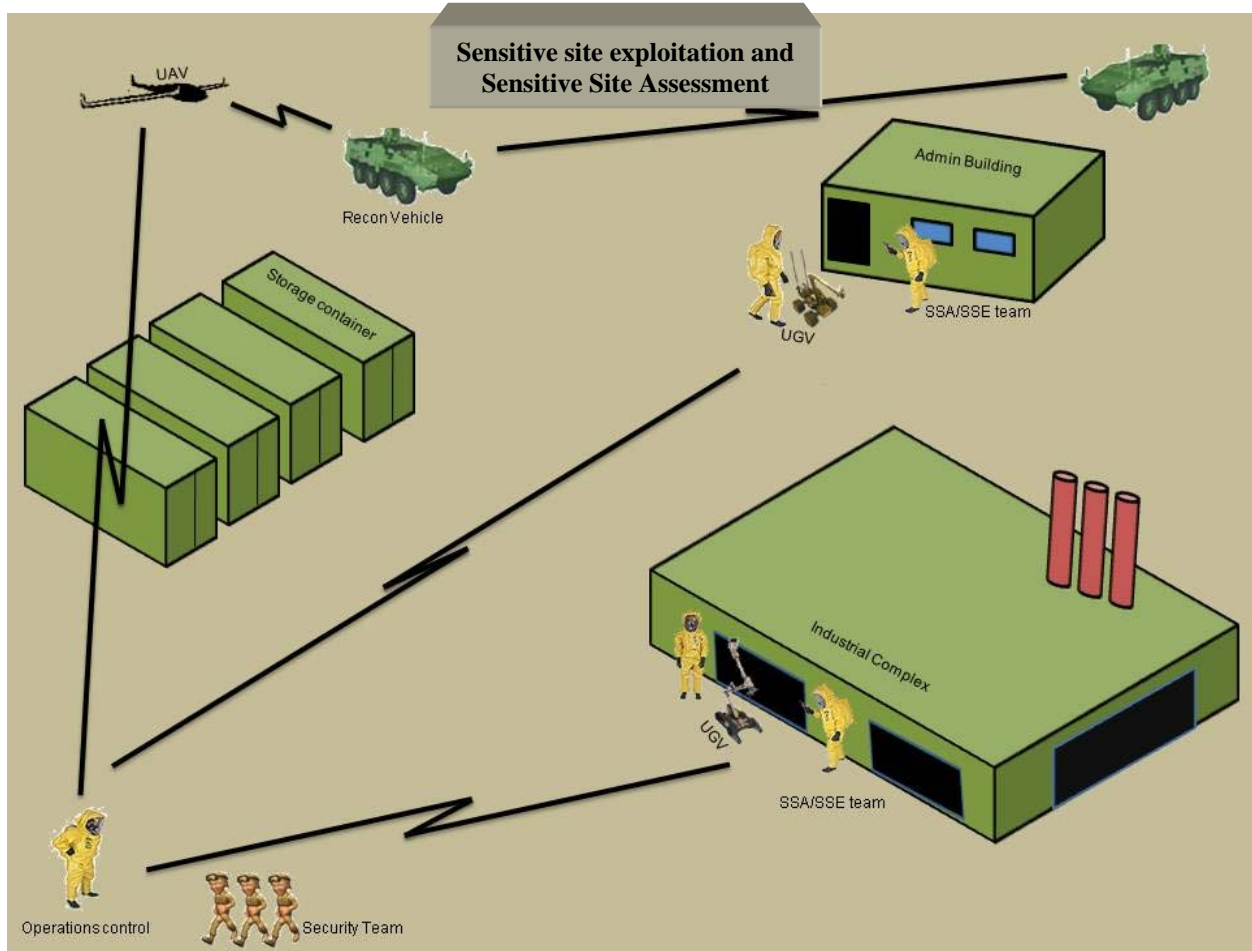


Figure 4-5. Site Exploitation

(7) Finally, the sensitive site exploitation and security teams conduct actions to ensure that the facility cannot resume manufacturing activity for a specified time. Actions taken include securing the manufacturing facility site with anti-intrusion and CBRN sensors, securing all buildings, securing or removing equipment essential to the manufacture of chemical agents, and destroying or removing agent precursors. This is done without causing excessive or permanent damage to the facility, so that it can eventually be returned to its original purpose of manufacturing fertilizers and pesticides for peaceful purposes (figure 4-6). (These actions are considered an offensive operation under the NMSCWMD definition, for example, destroying an enemy’s WMD capabilities, “may happen at any time, across the spectrum of conflict.)

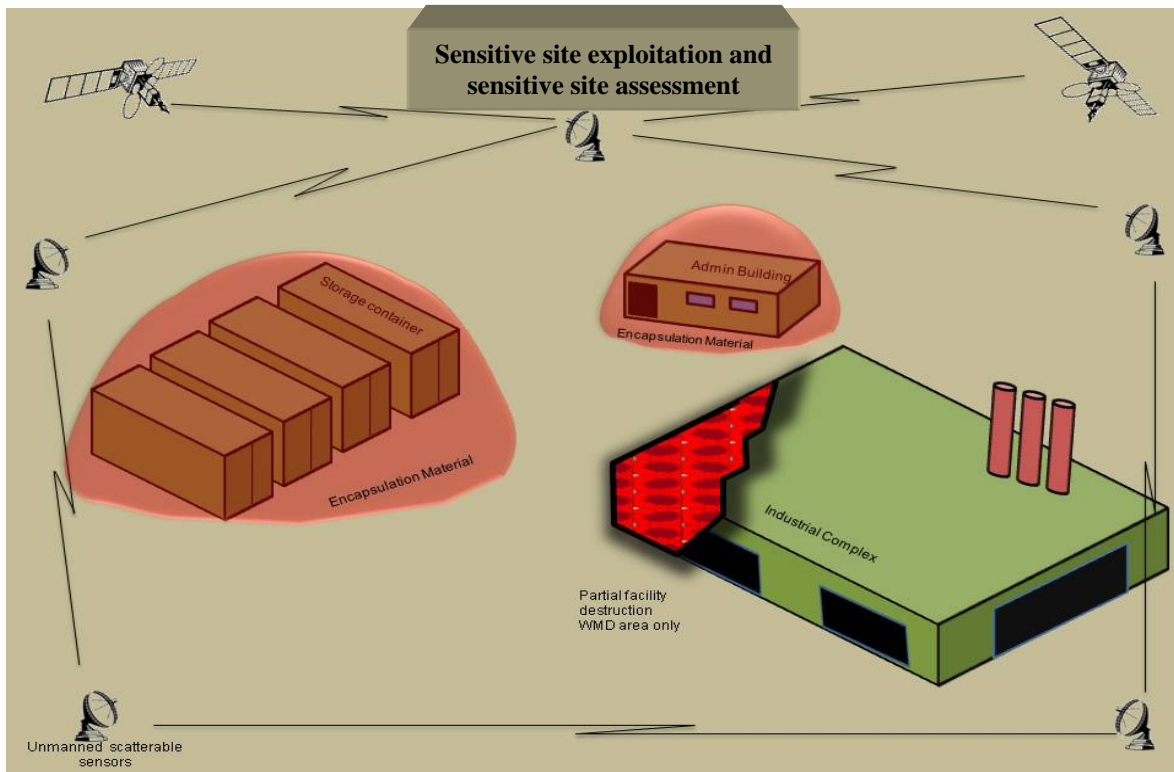


Figure 4-6. Site Security

h. Foreign CM vignette.

(1) As U.S. and coalition forces gain success in restoring the international border with Attica, Attican unconventional forces conduct cross-border operations in an adjacent third country not currently involved in the regional conflict. The intent of these actions is to instill fear and doubt in the U.S.' ability to enforce regional stability, increase pressure on the uninvolved country government to openly oppose the U.S., and create a cross border safe haven from which Attica can conduct attacks against U.S. and coalition forces.

(2) The third country has long been suspected of possessing a limited WMD research and manufacturing capability. This country has cooperated with various nongovernmental organizations to receive refugees and provide medical care at a major medical complex near the international border. Intelligence identifies this major medical complex as an area of interest for possible WMD activity. Movement of casualties into and out of the hospital confirms it is being used as a medical treatment facility. However, of more concern is activity at a laboratory and storage buildings nearby. The future Modular Force commander determines based on intelligence gathered from all available sources, that the laboratory and storage facility pose a potential WMD threat to nongovernmental organizations and indigenous civilians because of the military activity in and around those facilities. The laboratory complex is attacked with several small explosive devices apparently intended to produce collateral damage by releasing WMD material. The release of WMD material is intended to accomplish the Attican objective of discrediting the U.S. ability to provide stability to the region as well as force an open confrontation between the third country and the U.S. by exposing that country as a WMD actor.

(3) U.S. diplomatic engagement is successful and the third country requests U.S. assistance in dealing with the aftermath of the Attican attack.

(4) Post-attack battle damage assessment begins with operational and tactical aerial assets photographing the site to determine the extent of damage. The UAS serving as CBRN and visual sensor platforms are deployed to determine if there are signs of WMD contamination. Sensor data indicates the likelihood of hazardous levels of TIM present in and around the medical complex.

(5) Using this data, the CBRN staff members develop a plan to conduct foreign CM operations in the vicinity of the medical complex. It is imperative to mitigate the hazards and return the hospital to operational status as soon as possible because the hospital is the largest and most modern medical facility in the city. This will require decontamination of the hospital's interior.

(6) Third country (now a host nation) forces move in to provide security, followed by engineer and civil affairs units with missions to restore basic utilities and reestablish a degree of governmental control. CBRN units enter to conduct reconnaissance and surveillance and assist the medical team in analyzing safety of the water supply and critical facilities, such as medical facilities. With the threat of snipers, suicide bombers, booby traps, and other hazards in the medical complex, the CBRN team conducts reconnaissance and surveillance operations using UASs and UGSs. Both aerial and ground systems have both visual and CBRN detection capabilities. The UAS have the capability to move about the area quickly or hover yet are also able to land when necessary to employ short range sensors or to take samples for analysis to determine presence of CBRN agents. After mapping the contamination in and around the medical complex, ground robotic systems are sent inside the buildings to check for damage, casualties, enemy combatants, contamination, and other threats (figure 4-7).

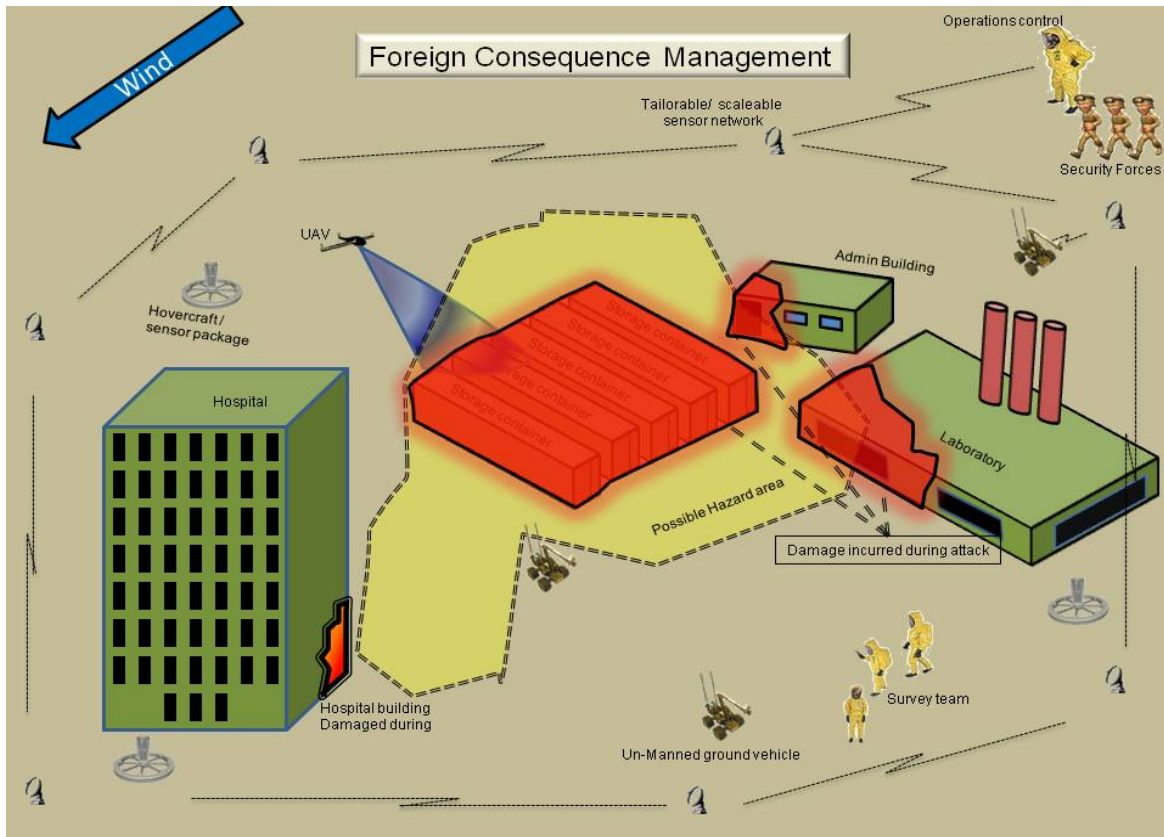


Figure 4-7. Reconnaissance and Surveillance Operations at the Medical Complex

(7) This reconnaissance reveals that patients, medical staff, and what appear to be injured enemy soldiers are still in the hospital. Some windows nearest the explosions are shattered, and there are indications that chemical contamination may have spread into the hospital interior. After locating and identifying the hazards, the team develops a plan to evacuate personnel from the damaged and contaminated areas and to initiate decontamination operations in those areas most critical to restoring medical services and eliminating risk to those still within the building. In cooperation with the security, engineer and medical teams, they develop a plan to allow the medical staff to continue to operate in the designated safe sections of the medical facility. Mobile unmanned decontamination platforms are sent into the areas of the hospital that were damaged by the explosions. After assessing contamination within the damaged sections of the hospital, a CBRN reconnaissance team in appropriate PPE enters accompanied by security personnel to provide protection in the event of hostile activity.

(8) After determining that there are no enemy combatants remaining in the hospital, occupants are evacuated from the vicinity of the damaged areas. A unit with the capability to assess, decontaminate personnel, equipment and facilities moves in to assess the extent of contamination within the hospital. To prevent spread of contamination throughout the building, the team quickly seals off contaminated interior portions of the hospital, to include return vents for the heating and cooling system. During the decontamination operation, items that cannot be decontaminated (such as, curtains and cloth and vinyl furniture) are removed from the facility. The decontaminates used require little or no water, are environmentally friendly, and are capable of decontaminating sensitive equipment such as electronic components. Once the facility is

decontaminated, the team positions small remote networked sensors throughout the facility to alarm if a hazard is detected (figure 4-8).

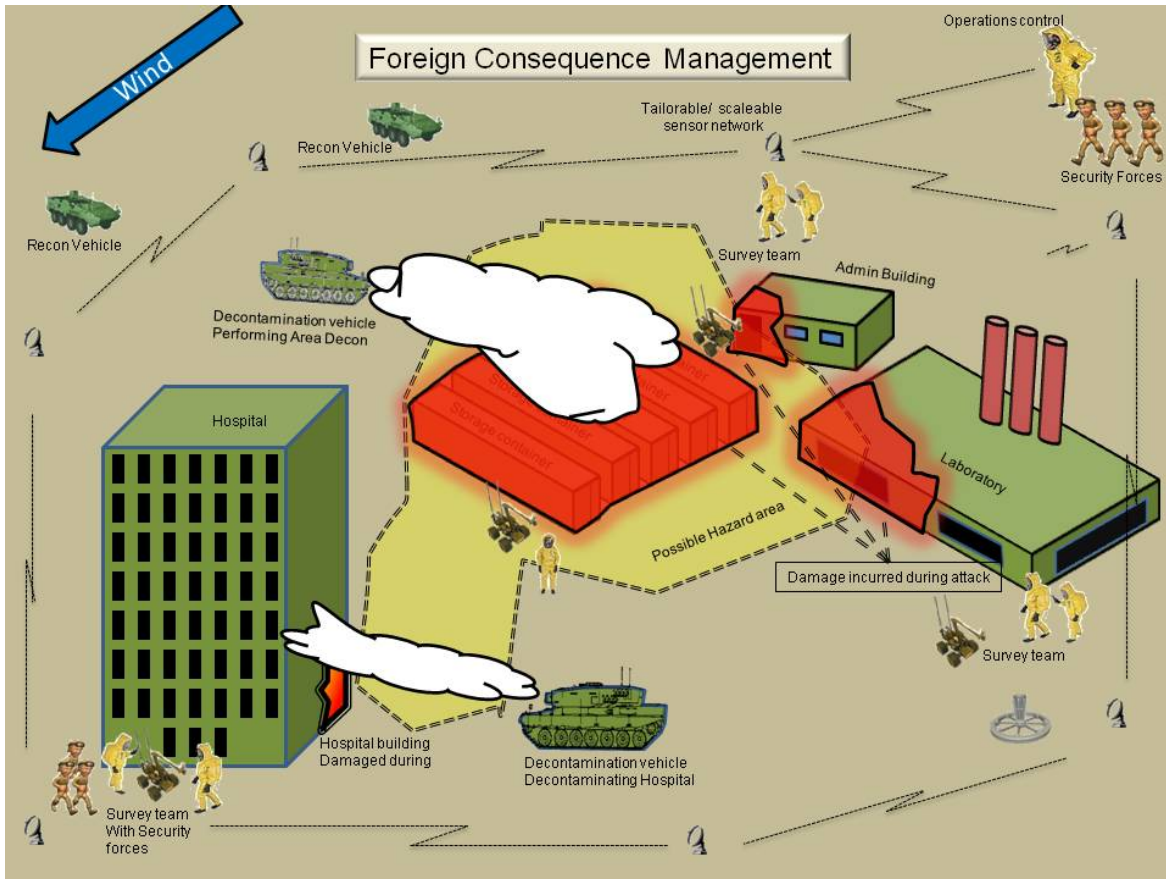


Figure 4-8. Decontamination Operations at the Medical Complex

(9) Once the medical facility is cleared, the decontamination team, in coordination with a forensics team, investigates the laboratory, which has received some damage, but is still structurally intact. The storage area was destroyed in the attack and the remaining rubble and surrounding area are potentially contaminated. This required the forensic teams inspecting the debris to be in appropriate protective gear while gathering evidence to include WMD material identification, deoxyribonucleic acid samples, and fingerprints, which are processed in accordance with crime scene protocol and used to populate an integrated information system to help establish attribution for the attack. Suspected WMD equipment is photographed and samples of all hazardous agents and documentation are collected before beginning decontamination operations.

(10) A CBRN unit with the capability to transport WMD forensic evidence receives all samples collected during the mission and coordinates with the forensics team before evacuating the samples. Once decontamination operations are complete, the area is marked accordingly and remote networked security and CBRN sensors are placed around selected areas of the medical complex (figure 4-9). With the full cooperation of the host nation government all equipment and materials suspected of being used to manufacture WMD are destroyed, secured or removed from the area (threat, reduction, and cooperation). The CBRN team executes an area decontamination

and remediation mission in order to ensure that no contamination remains in and around the medical complex in order to prevent civilian casualties and the further spread of contamination.

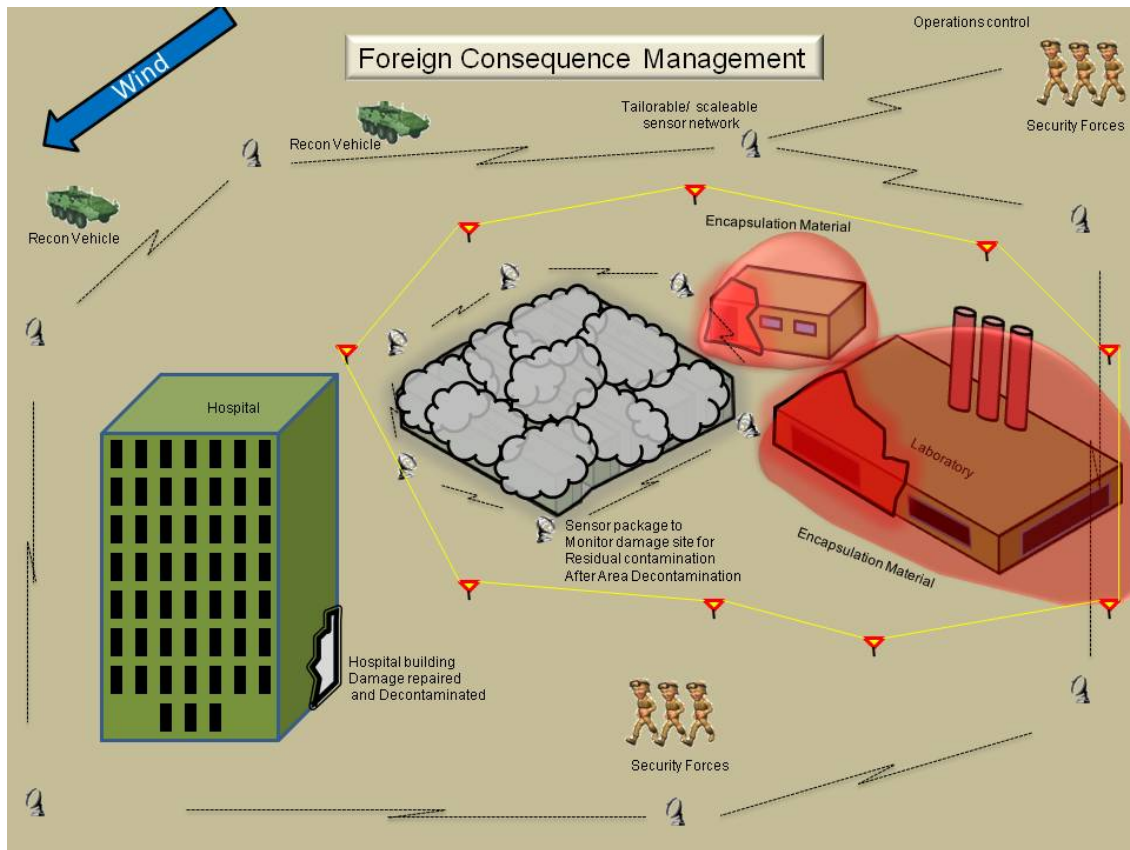


Figure 4-9. Site Secured

Chapter 5 Required Capabilities

5-1. Capability Statement Template

a. This chapter presents the results of the analysis that identified the future capabilities required to enable the CWMD concept. *Chairman of the Joint Chiefs of Staff Instruction 3010.02B, Joint Operations Concepts Development Process* defines a capability as the ability to achieve a desired effect under specified standards and conditions through combinations of means and ways to perform a set of tasks. The TRADOC CCP Writer's Guide further requires that a complete capability statement must address four elements--who, the organization requiring this capability; what, the main idea of the capability; where and when, the operating environment in which the capability will be required, and why, the reason or purpose for this capability.

b. The who element of a required capability statement is provided in terms of the echelons or units for which the capability is required. Since the focus of TRADOC Pam 525-7-19 are the tactical and operational levels of the operating and generating forces, this chapter lists

capabilities required by at least one of those three elements of the force. However, all echelons requiring a capability that is listed are identified. The echelons or force elements that are included are national, strategic, operational, tactical, CBRN tactical units, medical units, and the generating force.

5-2. CWMD Requirements Taxonomy

Using the functional concept framework and its resultant solution synopsis and key ideas, plus other sources, such as existing concepts and studies, discussions with SMEs, and suggestions made during the course of the CBRN and Army support to civil authorities seminars, the ICDDT generated a list of several hundred required capability statements for this CCP. The team then applied the conceptual framework of the Army functional concepts to aggregate and consolidate closely related capabilities into a manageable set of more detailed statements. These required capabilities are presented below.

5-3. Required Capability Statements

a. Table 5-1 organizes the required capabilities according to the functional concepts that they primarily satisfy and the key ideas which are critical to their fulfillment. In most cases, required capabilities apply to multiple functions.

b. CWMD required capabilities entries are encoded in the **who** column, see table 5-1. This column provides the echelons at which the capability is required. The single letter echelon abbreviation codes are: G (generating force (all)); M (medical units (operating force; tactical)); C (CBRN specialized units (operating force; tactical)); T (tactical units (operating force units; BCT equivalent for constructive visualization purposes)); O (operational units (operating force units; division equivalent for constructive visualization)); S (strategic); and N (national).

**Table 5-1
CWMD Required Capabilities Binned By Army Function**

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
1	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	Proactive NEBC	C, T, O, S, and N	Receive and contribute to JIIM real-time intelligence with linkages from tactical to national strategic levels to produce real time intelligence and SA.
2	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	Proactive NEBC	C, T, O, S, and N	Obtain comprehensive, high-fidelity intelligence regarding the operational environment WMD threat, situation, key individuals and networks, buildings (including interior rooms) and other infrastructure in all terrain categories, including urban, to support vulnerability assessments, mission planning, strike target selection, and the planning, rehearsal and conduct of operations in order to protect the force.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
3	TRADOC Pam 525-3-3, Battle Command	Proactive NEBC	C, T, O, S, and N	Conduct collaborative CWMD planning among command echelons and conduct cooperative CWMD operations with involved commanders in order to improve mission planning and maximize operational effectiveness.
4	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	Training	G	Collect and provide CBRN and TIM lessons learned and attack and release information to assist mission planning and development of doctrine and tactics, techniques, and procedures.
5	TRADOC Pam 525-3-3, Battle Command	Training	G	Enable trainers and training developers to work collaboratively in a distributed environment and provide the necessary tools to enable them to rapidly develop training tailored to individual or unit needs.
6	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See TRADOC Pam 525-3-4, Strike; TRADOC Pam 525-3-5, Protect TRADOC Pam 525-3-6, Move;	Training	G	Provide training tools based on an improved understanding of how trained skills of varying complexity degrade over time as a function of frequency of use, mode of training, initial student preparation and aptitude, and other important factors to enable determination of how, when, and where to more effectively and efficiently deliver training and performance support tailored to individual or unit needs.
7	TRADOC Pam 525-2-1, See	NEBC	C, T, O, S, and N	Incorporate full spectrum of cross-linked CBRN sensors, detectors, analyzers, and classification devices in manned and unmanned ground and aerial vehicles networked with reference library databases, COP, and GIG intelligence databases and provide near real-time graphics displaying contamination and other collected WMD intelligence in order to protect the force.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
8	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	Proactive Layered NEBC	C, T, O, S, and N	Employ a layered array of sensors, in conjunction with other information systems intelligence, surveillance, and reconnaissance (ISR) assets, to provide CBRN WMD intelligence updates of adversary WMD networks in near real time. This includes a requirement for sensors to remotely detect and identify CBRN hazards at locations not occupied by friendly forces to enable contamination avoidance. Sensors must detect at a distance via long detection range and an ability to be emplaced as part of a sensor array remotely. They must be networked to the COP and provide detection and non-detection status to fuse with other information to enable SA and SU. Sensor arrays should include disparate (non-CBRN) sensors and sources when disparate sensor source data produces a synergistic improvement to CBRN sensor data -- such as providing increased confidence in an assessment. These capabilities are required in order to enable force warnings, mission planning, SU, and force protection. They also enable tactical commanders to focus organic ISR in areas it is most needed.
9	TRADOC Pam 525-3-3, Battle Command	Proactive NEBC	O and S	Execute a JOA plan that effectively combines coalition and non-U.S. force responsibilities, measures, and assets for WMD CBRN and TIM detection, warning, and protection, as well as network and CBRN data sharing protocols in order to enable improved C2 and to protect the force. The plan must address the procedure of providing access to and allocation of CBRN information systems ISR assets and access to protection assets for eligible civilians.
10	TRADOC Pam 525-3-3, Battle Command	Proactive	T, O, S, and N	Determine CBRN threat intent and predict when, where, and how the enemy may perpetrate a WMD attack before it happens to assist in mission planning and targeting processes.
11	TRADOC Pam 525-3-3, Battle Command	NEBC	C, T, O, and S	Be linked, in near real time, to data on the battle command network that provides knowledge of current and planned joint, service, and agency collection activities in the operating environment in order to promote unified action.

Requirement	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
12	TRADOC Pam 525-2-1, See; TRADOC Pam 525-3-5, Protect; and TRADOC Pam 525-3-6, Move	NEBC	C, T, and O	Detect CBRN hazards and provide warnings to units, crews, and Soldiers before they encounter contamination. Warnings should be frequently updated to predict, by time interval, those areas in the JOA that will be subject to contamination. Warnings should be networked to enable tasking of specialized CBRN and medical assets. The COP should include CBRN release impact assessments. This capability is required to protect the force.
13	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-3-5, Protect	Training	C, T, and O	Support the Department of State Coordinator for Foreign CM to protect lives, property, and information in order to conduct successful foreign CM missions.
14	TRADOC Pam 525-3-3, Battle Command	Proactive Layered Training	C, T, and O	Participate in military to military CBRN training exercises and small unit exchanges in support of theater security assistance and regional engagement objectives. This includes training indigenous police and military forces in CWMD operations when appropriate. This capability is required in order to maximize operational readiness, foster CWMD interoperability, reduce U.S. Army force requirements, and deter adversaries.
15	TRADOC Pam 525-3-3, Battle Command	Proactive	C, T, O, and S	Monitor combatant command designated activities within the JOA for compliance with CBRN treaties or elimination requirements in order to support unified action.
16	TRADOC Pam 525-3-3, Battle Command	Proactive NEBC	C, T, O, S, and N	Access and analyze data on the battle command network that enables prediction of likely CBRN events/incidents in the JOA in order to protect the force, prioritize intelligence collection, and assist in network targeting.
17	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	NEBC	C, T, and O	Access an editable COP providing locations of contaminated and cleared areas in order to provide SU to guide CM mission planning, maneuver planning, and to protect the force.
18	TRADOC Pam 525-3-5, Protect, and TRADOC Pam 525-3-6, Move	Technology	T	Conduct military operations in a CBRN WMD environment with minimal performance degradation due to impaired flexibility in maneuver and dexterity caused by cumbersome PPE. For mounted crews, operate and fight in and through a full spectrum of CBRN hazards with no performance degradation in order to enhance mission performance and protect the force.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
19	TRADOC Pam 525-3-5, Protect, and TRADOC Pam 525-3-6, Move	Technology	T	Use platforms with the ability to rapidly negotiate rubble that can detect and rapidly mark or defeat, clear, reduce, and neutralize CBRN and TIM hazards in the JOA, while on the move, in order to protect the force and maintain freedom of maneuver and action.
20	TRADOC Pam 525-3-5, Protect	Technology	G	Quickly exploit emerging technologies that can provide CWMD solutions via interaction with research and development operations in order to protect the force.
21	TRADOC Pam 525-2-1, See, TRADOC Pam 525-3-5, Protect	Training	G	Provide platforms for CWMD operations that have an embedded modeling and simulation capability suitable for both training and operations in order to improve force effectiveness.
22	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	Proactive Layered NEBC	C, T, O, and S	Act on cues from networked strategic and operational level intelligence assets providing pervasive (with no dead spaces) and persistent surveillance of enemy WMD capabilities as well as targets of opportunity to detect, identify, and seize, interdict, or eliminate CBRN materials, weapons, components, storage sites, and operational WMD deployment and employment to protect the force and assist mission planning. This includes, when required, a capability to eliminate an adversary capabilities only for a period of time rather than permanently.
23	TRADOC Pam 525-3-4, Strike	Proactive	C, T, O, and S	In WMD elimination and offensive operations, incapacitate or destroy enemy WMD operational capabilities such as industrial sites (or parts of industrial sites) or clandestine biological agent producing laboratories being used for rogue WMD purposes in order to deny a capability for the enemy to use WMD. When necessary to restrict collateral damage, this capability should be provided via a nonlethal means.
24	TRADOC Pam 525-3-5, Protect	Technology	C and T	Conduct recovered chemical warfare material operations in order to remove potential hazards.
25	TRADOC Pam 525-3-3, Battle Command; TRADOC Pam 525-2-1, See; and TRADOC Pam 525-3-4, Strike	NEBC	C, T, and O	Detect, identify, and track ground-based CBRN WMD delivery systems during the time after the delivery system is launched towards its target and before it arrives at its target to enable active defense. This implies a required capability to distinguish CBRN payloads from conventional payloads. This capability is required to protect the force.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
26	TRADOC Pam 525-3-3, Battle Command; TRADOC Pam 525-2-1, See; and TRADOC Pam 525-3-4, Strike	NEBC	T, O, S, and N	Defeat ground-based delivery of WMD while the delivery system is en route by destroying, disrupting, or neutralizing the attack while negating or minimizing primary and collateral damage effects to protect the force.
27	TRADOC Pam 525-3-5, Protect, and TRADOC Pam 525-4-1, Sustain	Proactive NEBC	T and O	Maintain electronic systems architecture and function regardless of CBRN exposure or decontamination processes required to remove or neutralize contamination.
28	TRADOC Pam 525-3-3, Battle Command; TRADOC Pam 525-2-1, See; and TRADOC Pam 525-3-5, Protect	NEBC Technology	C, T, and O	In both safe and hot zones following CBRN and TIM attack or release, plan, prepare, coordinate, and conduct CBRN WMD CM operations that open lines of communication for military assistance; search for, recover, decontaminate and treat, and evacuate casualties; perform reconnaissance, survey, and sampling operations; and assess effects of WMD in order to protect lives and property. When directed, this includes support to SOF operations.
29	TRADOC Pam 525-3-5, Protect, and TRADOC Pam 525-4-1, Sustain	Technology	C and T	Minimize Soldier risk and labor in decontamination operations; minimize dependence on scarce resources; minimize harm to sensitive equipment caused by decontamination agents; and apply decontamination effort only to contaminated surfaces and volumes in order to minimize decontamination logistics burden and to protect the force.
30	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	NEBC Technology	O, S, and N	Rapidly detect WMD shipments within (and transiting) the JOA and update the COP in order to protect the force.
31	TRADOC Pam 525-2-1, See	Technology	T, O, S, and N	Covertly gain access into enemy sensor feeds in order to acquire information for mission planning.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
32	TRADOC Pam 525-3-3, Battle Command,; TRADOC Pam 525-2-1, See; TRADOC Pam 525-3-5, Protect; and TRADOC Pam 525-3-4, Strike	Proactive NEBC	C, T, O, S, and N	Rapidly assess results of CWMD counterforce operations and the potential requirement for follow-up operations through evaluation of: CBRN collateral damage requiring mitigation; degree of WMD facility and equipment disablement or destruction; degree of WMD agent or weapon neutralization, disablement, or destruction; degree of successful interdiction of WMD weapons, agents, materials, expert individuals, and others.; and other CWMD mission accomplishment metrics in order to plan for any required follow-up operations.
33	TRADOC Pam 525-2-1, See	Technology	C, T, O, S, and N	Differentiate between viable (live) and nonviable biological pathogens in order to protect the force and enable mission planning.
34	TRADOC Pam 525-2-1, See, and TRADOC Pam 525-3-5, Protect	NEBC Technology	C, T, O, S, and N	Perform medical and biological surveillance and intelligence operations to detect, assess, and warn against CBRN-induced health threats, and use medical countermeasures to defend against such threats, and medical rehabilitative care to recover following injury and illness in all environments, in order to protect military and civil populations.
35	TRADOC Pam 525-3-3, Battle Command,; TRADOC Pam 525-2-1, See; and TRADOC Pam 525-3-5, Protect	NEBC	C, T, O, S, and N	Rapidly detect, locate, assess (identify), and track CBRN materials in all environments and detect and assess CBRN and TIM hazards in the air, water, food, soil, on personnel, human remains, equipment, or facilities in all environments within a JOA to produce actionable intelligence in order to provide force protection, support site assessment and exploitation, support efforts to attribute WMD network operations, support CWMD mission effectiveness, battle damage assessment, and support CWMD mission planning. WMD elements include CBRN agents, TIM, WMD and precursors, dual use materials, weapons, equipment used in WMD manufacture, WMD-related industrial capabilities, WMD delivery systems (including pathogen vectors), adversary WMD experts, criminal or terrorist networks with WMD hostile intent, and other materials such as documents and records of interviews.
36	TRADOC Pam 525-2-1, See, and TRADOC Pam 525-3-4, Strike	Technology	C, T, O, S, and N	Detect and identify WMD delivery systems before they are employed in order to protect the force.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
37	TRADOC Pam 525-3-3, Battle Command,; TRADOC Pam 525-2-1, See; and TRADOC Pam 525-3-5, Protect	NEBC	C, T, O, S, and N	Detect WMD attacks and TIM incidents in near-real time in order to enable rapid mitigation and CM response. For rocket, artillery, and mortar attacks in flight, distinguish CBRN payload, or characterize as a non-standard payload, and link to networked sensors in order to cue and prioritize countermeasures (such as counter battery artillery) to engage the point of origin in order to protect the force.
38	TRADOC Pam 525-3-3, Battle Command,; TRADOC Pam 525-2-1, See; and TRADOC Pam 525-3-4, Strike	Proactive Layered	C, T, O, S, and N	Identify WMD targets which, when destroyed, will have the most disabling effects on the enemy's forces, capabilities, and integrity. This includes determining when and where to act to gain the best tactical advantages for starting and ending engagements that will have the greatest impact on the defeat of the enemy. This will enable defeat of the enemy.
39	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	Layered NEBC	C, T, O, S, and N	Exploit, or have access to exploited, geospatial intelligence. This includes imagery and geospatial information analysis to describe, assess, and visually depict physical features and geographically referenced WMD activities on Earth in order to improve operations planning.
40	TRADOC Pam 525-3-3, Battle Command	Proactive	C, T, O, S, and N	Identify sociocultural issues and needs to predict the perceptions and actions and reactions of indigenous population groups in relation to ongoing or planned CWMD military operations in order to enhance operations planning and conduct.
41	TRADOC Pam 525-3-4, Strike	Proactive	G, O, S, and N	Seize, secure, and exploit captured enemy weapons and weapon systems and new, potentially critically disruptive enemy technologies having WMD implications in order to protect the force.
42	TRADOC Pam 525-3-3, Battle Command	Proactive Layered	C, T, O, and S	Perform JOA CBRN environmental risk assessment, including establishment of the environmental and climatology baseline, in both permissive and non-permissive environments in order to protect the force and help establish the COP.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
43	TRADOC Pam 525-3-5, Protect	Technology	C, T, O, and S	Be protected against respiratory, percutaneous, ocular and other physical trauma associated with exposure to a wide range of CBRN and TIM hazards, and oxygen deficient atmospheres using disposable or easy to decontaminate PPE (such as uniforms, gloves, masks, and mask filters) that minimizes heat stress, flexibility and dexterity impairment, bulkiness, and weight, and that does not pose an extensive logistics burden. This required protection also applies to Soldiers in convoys, casualties unable to wear standard PPE, evacuees, and detainees. This is required in order to protect the force. The PPE should also provide a measure of ballistic protection and shielding from environmental effects of heat, cold, and precipitation and protection from hazards normally associated with the urban environment such as glass and rubble; and provide signature reduction from a variety of enemy detection systems.
44	TRADOC Pam 525-3-3, Battle Command	Proactive Training	C, T, O, and S	Understand the impact of multinational, religious, and cultural dimensions on the JOE. Have Soldiers and leaders who engage effectively with local officials and populations and who excel in shaping the environment to advantage in leveraging local and host nation support to operations in order to maximize operational effectiveness.
45	TRADOC Pam 525-3-5, Protect	Technology	G, O, and S	Provide collective CBRN protection for Soldiers, special equipment, and all critical activities and functions, including sites that repair critical assets, where a vulnerability and risk analysis indicates they are required in order to protect and sustain the force.
46	TRADOC Pam 525-2-1, See and TRADOC Pam 525-3-5, Protect	Technology	C, T, and O	Employ sensors providing early indications of abated hazard levels enabling very low risk unmasking in order to restore full combat effectiveness rapidly.
47	TRADOC Pam 525-3-5, <i>Protect</i> , and TRADOC Pam 525-3-6, <i>Move</i>	Technology Training	C, T, and O	Recognize WMD materials and equipment without placing Soldiers in contact with hazardous materials. Soldiers must be able to update the COP with both positive and negative findings rapidly. This capability is necessary to provide better force protection and enable planning for counterforce and other missions.
48	TRADOC Pam 525-3-5, Protect and TRADOC Pam 525-3-4, Strike	Training	C, T, and O	Employ improved, automated language translation capabilities to enable more rapid site assessment and exploitation, and intelligence collection in order to protect the force and assist CWMD mission planning.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
49	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-2-1, See	Proactive Layered	C, T, and O	Gather WMD related intelligence from the indigenous population in the local area in order to protect the force.
50	TRADOC Pam 525-3-3, Battle Command, and TRADOC Pam 525-2-1, See	Proactive Layered NEBC	C, T, and O	Conduct intelligence preparation of the battlefield to support CWMD. Define area of operations and areas of interest. Identify characteristics relating to CWMD; identify gaps in current CWMD intelligence holdings. Detect and display on the COP full spectrum CBRN agents, weapons, caches, transporters, and employment means prior to entering a JOA to protect the force and support mission planning.
51	TRADOC Pam 525-3-3, Battle Command,; TRADOC Pam 525-2-1, See; and TRADOC Pam 525-3-5, Protect	Proactive NEBC Technology	C, T, and O	Apply risk management principles against chemical hazards similar to doctrinal operational exposure guidance for radiation hazards. Using a set of decision support guidelines and in concert with detectors able to identify and quantify chemical hazard threats, compare health impacts at various exposure levels to the tactical risk of fighting encumbered by PPE at those exposure levels thus enabling response with the level of PPE that best protects the force. Perform appropriate protective measures in all climatic and CBRN environments, when vulnerability and risk analysis points to the need to do so, in order to protect troops, equipment, supplies, and facilities against CBRN and TIM contamination.
52	TRADOC Pam 525-3-3, Battle Command, and TRADOC Pam 525-3-5, Protect	NEBC	C, T, and O	Access and analyze data in order to enable timely operator and commander assessments and reactions to actual or potential impacts from a full spectrum of CBRN hazards (includes hazard prediction, hazard assessment, hazard warnings, and operational impact) to enable force warnings and to support mission planning and maneuver to avoid contamination. This is required in order to protect the force.
53	TRADOC Pam 525-3-5, Protect	Technology Training	T	Prevent and minimize internal CBRN contamination and transfer of external contamination into vehicles and platforms in order to protect the force and preserve operational readiness of equipment.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
54	TRADOC Pam 525-2-1, See; TRADOC Pam 525-3-5, Protect; and TRADOC Pam 525-3-6, Move	Layered Technology Training	C and T	Rapidly provide effective CBRN agent (including TIM) decontamination of personnel, wounds, remains, equipment, platforms, individual and crew-served weapons, cargo (including packaged petroleum, oils and lubricants, ammunition, and food), facilities (to restore accessibility for entry, exit, and designed use), and terrain. This includes a detection capability to verify thoroughness of decontamination at least to published standards and as effectively as risk managed planning dictates in order to mitigate WMD effects, quickly resume operations, enable freedom of maneuver, and protect the force and non-combatants. Decontamination must be effective despite encapsulating materials such as mud, ice, and snow.
55	TRADOC Pam 525-3-5, Protect, and TRADOC Pam 525-3-6, Move	Layered Technology	C and T	Decontaminate vehicles on the move or at a minimum provide a deployable thorough decontamination capability far forward on the battlefield to recover operational readiness quickly.
56	TRADOC Pam 525-3-5, Protect, and TRADOC Pam 525-3-6, Move	Technology	C and T	Use platforms and equipment with improved (reduced) decontamination requirements that can operate longer after becoming contaminated before decontamination must be performed in order to prevent the materiel from becoming permanent losses and to preserve combat power.
57	TRADOC Pam 525-2-1, See; TRADOC Pam 525-3-5, Protect; TRADOC Pam 525-3-6, Move; and TRADOC Pam 525-4-1, Sustain	Technology	C and T	Conduct route reconnaissance, at a target speed of unimpaired maneuver speed, to detect and identify CBRN hazards, to include finding gaps through and detours around CBRN-contaminated areas to avoid unnecessarily entering contaminated areas to protect the force, maintain full combat readiness, reduce decontamination logistics burden, and enable freedom of action and maneuver.
58	TRADOC Pam 525-2-1, See, and TRADOC Pam 525-3-5, Protect	Technology	M and T	Initiate medical immunizations, other prophylaxis measures, and other medical pretreatment measures to counter full spectrum of CBRN and TIM.
59	TRADOC Pam 525-2-1, See, and TRADOC Pam 525-3-5, Protect	Layered Technology	M and T	Conduct surveillance of food and water supplies throughout the JOA to protect the force.
60	TRADOC Pam 525-3-3, Battle Command	NEBC Technology	G and T	Assure NEBC operations security through positive identification of authorized users.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
61	TRADOC Pam 525-3-5, Protect	Proactive	G	Assure standards for PPE are based on sound research and testing protocols against the range of CBRN agents most likely to be encountered in combat in a particular JOA to balance force risk and cost.
62	TRADOC Pam 525-3-3, Battle Command; TRADOC Pam 525-3-6, Move; and TRADOC Pam 525-3-5, Protect	NEBC	O and S	Assess component command contamination reports for operational degradation implications and restoration operation requirements to plan operations.
63	TRADOC Pam 525-3-3, Battle Command and TRADOC Pam 525-Protect	NEBC	T and O,	Identify CM requirements and priorities and monitor progress of CM operations to minimize loss of life and property in the initial crisis response stage of a WMD incident in order to develop effective plans for tactical mitigation operations and for domestic and foreign CM operations and to provide effective CM C2.
64	TRADOC Pam 525-2-1, See, and TRADOC Pam 525-3-5, Protect	Technology	C, T, and O	Determine extent (amount and level of) and specific locations of contamination; the resources required to restore military operational capability; and acceptable risk managed residual hazard level in order to conduct effective WMD CM and protect the force.
65	TRADOC Pam 525-3-5, Protect, and TRADOC Pam 525-4-1, Sustain	NEBC	C, T, and O	Project logistic requirements for CM recovery and reconstitution, assess force protection requirements during such operations, and assess the impact of recovery activities to ongoing tactical objectives in order to plan operations and advise commanders.
66	TRADOC Pam 525-3-5, Protect	Technology Training	C and T	Physically mark TIM, CBRN contaminated areas and mark cleared, and restricted (safe) points and areas using standardized marking systems deployable and visible under all weather and lighting conditions in order to protect the force and noncombatants.
67	TRADOC Pam 525-3-5, Protect	Training	C and T	Transport contaminated human and military working animal remains; if necessary, remove radiological contamination and neutralize biological and chemical contamination hazards when processing such remains; establish mortuary affairs procedures to process contaminated remains during domestic CBRN WMD incidents in order to contain hazards and protect health of Soldiers and civilians.

Require-ment	Army function(s)	CCP key ideas	Requiring echelons (who)	What, (when, where, and) why
68	TRADOC Pam 525-3-3, Battle Command	Proactive	C and T	When DOD support is requested by authorized civil authority in accordance with the National Response Framework, provide support to civil authorities in protecting U.S. territory, population, and infrastructure before an attack by participating in domestic preparedness training exercises and events in order to protect lives and property.
69	TRADOC Pam 525-3-5, Protect	Training	M, C, and T	As part of defense support to civil authorities operating within the guidelines of the National Response Framework during a domestic CBRN WMD incident, establish a non-ambulatory clothing removal station and domestic response casualty decontamination site in order to protect health of Soldiers and civilians and to contain hazards.
70	TRADOC Pam 525-3-5, Protect	Training	C	Provide immediate on site casualty decontamination in CM missions in order to save lives, protect health and neutralize or remove hazards.
71	TRADOC Pam 525-3-5, Protect	Proactive Layered	M	Establish a medical emergency triage, emergency treatment station, and casualty contamination check station in event of WMD employment or CBRN release and perform rapid CBRN patient diagnosis to determine appropriate disposition during CBRN medical triage with link to appropriate command health monitoring system(s). Effectively treat illness in Soldiers caused by CBRN agents and track processing of these casualties. These capabilities are required in order to protect the force.
72	TRADOC Pam 525-3-5, Protect	Proactive	M	Rapidly provide, distribute, and verify administering of tailored medical preventive and countermeasures in order to protect the force.

5-4. Alternative Taxonomies

national, joint, and Army concepts and doctrine describe numerous CWMD, CBRN, and protection taxonomies. Table C-1 shows how the capabilities bin into the taxonomies found in three other sources: the NMSCWMD, the line of operations (LOOs) defined in the JICCWMD and TRADOC Pam 525-3-5.

5-5. Network-Enabled Battle Command Required Capabilities

a. The presence of a robust NEBC is critical to the CWMD concept; therefore, the authors feel that it is necessary to itemize the required capabilities for this enabler. The capabilities are broken out into four areas. First are the capabilities required of the network. Second are capabilities required for the various tailored COPs maintained on the network. Third are capabilities required for the GIG, information that can be accessed via the network. Fourth are

the capabilities required for DSTs resident on the network. These requirements serve as underpinning for capability statements 1, 2, 3, 7, 8, 9, 11, 12, 16, 17, 22, 25, 26, 28, 30, 32, 34, 35, 37, 39, 51, 52, 62, 63, and 65, see table 5-1.

b. The network must have these required capabilities.

(1) Be reliable; redundant; defended against computer network attack, deception, electronic intrusion or monitoring; and incorporate multilevel security to control access in order to provide operations security.

(2) Direct relevant WMD CBRN information to the right person at the right time in a usable format to facilitate SU and decisionmaking.

(3) Enable effective communication across the entire force, regardless of terrain, environmental conditions, organization, or operational distance in order to conduct military operations.

(4) Establish seamless interoperability with multinational coalition force partners and interface with industry and governments (foreign and domestic) in order to support military operations and promote SU.

(5) Link Soldiers and teams into the tactical battle command network; not overwhelm Soldiers and teams with complexity or excessive information; and provide a shared operating picture in the immediate tactical environment in order to support improved mission conduct.

(6) Provide digitized unit feedback and observations during the conduct of CWMD operations to retain SA and SU in order to provide effective NEBC.

(7) Provide rapid reachback (when required, near real time) from tactical and operational unit levels to a layered set of data sources including knowledge and training repositories and home station operations center experts to obtain information to help assess detections, secure approval to conduct sensitive missions, and collaborate on mission planning in order to provide more effective mission planning and conduct.

(8) Provide access to the GIG and reliable communications from lowest tactical levels to joint, theater, and national sources in order to assure decision dominance by tactical commanders.

(9) Include redundant and multilayered, horizontally and vertically integrated, information systems ISR sensors and systems that do not present a single point of failure in order to mitigate operational risk.

(10) Use networked sensor inputs to automatically disseminate critical, time sensitive CBRN hazard warnings to all affected dismounted personnel in time to enable donning protective gear or getting to collective protection shelters; and to all maneuvering forces with

sufficient lead time to enable maneuver to avoid the hazard if that is the best tactical course of action, in order to provide force protection.

c. The COP must have these capabilities.

(1) Provide a comprehensive picture of the CBRN hazard environment tailored to force, function, level, and situation requirements in order to effectively plan and conduct operations.

(2) Support automated information flows across war fighting functions.

(3) Add meaning to relevant information by formatting, plotting, translating, correlating, aggregating, organizing, categorizing, analyzing, evaluating, fusing, and displaying it in visual and audio formats that are easily understood by users to enable effective planning, operations, and C2.

(4) Access and share WMD information attained through all mission area operations.

(5) Correlate observations of the indigenous population for indicators of WMD attack or WMD TIM release in order to protect the force.

(6) Fuse the input from networked layers of CBRN and disparate sensors with other relevant information to provide actionable WMD intelligence including identification of WMD interdiction targets in order to enable SU.

(7) Gather and present the location, sustainment and protection status, and missions of all elements of the force, including joint and coalition partners in order to enable effective C2.

(8) Display in near real time the locations and characteristics of hazard areas, warned areas, sensitive sites, and other locations of WMD interest in order to inform Soldiers, leaders, units, civilian populations, first responders, and coordinating agencies in order to protect lives and property and to enable mission planning.

(9) Enable tactical echelon access and update.

(10) Display locations and tracks (if moving) of WMD materials within and transiting the JOA in order to maintain SA and SU and enable mission planning.

(11) Enable risk based CBRN force protection decisions, including forecasts of probability and severity of CBRN encounter in order to plan missions.

d. The GIG must be survivable and contain these capabilities.

(1) Be linked and effectively integrated with layered arrays of CBRN sensors, disparate sensors, databases, surveillance assets, communication systems, and intelligence operators and analysts to enable immediate collection and processing of unambiguous, accurate threat intelligence information. Threat intelligence includes adversary WMD capabilities and activities

such as actions planned or employed against friendly resources (forces, physical assets, or information) throughout the JOA in order to enable accurate and timely detection of threats and hazards, assist mission planning, protect the force, and enable SA, SU, and effective C2.

(2) Provide collaborative information and planning environment integrated within the JIIM network to improve and accelerate the decision action cycle, support higher levels of SA and SU, and enable improved mission planning and execution.

(3) Provide access to civil information management databases maintained by government and nongovernmental organizations on civil infrastructure located in the JOA and fuse that information with other CWMD mission planning data on the battle command network to inform the COP and enable SA and SU.

(4) Provide access to worldwide police and intelligence databases in a JIIM environment, in order to gain information on WMD network actors and operations.

(5) Provide access to national and international organizations' CBRNE and WMD forensics databases and to the expertise of national and international associations of WMD forensics experts. This capability is required to protect the force, determine WMD network attribution, and enable effective WMD network targeting.

(6) Provide access to archived TIM and WMD event history to assist mission planning.

(7) Provide access to accurate micro-meteorological weather forecast data to support operations and provide required input to hazard transport and dispersion models underpinning the hazard warning system in order to protect the force.

e. Decision support tools (GIG applications) must provide these capabilities.

(1) Provide automated support and checklists to help Soldiers identify potentially sensitive sites, secure sensitive sites while preserving forensic evidence for later attribution, perform structured assessments of CWMD mission operations (such as, battle damage assessment), and report on findings and update the COP.

(2) Provide a tool to assist analysts fusing data from health and human service organizations, hospitals, retail sales, and other database sources to provide indicators of an impending biological or other WMD attack. There must be a capability to access these data sources and to use battle command network software tools for data analysis.

(3) Provide an automated tool that assists analysts determining appropriate mix, numbers, and placements for CBRN sensors based on a number of variables such as likely threat disposition, topography, climate, and prevailing winds in order to protect joint and coalition assets and personnel.

(4) Provide automated analytic tools incorporating pattern analysis to support WMD attribution and other exploitation efforts.

(5) Provide automated tools that perform multiple types of data transformations (data fusion algorithms) and that enable visualization of various data transformation results in order to enable analysts to evaluate data easily from CBRN and disparate sensors and other sources in order to improve SA, SU, and operations planning.

(6) Provide an automated tool that evaluates hazard predictions (detailed plume plots) with respect to unit locations on the COP to alert units at risk of encountering contamination and warn units that can change their scheme of maneuver to avoid the contamination.

(7) Provide a medical surveillance software tool for use in the homeland and JOAs in order to protect the force.

(8) Provide an automated tool that assists CBRN staffs in planning WMD mitigation operations such as reconnaissance and decontamination that minimize the impact of CBRN battlefield hazards on current operations.

(9) Provide an automated tool for use in sensitive site exploitation that assists Soldiers with recognizing items of WMD interest in order to protect the force.

Chapter 6

Implications and Questions

6-1. Earlier Analysis Informing the CCP

a. Prior and ongoing analyses have influenced the concepts and required capabilities in this CCP. Some of the earlier work has focused on generalized force and site protection. Important efforts of this more generalized nature include several studies under the umbrella of the integrated unit base installation protection construct; the Joint Force Protection Advanced Security System joint capability technology demonstration; the force protection joint experiment, which provides a value-added layer of analysis, integration, and scope extension to the integrated unit base installation protection and Joint Force Protection Advanced Security System; and the comprehensive force protection initiative. The aforementioned work addressed CBRN protection to some extent.

b. Earlier analyses that have most significantly influenced the development of this CCP focused more directly on CBRN and CWMD. The most important investigation in this regard was the CBRN seminar, conducted at the MANSCEN. That seminar's main purpose was to inform the TRADOC 525-7-19 effort. Seminar discussions helped shape the main features of the CCP and resulted in the identification of roughly a hundred distinct required capabilities associated with the CWMD. Later analysis resulted in the aggregation of some of these capabilities, reducing their number. Other influential studies more focused on CCP topic areas include a CBRNE installation protection study performed by representatives from the Office, Secretary of Defense, the military Services, combatant commands, and DOD agencies; and the Chemical and Biological Defense Information Analysis Center CBRN defense functional area analysis.

c. Some of the relevant content and topics addressed in the more generalized protection studies include those listed:

(1) The integrated unit base installation protection concept of operations, functional area analysis, and joint capabilities document.

(a) Protection includes offensive and defensive capabilities.

(b) Sound decisions based on actionable intelligence attained through battlespace awareness provided by persistent and pervasive sensing, surveillance, and precise identification.

(c) Collaborative C2 in a JIIM environment.

(d) Net-centricity as a fundamental aspect of future protection operations.

(e) Joint force requirement to maintain friendly force SA while detecting, monitoring, and tracking an adversary's action or changes in the environment that may be hostile to the joint force.

(f) Active measures to prevent, deny, and deter adversary plans and actions. Such actions may be preemptive and include direct attack against enemy C2 nodes, assembly areas, weapon caches, and others.

(g) Passive measures to minimize damage caused by hostile action, such as cover for supplies and personnel and hardening of electronic systems against electromagnetic pulse effect in the event of a nuclear or other future electromagnetic pulse producing occurrence.

(h) The JFC may task multiple units from more than one service for a collective effort in conducting a single protection mission. In such a case, the JFC would expect one standard and a consistent level of performance. Similarly, a unit from one organization may hand off a protection mission to a unit from a different service, necessitating a smooth transition to ensure success.

(i) Attributes for each of the detect, assess, warn, defend, and recover capability areas.

(j) Joint capability shortfalls and redundancies (joint capabilities document, only).

(k) Tasks, conditions, and standards for protection tasks, including future required capabilities (functional area analysis only).

(2) The Joint Force Protection Advanced Security System Joint Capability Technology Demonstration.

(a) Comprehensive SA will be attained by integrating disparate sensor technologies.

(b) Maximizing use of unmanned and unattended technologies helps to provide effective use of personnel.

(c) COP based on relevant sensor data (via sensor fusion) to provide improved SA.

(d) Common C2 architecture to provide scalable, tailorable protection solutions.

(3) Force protection joint experiment

(a) Net-centric architectures.

(b) Robotic collaboration.

(c) Sensor integration.

(d) Warfighters can leverage savings from reducing exposure of friendly force personnel to hostile action for use in other missions.

(e) Artificial intelligence can enhance the fusion evident within the COP and improve SA.

(4) Comprehensive force protection initiative

(a) Rapid, accurate sharing of CBRN information and for warning Soldiers of imminent hazards.

(b) Standoff detection of CBRN and TIM vapors and hazards from safe distances.

(c) Point detection, identification and quantification of CBRN and TIM contamination at low levels.

(d) Ability to detect, assess, and predict cloud of contamination in time to issue a warning and have forward operating base personnel don PPE.

(e) Protect critical infrastructure and occupants from CBRN contamination.

(f) Perform equipment, facility and mass personnel decontamination.

d. Important content of the more focused CBRN and CWMD studies includes:.

(1) The MANSCEN CBRN seminar, extracts from the MANSCEN final report. The seminar provided valuable information in defining the Army's future role in CWMD and identifying those capabilities required to support the JFC. The Army needs to shift from thinking in mainly passive defense terms to focus more on preemptive actions. While reaction to an event continues to be necessary, the elimination or neutralization of the threat before possible employment is preferred. The Army needs to increase the quality, timeliness, scope, and amount

of CWMD threat intelligence provided to commanders. The Army needs to improve intelligence fusion and dissemination of threat information to shorten the decisionmaking cycle for the commander.

(2) The final report also states that detection and identification of threats should be conducted at greater distances to prevent loss of manpower and equipment. The equipment should be sensitive to both commercial and military grade threats. Decontamination systems should be more capable, faster acting, more versatile (able to decontaminate sensitive equipment), and more environmentally friendly. The Army requires methods to reduce the logistics burden in neutralizing and reducing CBRN effects on personnel, equipment, and critical infrastructure. Personnel protective equipment should enable Soldiers to work at a higher level of performance for longer periods by reducing the physiological stress associated with wearing it. The Army requires better downwind hazard prediction that enables both a reduced possibility of contamination and a reduced incidence of needless donning of PPE.

(3) CBRNE installation protection study. Identified a thorough set of CBRNE required tasks and identified numerous capability gaps, most of them non-materiel.

(4) CBRN defense functional area analysis. Provided joint CBRN defense required tasks, conditions, and standards and traced the tasks through the Universal Joint Task List.

6-2. Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) Implications

a. At a coarse level, the main implications arising from TRADOC Pam 525-7-19 are requirements to:

(1) Design and build effective organizations and train effective Soldiers for implementing CWMD.

(2) Develop defensible required threshold and objective capability standards.

(3) Determine the sets of CWMD capabilities the Army must provide to and receive from other Services in order to implement CWMD in the JIIM environment.

(4) Determine and implement the CBRN and CWMD training and training support capabilities the U.S. Army must provide to other Services or integrate with other services to implement train as you fight model.

b. In greater detail, doctrinal implications include:

(1) Emerging doctrine will focus on capabilities to conduct CWMD missions against adversaries with a joint force that shares common systems, tactics, techniques, procedures, and doctrine. The doctrine production system may need to become more responsive during the period when the future Modular Force is inculcating the CWMD capability requirements in its operations and culture.

(2) Information management procedures standardization is necessary to implement the joint, networked concept of CWMD operations. At the same time, tactics and operational doctrine must stress the art of war and enable Soldiers to create flexible and adaptive solutions. New doctrine and tactics, techniques, and procedures will be required to effectively plan and manage battles collaboratively.

c. Organizational implications include:

(1) To effectively support future operations, organizations must continue to transform to more modular, scalable, and mission tailorable organizations, with multifunctional capabilities. They must become more versatile and agile to support joint operations and must possess capabilities to support the operations of maneuver and support forces.

(2) The range of missions assigned to the future Modular Force will force an alignment change from the traditional command echelons. Army headquarters will support the combatant commander with the command structure appropriate for land operations. The grade of the commander and functions of the headquarters will not necessarily correspond to the numbers of forces assigned to it.

(3) Higher headquarters will be organized and equipped to exercise CWMD over flexible task organizations. In many operations, the number and composition of subordinate units will significantly differ from current day operations. As each operation unfolds, the makeup of the deployed future Modular Force will evolve, shifting in composition, as the mission and circumstances require. While units stationed with the headquarters may align for training and readiness, actual operational groupings will be based upon mission requirements.

d. Training implications include:

(1) There must be sufficient collective training for the force packages assembled to conduct joint or multinational CWMD operations. Battle staffs should routinely engage in exercising varying force packages in difficult and demanding tasks that they will perform in war in order to identify and correct weaknesses and gaps.

(2) As new military occupation skills are required and technologies emerge, the Army must be flexible and responsive enough to provide the associated new training. It is important to minimize the disparities in performance of any given CWMD task produced by using differing force packages all equipped to perform the task.

(3) To retain a lean, effective deployed staff, staffs must receive frequent training in complex joint and multinational operations at the operational and tactical levels. This training is essential to build the basis for trust and rapport, leader development, and responsive capabilities.

(4) Evolution of the future Modular Force will necessitate implementation of a lifelong training paradigm and the accommodation of training tasks emerging from expanding Army CWMD missions in the future JOE. Training time may not be correspondingly increased.

(5) Embedded training modules should complement new equipment training, battle staff training, home station sustainment training, and institutional training and approach the quality and standards of the combat training centers. Embedded training shall also provide the tools to assess operations and evaluate individual and collective task performance based on mission training plans, so lessons are captured and focused retraining may occur. Small unit training will remain at the foundation of readiness and effectiveness.

e. Materiel implications are include:

(1) Resources are always limited. Lack of materiel restricts the unit's ability to execute missions. Modernization and sustainment seek to provide and maintain capabilities within available resourcing levels. Realization of the future Modular Force and CWMD is dependent upon the development and incorporation of advanced technology on the battlefield.

(2) In a networked, distributed operational approach to warfare, the importance of optimizing the entire system often supersedes the strict optimization of a single weapon, staff element, or past program.

(3) Collaborative planning from strategic to tactical levels will eliminate much of the serial processing in current planning and allow streamlining of the military decisionmaking process. Planning in concert, commanders and staffs at successive echelons will have a clearer and common understanding of intent and fuller appreciation of the implications of planning decisions across units and formations. Collaborative planning should enable greater decentralization and simultaneity in conducting CWMD missions.

(4) Access to a COP and common information environment as part of the GIG will enable subordinate commanders to self-synchronize their CWMD actions and make adjustments in response to changing situations.

(5) The sum of technological advancements in new and upgraded materiel will enable Soldiers on the battlefield to anticipate more reliably and apply force more precisely and effectively.

f. Leadership and education implications include:

(1) One of the keys to enable CWMD is the ability to develop leaders and staffs capable of effective performance across the range of military operations in a complex, uncertain, and dynamic operational environment. Leaders must be educated, trained, and developed to be self-aware, innovative, and adaptive in operations. They must have a joint and expeditionary mindset, and successfully apply joint operational art across the range of CWMD operations. Leaders will benefit from JIIM education and experience early in their careers. Realistic training coupled with operational experience will convert knowledge into operational competence.

(2) The Army leader development system must focus on human qualities of initiative, mature judgment, flexibility, trust, and teamwork to achieve the full potential of this CWMD concept. The Army must instill audacity in its leaders and condition them away from passivity

in the absence of certainty. Changes that impact the mix and capabilities of a leader's staff specialists and generalists are significant. The rapid evolution of automated systems and capabilities require a change in leader development to ensure future leaders and staff can leverage these new tools. Emerging technology will help leaders focus on critical decisions, highlight opportunities for initiative, and facilitate teamwork.

(3) The lifetime of education paradigm also applies to leader education. Additionally, leaders must understand the impact of culture on operations. Knowledge centers should be configured to support professional leader CWMD education.

g. Personnel implications include:

(1) Soldiers are the Army's greatest resource and the most important factor in maintaining unit readiness. Implementing force stabilization policies that reduce personnel turbulence better supports a lifetime training and education paradigm. Reducing the redundancy that occurs in some training cycles is also important. The personnel management system must adapt to force stabilization and ensure it provides the career paths needed to fully prepare CWMD leaders in the future Modular Force.

(2) New organizational constructs will place greater reliance on experienced civilian personnel to provide the expertise needed to support CWMD training readiness and global operations. Research and experience will help define effective combinations of Army active and reserve component unit capabilities, Department of the Army (DA) civilians, and contractor personnel.

h. Facility implications include the following.

(1) The Army facilities and infrastructure will require significant investment of resources to train, sustain, mobilize, and deploy forces in accordance with CWMD and future Modular Force concepts. Installation information facilities will enable distributed information sharing among the sustaining base and deployed forces during all operational phases.

(2) Prior to deployment, operational staff located at fixed facilities on the installation can collect, process, and analyze large volumes of data such as terrain databases that must be pre-positioned down to platform level. Installations will require suitable facilities for skilled civilian personnel supporting a military staff. Installations will also need to consider developing facilities needed to provide realistic field training that supplements virtual battlefield training. Specific facility plans must be initiated with sufficient lead-time to obtain required resources so that the facilities are available to support CWMD training when needed.

(3) Facing an increasing threat of WMD employment and terrorist attacks with CBRN and TIM, facilities may require new standards to protect the personnel and assets they house from physical attack.

6-3. DOTMLPF Questions

a. In addition to the DOTMLPF implications addressed above, many questions arose during the CCP development analysis. Some of those questions already appear on the 2008 fiscal year integrated question list (IQL) maintained by ARCIC as part of the Army Concept and Capability Developments Plan. An example of such a duplicate question is, “What existing or emerging civilian and industrial use technologies can be adapted to challenge or deny U.S. networks and functional capabilities (dual-use technologies)?”

b. Table 6-1 presents questions that arose which do not already appear in the IQL for 2008.

Table 6-1
Questions Nominated for Addition to the ARCIC IQL

IQL Functional Area	Priority	Question
Military Capabilities Development	Critical	What types and mixes of capabilities must reside in organizations with CWMD responsibilities?
Military Capabilities Development	Critical	What are the prioritized CWMD capability gaps and shortfalls for the near term and the mid and far term futures?
Military Capabilities Development	Important	How do we provide decision aids and collaborative, distributed training, and problem solving that empowers staffs to advise and support commanders during planning, preparation, rehearsal, and execution of CWMD exercises and operations?
Military Capabilities Development	Important	How will units enable their leaders to have sufficient intelligence of the CWMD operational environment and threat CWMD networks to prevent WMD attack?
Military Capabilities Development	Important	How do units share and integrate critical and selected operational data (platform level) required to effectively command and employ sustained CWMD capabilities during operations?
Military Capabilities Development	Important	How does the Army recruit and retain the personnel necessary to perform Army CBRN operations functions?
Military Capabilities Development	Important	Are there adequate facilities available to Soldiers, leaders, battle staff, non-uniformed personnel, and units to attain and maintain acceptable levels of training effectiveness for CWMD operations?
Military Capabilities Development	Important	What advanced training tool sets are required to support adequate Soldier training and development for CWMD missions?
Military Capabilities Development	Important	Can the Army augment current organizational structures to satisfy CWMD required capabilities or will it require new organizational structures?
Military Capabilities Development	Important	What type, scope, and frequency of training must the future Modular Force conduct to enable effective CWMD operations?

IQL Functional Area	Priority	Question
Military Capabilities Development	Desired	What training is required for contractors and DA civilians on the battlefield who support CWMD missions?
Military Concept Development	Critical	How does current training and leader development enable CWMD? How can the Army adapt its training to better enable current forces to engage in CWMD operations as integral parts of joint and combined arms teams, and independently, when and as necessary?
Military Concept Development	Important	What are the impacts of national ROE, policies, and law during CWMD missions?
Military Concept Development	Important	What are the best organizations to develop and conduct an integrated CWMD campaign?
Military Concept Development	Important	How should we manage and disseminate information to maximize a shared level of SA among all echelons?
Military Concept Development	Important	What are good organizational solutions for providing low-density CWMD capabilities?
Military Concept Development	Important	What training designs will develop units and leaders that can contribute their capabilities in providing the full range of CWMD capabilities as members of the joint team?
Military Concept Development	Important	How will units achieve continuous, dominant SU throughout tactical CWMD operations?
Military Concept Development	Desired	What are the limits to interdependence among Service and branch functions?
Military Concept Development	Desired	What are the key variables that reflect the CWMD military challenges implicit in the future JOE?
Military Requirements Integration	Critical	Who communicates with whom and what in CWMD missions? What challenges will this configuration face across all mission sets?
Military Requirements Integration	Important	What technical and materiel CWMD capabilities should the Army pursue, and which should be left to joint dependence or interdependence?
Military Requirements Integration	Important	What infrastructure is required at forts and installations to adequately support CWMD training and operations?
Military Requirements Integration	Important	What infrastructure is required in theater to support CWMD missions?
Science and Technology	Critical	How will we achieve compatibility, interoperability, and operational effectiveness for CWMD systems?
Science and Technology	Critical	What technologies are critical to consider and invest in for the development of effective and capable CWMD materiel solutions?
Science and Technology	Important	What are the required roles and capabilities for unmanned systems on the battlefield during CWMD operations?
Science and Technology	Important	How sensitive are CWMD operations to network degradation?

IQL Functional Area	Priority	Question
Science and Technology	Important	How will commanders and staffs acquire and develop knowledge to support full spectrum operations if the network is degraded or absent and advanced sensors are degraded or unavailable?
Science and Technology	Important	What are the best methods to conduct cooperative CBRN sensor employment?
Science and Technology	Important	What is the best design for threshold force CWMD intelligence fusion?

c. The questions in table 6-1 are nominated for addition to the IQL. For each nominated question, the table identifies the appropriate IQL functional area and the relative question priority within the functional area. As part of follow-on CBAs and other post CCP studies, new analyses will help answer these questions.

6-4. Future Wargaming and Experimentation

a. Future experiments will seek to inform estimates of the expected operational benefit for given CWMD task performance improvements to help set quantitative standards for enhanced task performance. Appropriate venues for such studies could include seminar experiments to collect professional military judgment, wargaming analysis, and others. Future studies also will assess whether a given level of performance improvement is technologically feasible or affordable in a given timeframe. Initial studies of technological and economic feasibility may use scientifically informed market-analysis-like assessments.

b. As part of the literature search in future experiments and studies, there should be a broad effort to collect evidence to underpin estimates of assumed or required task performance standards. Examples of valid evidence could include operational lessons learned; analytic studies of operational and combat experience; data from field tests and exercises; results from modeling and simulation analysis; and documented, peer-reviewed logical analyses based on common perceptions and knowledge (professional military judgment).

Chapter 7 Risks and Mitigation

7-1. CCP Key Assumptions

a. To produce TRADOC Pam 525-7-19, some assumptions about the future JOE, technology development influencing CWMD capabilities and GIG capabilities, the rate of progress in transforming the Army to an increasingly modular force, and several other areas were applied. The assumptions were necessary in order to provide a joint context and set of operational conditions in which to project and think about future CWMD missions and tasks.

b. In making assumptions, five things are considered:

(1) Is the assumption really required to enable the desired action? In this case, the desired action was developing future CWMD operations and developing an understanding of the capabilities that would be required to enable CWMD.

(2) Does the assumption have to remain an assumption, that is, can more research tie it down to a fact? This assumption does not apply as TRADOC Pam 525-7-19 is about realities that may or may not be true in the future.

(3) What is the relative confidence in the assumption? Certainly, the assumption should represent the most expected future reality. However, SMEs may have a level of confidence in the assumption that ranges from significant uncertainty to strong confidence.

(4) How sensitive is the output (TRADOC Pam 525-7-19 contents) of the desired action to the assumption? If sensitivity to the assumption is very low, then the assumption is probably not a prerequisite to the desired action.

(5) If the desired action is very sensitive to the assumption, and the confidence in the assumption is relatively low, then analysts should consider how the output of the desired action might change or might need to be changed if said assumption fails to hold true. Table 7-1 summarizes these assumptions.

**Table 7-1
TRADOC Pam 525-7-19 DOD and national assumptions**

Assumption	Confidence	Sensitivity
DOD and national and Assumptions		
Fundamental objectives of current national strategy will remain applicable in 2015-2024.	High	High
The U.S. will maintain a unilateral capability to act militarily to protect national interests, but when possible, the U.S. will act with other nations to provide a CWMD capability.	High	High
The U.S. will pursue its national interests through proactive global engagement.	High	High
The fundamental roles and responsibilities of DOD and other government agencies will remain unchanged.	High	High
The U.S. and coalition partners will operate with local to theater air, space, and maritime superiority.	High	High
Military operations will be conducted within a JIIM framework.	High	High
Adversaries will continue to pursue WMD capabilities.	High	High
The U.S. will have technological overmatch in most regions.	Medium-High	Medium-High

Table 7-1
TRADOC Pam 525-7-19 DOD and national assumptions, continued

Army Assumptions	Confidence	Sensitivity
Army organizational design will continue to evolve as technologies mature and lessons from the current Modular Forces are incorporated.	High	High
The Army will remain a force of light, medium, heavy, and special purpose forces during the 2015-2024 timeframe.	High	Medium
Army transformation objectives will be achieved and form the force structure baseline from during the 2015-2024 timeframe. Modularization of combat, combat support, and combat service support units will be complete. The BCT will be the basic future Modular Force building block for tactical operations and will be supported by similar modularized functional organizations. The mix of forces and size of the Army will be subject to significant change due to any number of unforeseen factors.	Medium	Medium
Adversary Assumptions	Confidence	Sensitivity
Adversaries will continue to adapt their organizations and operations in response to U.S. capabilities.	High	High
The JOE accurately describes the most likely security environment during the 2015-2024 timeframe.	Medium	High
Adversaries will not routinely or frequently employ WMD or CBRN and TIM as weapons.	Medium	High
Technology Assumptions	Confidence	Sensitivity
Sensors and sensor networks will enable dependable CBRN and WMD sensing to support accurate assessment of what is detected, its location, and other forensic signatures to enable: attribution of WMD actions to specific networks, locations, individuals, and others; prediction of future threat activity; and planning and executing CWMD missions.	Medium-Low	Medium-High
Advances in information systems ISR capabilities will enable higher levels of SU in operations at lower tactical levels.	Low-Medium	High
Advancements in automation will permit large amounts of data to be mined without significant human intervention enabling rapid, effective fusing of disparate data into information.	Low-Medium	High
The network envisioned as the backbone for network-enabled operations will exist and work as estimated.	Low-Medium	High
The future Modular Force will have highly reliable internal and external connectivity within the larger global network.	Low-Medium	High
DOD and Army efforts to establish horizontal integration throughout the force will provide the information architecture needed to allow all elements of the joint force to share data, information, and knowledge.	Low-Medium	High

7-2. Concept Risks and Mitigation

a. The six technology assumptions at the bottom of table 7-1 have a relatively low level of confidence and relatively high level of CCP concept sensitivity. Accordingly, concept risk and mitigation statements are provided for those potentially problematic assumptions.

(1) Risk. Sensors and sensor networks will not provide significantly more dependable CBRN and WMD sensing nor more accurate assessment of what is detected, its location, and other forensic signatures.

(a) Impact. Advanced sensor and sensor networks are a key enabler of CWMD. They are required to provide a future advanced capability to detect network activities such as, manufacturing, storage, movement, and use of CBRN agents as well as a future advanced capability to attribute WMD related actions to individuals and networks. Failure of the assumption to hold true would have direct consequences on the Army's ability to protect deployed forces and homeland citizens in the face of a growing capability to manufacture new WMD agents, miniaturize existing weapons, hide development of weapons, and other threat WMD trends. A significantly incomplete capability to reliably and responsively detect WMD employment, especially biological and chemical and TIM attacks, would threaten U.S. deployed forces and homeland citizens.

(b) Additionally, failure to achieve these advanced capabilities in the development of CBRN sensor technologies would severely compromise our ability to achieve national, DOD, and joint CWMD endstates. Even with only modest technological sensor advancement, the U.S. WMD defense posture would not be as strong as today if the rate of technology advancement did not keep pace with the increasing threat of WMD network activity and employment. Due to the Army's inability to precisely locate WMD threats, there could be increased pressure for the U.S. or friendly coalitions to conduct inspections and searches of foreign industrial and military facilities, backed by armed force if necessary. Such inspections conducted under the threat of use of force, would be required to help provide protection for both deployed forces and the homeland. These inspections, conducted without compelling evidence that the facility was involved in WMD related activities, could seriously hamper attainment of U.S. diplomatic objectives and goals.

(c) Mitigation. Strengthen multinational nonproliferation efforts such as the Proliferation Security Initiative, a large multinational organization dedicated to interdicting proliferation of banned weapons and weapon technology. Of concern will be countries with current and developing capabilities that are not members of that organization. If affordability of the technology is a main source of the problem, enhanced allied cooperation in the development, procurement, and fielding of advanced sensors could mitigate the impact.

b. As the second and third technology assumptions (they both relate to intelligence collection, fusion, distribution and SU) have similar characteristics both are addressed within this risk and mitigation statement.

(1) Risk. Advances in information systems ISR capabilities will not be sufficient to enable significantly higher levels of SU in operations at lower tactical levels. Advancements in automation will not permit mining of large amounts of data without significant human intervention enabling rapid, effective fusing of disparate data into information.

(a) Impact. TRADOC Pam 525-3-3 rests on a foundation of assumed SU. Urban and other challenging operating environments and adaptive enemy tactics will require highly granular intelligence and may hinder anticipation of future events. The large amount of intelligence and other information required will generate a demand for rapid and accurate processing, fusing, and distribution. The ability to see and know is the basis for commander to form SU. The degree to which the assumption regarding information systems ISR becomes invalid will impact the future Modular Force ability to develop the situation out of contact and conduct precision strike in counterforce operations. WMD network activity is increasing and WMD technologies continue to advance and proliferate. Failure to outpace the rate of Threat WMD capability development with our own ability to collect and fuse intelligence could have serious, even disastrous, consequences. A credible threat of WMD attack could blunt U.S. diplomatic and military efforts. At the far end of the scale, the joint force or homeland could be attacked.

(b) Mitigation. Develop information sharing agreements and collaboration tools with partners. Provide security assistance in the form of common data formats and information technology. The future Modular Force should, however, be prepared to act unilaterally if required.

c. As the final three bold-faced assumptions (all relate to GIG capabilities) have similar characteristics, they are all addressed within this risk and mitigation statement.

(1) Risk. The network envisioned as the backbone for network-enabled operations will not provide all the significant capabilities identified in the GIG Mission Area Initial Capabilities Document. The future Modular Force will not have highly reliable internal and external connectivity within the larger global network. DOD and Army efforts to establish horizontal integration throughout the force will not provide the information architecture needed to allow all elements of the joint force to share data, information, and knowledge.

(a) Impact. Fielded C2 systems will not provide the robust, assured, and timely flow of accurate and relevant information needed to successfully conduct CWMD missions. Segregation of information by type, classification, command, and mission will make it difficult to transport, store, and process essential information within the JTF. This will be an especially difficult problem for U.S. allied and coalition partners. Lack of a common data standard will hamper data retrieval capabilities. Retrieved information may come from stove piped sources that are not interoperable, making it difficult for the receiving system to use it (for example, merging received information into a COP). The set of DOD automated battlefield applications will continue to not deliver the required levels of functional and technical interoperability.

(b) Collaborative processing will be limited resulting possibly producing inferior mission plans. An inability to rely on an ability to retrieve accurate information in a timely manner will constrain commanders' decisionmaking abilities. The use of multiple proprietary protocols in

the transport of digital information will constrict the flow of information to commanders and weapon systems thus impeding CWMD mission planning and execution where time sensitive operations are the norm. COP information content and visualization will not be based on a capability to ascertain the context in which humans are functioning and thus will continue to provide information in predetermined ways rather than in the form most useful to the human given their assigned role, mission, and function. This will impede military processes requiring human–system interaction. It will continue to be the case that no single multilevel security battlefield network will be in place.

(c) Additionally, end-to-end communications, especially to lower tactical levels will not be integrated and interoperable. There may be an insufficient capability to produce and disseminate time critical survival information because most military information systems are designed to support non-time-critical planning information. Users will not have access to all available information and data which should be available. This will restrict the ability of commanders, decisionmakers, and operators at all levels. Information available to the user will not always be in the desired format causing wasted time in reformatting and converting received information. This will restrict the command decisionmaking process and can adversely affect the success of CWMD operations. When decisions must be made in seconds, it is essential that information arrive in an immediately useful format.

(d) Mitigation. Improve quality of service and bandwidth availability for the non-secure Internet protocol router network and secure Internet protocol router network to meet warfighter requirements. Develop information sharing agreements and collaboration tools with partners.

d. Future studies and experimentation should include efforts to assess the level of continuing confidence in the above and other related assumptions.

Appendix A References

Section I

Required Publications

(ARs, DA pams, FMs, and DA forms are available at [Army Publishing Directorate \(APD\) - Home Page](#). TRADOC publications and forms are available at [TRADOC Publications](#). Joint Concepts are available at <http://www.dtic.mil/futurejointwarfare/concepts>)

Capstone Concept for Joint Operations.

Joint Integrating Concept for Combating Weapons of Mass Destruction.

National Military Strategy to Combat Weapons of Mass Destruction.

National Strategy to Combat Weapons of Mass Destruction.

TRADOC Pam 525-2-1

The United States Army Functional Concept for See 2015-2024.

TRADOC Pam 525-3-0

The Army in Joint Operations: The Army's Future Force Capstone Concept 2015-2024.

TRADOC Pam 525-3-1

The United States Army Operating Concept for Operational Maneuver 2015-2024.

TRADOC Pam 525-3-2

The United States Army Operating Concept for Tactical Maneuver 2015-2024.

TRADOC Pam 525-3-5

The United States Army Functional Concept for Protect 2015-2024.

Joint Operating Environment – Trends and Challenges for the Future Joint Force Through 2030.

Section II

Related References

Capabilities Needs Assessment Database. (Available at <https://cna.tradoc.army.mil>.)

Chemical, Biological, Radiological and Nuclear Defense Information Analysis Center.

CJCSI 3010.02B

Joint Operations Concepts Development Process.

CJCSI 3170.01F

Joint Capabilities Integration and Development System.

CJCSI 6212.01D
Interoperability and Supportability of Information Technology and National Security Systems.

CJCSM 3500.04D
Universal Joint Task List.

Deputy's Advisory Working Group, Joint Capability Areas Baseline Realignment Briefing.
(http://www.dtic.mil/futurejointwarfare/cap_areas.htm)

Deputy Secretary of Defense Memorandum, *Weapons* of Mass Destruction Civil Support Team Program Review.

Deterrence Operations Joint Operating Concept.

DOD Architecture Framework.

DOD 6055.06-M
DOD Fire and Emergency Services Certification Program.

DODD 2000.12
DOD Antiterrorism Program.

DODD 2060.02
DOD Combating Weapons of Mass Destruction Policy.

DODD 3150.5
DOD Response to Improvised Nuclear Device Incidents.

DODI 2000.16
DOD Antiterrorism Standards.

DODI 2000.18
DOD Installation Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive Emergency Response Guidelines.

DODI 6055.6
DOD Fire and Emergency Services Program.

FM 1-01
Generating Force Support for Operations.

FM 3-0
Operations.

TRADOC Pam 525-7-19

FM 3-11

Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Defense Operations.

FM 3-90.15

Sensitive Site Operations.

FM 4-02.283

Treatment of Nuclear and Radiological Casualties.

FM 4-02.7

Health Service Support in a Nuclear, Biological, and Chemical Environment TTP.

FM 4-20.64

Mortuary Affairs Operations.

FM 7-15

The Army Universal Task List.

FM 8-284

Treatment of Biological Warfare Agent Casualties.

Government Accounting Office Report 07-143

Chemical and Biological Defense.

Integrated Unit Base Installation Protection Concept of Operations.

Integrated Unit Base Installation Protection Functional Area Analysis.

Integrated Unit, Base, Installation Protection, Initial Capabilities Document for Interoperability.

Joint Capabilities Document for Integrated Unit, Base, and Installation Protection.

Joint Capability Technology Demonstration, Joint Force Protection Advanced Security System.

JP 1-02

Department of Defense Dictionary of Military Terms.

JP 3-0

Joint Operations.

JP 3-11

Joint Doctrine for Operations in Nuclear, Biological, and Chemical Environments.

JP 3-27

Homeland Defense.

JP 3-40

Joint Doctrine for Combating Weapons of Mass Destruction.

JP 3-41

Chemical, Biological, Radiological, Nuclear, and High Yield Explosives Consequence Management.

JP 5-0

Joint Operation Planning.

JROCM 202-0222

Mission Area Initial Capabilities Document Global Information Grid.

Multi-Level Scenario Module 1 Documentation

Available on Army Knowledge Online under U.S. Army Organizations/TRADOC/Command and Centers/TRAC/TRAC Current Studies/Multi-Level Scenario

National Security Strategy of the United States of America.

National Strategy for Combating Terrorism.

National Response Framework.

Protection Joint Functional Concept.

Quadrennial Defense Review Report.

Strategy for Homeland Defense and Civil Support.

TRADOC Pam 525-3-3

The United States Army Functional Concept for Battle Command 2015-2024.

TRADOC Pam 525-3-4

The United States Army Functional Concept for Strike 2015-2024.

TRADOC Pam 525-3-6

The U.S. Army Functional Concept for Move 2015-2024.

TRADOC Pam 525-3-66

Military Operations Force Operating Capabilities.

TRADOC Pam 525-4-1

The U.S. Army Functional Concept for Sustain 2015-2024.

TRADOC Pam 525-5-500

Commander's Appreciation and Campaign Design.

TRADOC Pam 525-7-19

TRADOC Pam 525-7-1

The U.S. Army Concept Capability Plan for Unit Protection for the Future Modular Force 2015-2024.

TRADOC Pam 525-7-2

The U.S. Army Concept Capability Plan for Distribution Operations for the Future Modular Force 2015-2024.

TRADOC Pam 525-7-4

The U.S. Army's Concept Capability Plan for Space Operations 2015-2024.

Appendix B

Linkage of the CCP Solution to National Strategy and Joint and Army Concepts

B-1. JICCWMD

a. The military problem in the JICCWMD is that the JFC lacks a full range of capabilities to support unified action to proactively and comprehensively dissuade, defeat, deter or mitigate the rogue behavior of multiple WMD functional networks. The JIC emphasizes a layered solution to the military problem that includes synchronized execution of CWMD missions against multiple WMD network functions such as weapons delivery, finance, logistics, C2, and others.

b. The JFC's effort to CWMD is focused on an adversary's decisionmaking calculus. The desired effects to influence that calculus are to impose costs or to deny benefits or to influence the adversary's perception of WMD program costs and benefits versus the value of restraint. Effective decisionmaking calculus targeting is accomplished through application of a broad range of military capabilities against multiple WMD networks. The elements critical to success of the joint campaign include engaging early, coping with uncertainty, layering the approach, and establishing attribution. These critical elements of the joint campaign strongly influenced the key ideas in the TRADOC Pam 525-7-19 proposed solution set to the military problems.

B-2. TRADOC Pam 525-3-0

a. The concept described in this capstone is developed to solve the following military problem: The Army, in a JIIM context, must address fundamental operational requirements for expeditionary agility and responsiveness as well as the staying power, durability, and adaptability to carry a conflict to a victorious conclusion, no matter what form it eventually takes.

b. The TRADOC Pam 525-3-0 describes three potential alternative futures against which to propose conceptual frameworks for providing solutions to the military problem. In the third proposed alternative future, the military problem is not solved. The more emphasized of the two futures leading to military success is the one in which irregular, long term wars predominate. The second future is a potentially catastrophic warfare future—one in which WMD have proliferated globally and the threshold for their use has fallen. In this second proposed future, the Army would expect both state and non-state adversaries to employ WMD capabilities to deter and deny U.S. intervention, negate U.S. military advantages, and impose a requirement on U.S. forces to operate within contaminated environments. There are numerous downsides to this future, not the least of which would be that it could call into question the survival of the Nation.

c. The intent of the concept capabilities proposed in TRADOC Pam 525-7-19 is to reduce the likelihood of transition from the irregular warfare future to the catastrophic warfare future.

d. As mentioned above, the U.S. Army capstone concept does not provide a solution to the military problem if the third alternative future becomes reality. That alternative future could result from failure to hold true of any of ten key assumptions identified in the capstone concept. Of those ten assumptions, the following have particular relevance to TRADOC Pam 525-7-19.

- (1) Improved SU and maintained information superiority.
- (2) Fully integrated battle command systems (both horizontally and vertically).
- (3) Adequate joint information dissemination and management.
- (4) High confidence battle damage assessments.
- (5) Smaller logistical infrastructures leading to sustainment demand reductions.
- (6) Effective defense against WMD.

e. For each of the two potential futures enabling solution of the military problem posed in TRADOC Pam 525-3-0, the document provides several implications that apply to TRADOC Pam 525-7-19 to include:

- (1) Requirement for increased force versatility.
- (2) Minimized potential for single-point strategic surprise and failure.
- (3) A culture of innovation and adaptability.
- (4) Institutionalized solutions to integrate and unify U.S. civil/military authorities.
- (5) Ability for balanced forces to intervene rapidly.
- (6) Network-enabled battle command.
- (7) Requirement for SU.
- (8) Goal of full operational net assessment of adversaries.
- (9) Modular, brigade-based force structure.
- (10) Reduced sustainment demand and logistical infrastructure in theater.
- (11) Continuous pressure on the adversary.
- (12) Denial of enemy opportunities to exercise initiative.
- (13) Denial of enemy use of sanctuaries.

B-3. TRADOC Pam 525-3-1

a. TRADOC Pam 525-3-1 mentions all three futures described in the capstone concept but specifically treats only the irregular warfare dominant future. In this interpretation of that future, the use (but not widespread use) of WMD in conflict can occur.

b. TRADOC Pam 525-3-1 provides many of the same implications found in the capstone concept but also provides additional implications with relevance to this CCP's key ideas, enablers, and tasks. The additional implications include the following.

- (1) Deter or deny the use of WMD in conflict.
- (2) Persistent surveillance of critical enemy capabilities.
- (3) Unit-based force protection capabilities including WMD defense.
- (4) Combat support capabilities employed in direct support of decisive operations.
- (5) Potential for operations in contaminated environments.
- (6) Use of unmanned systems and other robotics to improve survivability and SA.
- (7) Sensors to see through, under, and around urban structures.
- (8) Urban-tailored communications networks and highly maneuverable ground assault vehicles to deal with urban clutter and restricted pathways.
- (9) Impact of foreign CM missions on operational tempo.
- (10) Use of mobile formations in distributed operations with decentralized forces to reduce risk of catastrophic loss.

B-4. TRADOC Pam 525-3-2

a. Key solution elements to the operational problem posited in this concept include higher levels of SU, networked C2, and improved mobility. These elements enable the force to be proactive, which is one of the two key ideas of TRADOC Pam 525-7-19.

b. In addition to many of the same implications found in the concepts summarized above, this TRADOC Pam 525-3-2 provides the following additional relevant implications.

- (1) Rapid tactical maneuver can quickly position future Modular Force units near the enemy, making the enemy's use of WMD problematic for his own forces.

(2) Future Modular Force units operate from dispersed, noncontiguous areas throughout the depth of the operational environment thus complicating an enemy's WMD targeting decisions.

(3) Joint ISR focuses on identifying WMD capable enemy forces.

(4) Reconnaissance units enable contamination avoidance by detecting contaminated areas and making that information immediately available to all other units through the COP.

(5) The future Modular Force will further integrate the capabilities of joint, multinational, interagency, and nongovernmental organizations at the tactical level.

B-5. TRADOC Pam 525-2-1

a. TRADOC Pam 525-2-1 focuses on the acquisition of data, transformation of data into information and knowledge, and provision of knowledge to the future Modular Force to help enable SU of the complex operational environment. The ability to see first, understand first, and act first depends on the ability of the commander to acquire data and information from the operational environment. It also depends on an ability to transform information into knowledge and intelligence, and to provide it in a form that best helps commanders combine the knowledge with judgment and intuition to decide and act effectively.

b. The military problem is that future operational environments and adaptive enemy operations will require highly detailed actionable intelligence and the complexity of the JOE may hinder anticipation (increase uncertainty) of future events. Large amounts of intelligence and other information will demand rapid and accurate processing, analysis, and distribution capacity.

c. The key ideas forming the solution to this problem include the following.

(1) Acquire. Acquire data about the environment, friendly, and enemy forces to support development of information and knowledge and, ultimately, support understanding.

(2) Transform. Convert data into knowledge, which the force can employ operationally.

(3) The fusion and analysis needed is the most important and difficult element of the see function.

(4) Provide. Distribute knowledge and intelligence to the right users at the right time and in the right form.

(5) Exploit data. Develop data exploitation tools that account for ambiguities in data and to mine large quantities of varied data to help analysts use the data more effectively.

d. In addition to many of the same implications found in the concepts summarized above, this concept provides the following additional relevant implications:

- (1) CBRN sensors comprise an integrated detection network crucial to protecting the force.
- (2) Sensors are rapidly tailorable to accommodate new observables.
- (3) Near real time COP visualization.
- (4) Embedded ability to conduct mission rehearsal en route.
- (5) Accurate and rapid understanding of environmental constraints.
- (6) Reliable network access with need to know security protections, data sharing, and collaboration (such as, access on as needed basis).
- (7) Lowest echelons able to share a near-real-time COP horizontally and vertically.
- (8) Shortened decision cycles.
- (9) More accurate estimates and forecasts.
- (10) Rapid and accurate assessment of effects on targets.
- (11) Rapid downlink, processing, and analysis of national and commercial imagery.
- (12) Organic data transformation capabilities at lower tactical levels.
- (13) Network access to mine extensive data sources to detect patterns and relationships.
- (14) Organic and non-organic collection means to detect, locate, identify, and track targets.
- (15) Collection against ambiguous and low signature systems.
- (16) Use of knowledge built by JIIM organizations in and outside the operational environment.
- (17) Evidentiary data for attribution.
- (18) Modeling potential population impact of friendly and enemy operations.
- (19) Reachback to military and civilian experts from across a variety of disciplines.
- (20) Identification and tracking for designated individuals.
- (21) Effective integration of multinational forces' capabilities and SA.

B-6. TRADOC Pam 525-3-3 and TRADOC Pam 525-3-4

TRADOC Pam 525-3-3 and TRADOC Pam 525-3-4 provided no relevant content that has not already been addressed in the reviews of the other functional concepts presented thus far.

B-7. TRADOC Pam 525-3-5

a. The basic operational problem underlying this concept is enemy attacks against people, assets, and information. A primary aspect of the concept solution is to not just rely on traditional passive protection capabilities but to increasingly use active capabilities to counter adversaries before they can produce their desired effects on friendly operations. Active capabilities will be at the platform and unit level, and will protect in both static and mobile situations. This active protection may also be achieved, in part, through seizing the initiative, and conducting simultaneous and distributed operations. This solution has similarities to the CWMD CCP solution key idea of being proactive and engaging early as a means to protect against potential attacks conducted at a time and place chosen by an adversary.

b. In addition to many of the same implications found in the concepts summarized above, this concept provides the following additional relevant implications:

- (1) Detect includes an ability to sense the full range of CBRN hazards.
- (2) Soldiers must be protected from CBRN weapons, to include exposure to non-military TIM.
- (3) Army civilians and contractors will require protection capabilities similar to Soldiers.
- (4) Unmanned system capabilities must have a learning based perception to understand their environment and recognize variables.
- (5) Unmanned platforms will require modular capability packages. One such package could be a mechanical system that can manipulate objects to neutralize/destroy CBRN materials.
- (6) Robotics is required at the lowest unit level and must be fully integrated into the organization's organic protection scheme.
- (7) The Army must be prepared to support combat operations for WMD elimination by locating, identifying, securing, rendering safe, disabling, and destroying an adversary's WMD programs and related capabilities.
- (8) In any environment, the Army must be prepared to support operations to interdict the transit of WMD, its delivery systems and associated components, technologies, and expertise. Often this will be part of a joint operation requiring a rapid reaction to a fluid situation.
- (9) The Army must be capable of managing the consequences of a WMD attack and to provide support to the U.S. and friendly nations' civil population and governments to restore essential operations and services.

(10) Soldier PPE must allow the Soldier to remain mobile and flexible while providing protection in CBRN environments.

B-8. TRADOC Pam 525-3-6

TRADOC Pam 525-3-6 did not present content related to the TRADOC Pam 525-7-19 framework that has not already been summarized in the above reviews of Army concepts.

B-9. TRADOC Pam 525-4-1

TRADOC Pam 525-4-1 did not present much relevant content distinguishable from that already summarized in the above Army concept reviews. The exception was this implication: the future Modular Force requires the capability to test and treat contaminated water in a CBRN environment and support CBRN decontamination operations.

B-10. TRADOC Pam 525-7-1

a. TRADOC Pam 525-7-1 scope includes protection functions and the integration of desired capabilities to preserve the operational and tactical freedom of movement. The scope also includes protection for personnel, assets, and information against all sources of threat, including CBRN. It uses the detect, assess, decide, act, and recover construct from the protection functional concept. However, the emphasis is not just on these passive defense actions. The concept also discusses how the Army must conduct tactical procedures to reduce or eliminate the number and effectiveness of attacks. This is similar to the ‘proactive approach’ key idea in TRADOC Pam 525-7-19.

b. TRADOC Pam 525-7-1 also uses the tactical maneuver operating concept qualities of firsts: see first, understand first, act first, finish decisively, and re-engage at will. In this CCP, the decide, assess, decide, act, and recover functions enable the five qualities of firsts.

B-11. TRADOC Pam 525-7-2

- a. Speed, precision, and accuracy for exploiting information to improve planning.
- b. Means and procedures to manage information.
- c. Criticality of collaborative planning and monitoring between supported and supporting units.
- d. State of the art C2 networks (one of the CCP’s key ideas).
- e. Robust C2 organization, using a COP and information systems to provide collaborative and responsive operational and tactical support synchronization.
- f. Exchange between coalition partners of classified information required for operations.

B-12. TRADOC Pam 525-7-4

TRADOC Pam 525-7-4 includes the following implications to TRADOC Pam 525-7-19.

- a. Space systems play a large role in the ability to detect and deter.
 - b. Space based systems must move into a direct support role for land component operations.
 - c. Army space support operations will provide dedicated, responsive theater focused support to operational and tactical commanders.
 - d. Space payloads will operate in a global network-enabled environment, support common access across each echelon, and support distributed operations.
 - e. Space systems supporting land forces may be under national, civil, commercial, military, or international consortium control.
 - f. CBRN units identify CBRN contamination; weapons research, development, production, storage, and delivery systems; and TIM within the JOA. Space based assets assist these efforts.
 - g. Space based assets assist early entry operations by identifying options for and assessing results of WMD interdiction, direct and indirect attacks, or WMD elimination operations.
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Appendix C

Relationship of CWMD Required Capabilities to Alternative Taxonomies

C-1. Future required capabilities

Future required capabilities listed in chapter 5 bin into the taxonomies found in three other sources: The NMSCWMD, JICCWMD, and TRADOC Pam 525-3-5. Each of these sources significantly influenced CCP analysis, and they describe CWMD from different perspectives. The bins in the selected taxonomies include:

- a. The eight mission areas in the NMSCWMD.
- b. The four lines of operation (LOOs) defined in the JICCWMD (fight for intelligence, shape and assure, impose cost, and deny benefits).
- c. The five protection tasks identified in TRADOC Pam 525-3-5 (detect, assess, decide, act, and recover).

(1) A description of the NMSCWMD mission areas was discussed earlier. Descriptions of taxonomy elements in the other two sources follow. This information, taken from the source documents, helped support assignment of required capabilities into the various structure elements.

(2) The JICCWMD uses LOOs to help visualize the intended progress of the joint force toward achieving operational and strategic objectives. LOOs define the orientation of the force in time and space or purpose in relation to an adversary or objective. One way the JFC might consider designing his LOOs is through application of the central idea of this JIC, that being to impose costs or deny benefits or to influence the perception of costs, benefits, and value of restraint for any WMD related course of action. In this construct, the JFC would derive four LOOs.

(a) Fight for intelligence. These directed military and nonmilitary actions seek to obtain detailed knowledge about WMD actors, their actions, intentions, and their enabling networks. This fight for intelligence activities complement DOD and National intelligence campaigns and may require the JFC to conduct overt, covert or clandestine actions specifically designed to provoke a response that illuminates the adversaries' networks, intentions, support activities, and personalities. These actions also seek overall SA of all potential WMD actors, state or non-state, known, anticipated or unknown.

(b) Shape and assure. These actions prepare the operational environment for future operations by shaping the perceptions, influencing the behavior of WMD actors and promoting cooperation with CWMD allies in order to assure combating WMD success. The effects of singular actions or cumulative effects of multiple actions may be decisive, causing the WMD actor to forgo development, acquisition, or employment, or they may establish conditions with partners and allies that enable other LOOs to be decisive.

(c) Impose cost. These actions apply, or demonstrate the ability to apply, destructive and disruptive military capabilities against a WMD actor under conditions that range from uncertain to hostile. These actions produce both kinetic and non-kinetic effects and increase the political and resource costs to WMD actors. The JFC designs these actions to defeat a hostile actor's attempts to proliferate, gain, deploy, or employ WMD and to dissuade these hostile actors from future WMD related activities. The demonstrated ability to execute these actions may influence WMD actors' perception of potential costs for pursuing a particular course of action and thus may have a deterrent effect.

(d) Deny benefits. These are activities to defend, respond, and recover from WMD use or demonstrate the capability to do so. They include coordination, integration, synchronization and execution actions that reduce U.S., allied, and partner vulnerabilities to WMD attack and that minimize the effects (for example, physical and functional) of WMD use. This LOO denies or threatens to deny political or military benefits for WMD possession or use. The demonstrated ability to execute these actions may have a deterrent effect on WMD actors.

(3) TRADOC Pam 525-3-5 defines the five protection tasks as:

(a) Detect. Detect includes an ability to sense the full range of friendly and hostile air, ground, CBRN, electronic and intelligence activities to provide real time SA enabling 360° hemispherical protection. To detect, military forces must collect timely, unambiguous, and accurate data on adversary capabilities and actions planned or employed against friendly personnel, assets, or information.

(b) Assess. Assess includes the ability to recognize, classify, and identify data and information upon detection to correctly formulate procedures and drive courses of action, enabling the ability to decide. Protection assessment will include the ability to share friendly and adversary information relevant to the operational environment, in order to facilitate SU.

(c) Decide. Decide is the ability to reach an appropriate judgment after planning and analyzing courses of action. The decide function also includes the ability to task, monitor, and change an action after a decision has been made.

(d) Act. Act includes the capability to execute the subtasks of active and passive measures to protect the force, and may include both offensive and defensive operations. These measures can be proactive or reactive, and include the ability to execute warning of both friendly and enemy actions.

(e) Recover. Recover includes actions taken during or after an event to restore, in a minimum amount of time, all capabilities that protect personnel, assets, and information. When directed, recovery includes support to interagency and multinational partners, domestic and foreign civilians, and their infrastructure.

C-2. Cross Cutting Relationships

The cross cutting relationships of the required capability statements from table 5-1 to NMSCWMD mission areas, JICCWMD LOOs, and TRADOC Pam 525-3-5 protection tasks are provided in table C-1.

**Table C-1
CWMD Required Capabilities Crosswalk**

Required Capability #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36			
Echelon:																																							
National	X	X	X				X	X		X						X											X					X	X	X	X	X	X	X	
Strategic	X	X	X				X	X	X	X	X				X	X							X	X			X					X	X	X	X	X	X	X	
Operational	X	X	X				X	X	X	X	X	X	X	X	X	X	X							X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Tactical	X	X	X				X	X		X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CBRN	X	X	X				X	X			X	X		X	X	X	X						X	X	X	X			X	X			X	X	X	X	X	X	
Medical																																							
Generating Force				X	X	X																																	
NMSCWMD Mission:																																							
Security Cooperation	X	X	X	X	X	X	X	X	X	X	X	X	X	X																									
Threat Reduction															X																								
WMD-Interdiction	X	X	X	X	X	X										X	X	X	X	X	X	X	X																
WMD-Offensive Operations	X	X	X	X	X	X										X	X	X	X	X	X	X	X	X															
WMD-Elimination	X	X	X	X	X	X										X	X	X	X	X	X	X	X	X	X														
Active Defense	X	X	X	X	X	X	X	X								X	X	X	X	X	X	X	X				X	X											
Passive Defense	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X	X	X				X		X	X	X	X	X	X	X	X	X	X	X	
Consequence Management	X	X	X	X	X	X	X						X			X	X	X	X	X	X								X	X	X								
TP 525-3-5 Protect Task:																																							
Detect	X	X	X	X	X	X	X	X	X	X	X	X			X					X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		
Assess	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X			X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Decide	X	X	X	X	X	X			X	X	X	X			X	X	X			X	X	X	X		X		X	X	X	X			X		X				
Act	X	X	X	X	X	X			X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Recover	X	X	X	X	X	X						X			X	X		X	X	X								X	X										
JICCWMD LOO																																							
Fight for Intelligence	X	X	X	X		X	X	X		X	X	X			X	X		X			X			X			X				X	X	X	X	X	X	X		
Shape and Assure		X	X		X	X			X	X	X	X	X							X	X	X		X			X	X	X						X				
Impose Cost		X	X	X			X																	X	X		X	X									X		
Deny Benefits		X	X	X			X		X		X	X				X	X	X			X			X		X		X	X	X				X	X	X	X		

Required Capability #	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72			
Echelon:																																							
National	X	X	X	X	X																																		
Strategic	X	X	X	X	X	X	X	X	X																		X												
Operational	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										X	X	X	X										
Tactical	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X					
CBRN	X	X	X	X		X	X	X		X	X	X	X	X	X	X		X	X	X	X						X	X	X	X	X	X	X	X	X				
Medical																																			X	X			
Generating Force					X				X																											X	X		
NMSCWMD																																							
Mission:																																							
Security Cooperation								X																															
Threat Reduction							X																																
WMD-Interdiction																																							
WMD-Offensive Operations																																							
WMD-Elimination																																							
Active Defense																																							
Passive Defense	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X													
Consequence Management																											X	X	X	X	X	X	X	X	X	X	X	X	X
TP 525-3-5																																							
Protect Task:																																							
Detect	X	X	X	X		X				X	X		X	X	X	X		X	X		X		X	X			X												
Assess	X	X	X	X		X				X	X	X	X	X	X	X		X	X		X		X	X			X	X	X										
Decide										X		X	X	X	X	X	X		X		X		X			X	X	X		X		X		X		X	X		
Act					X		X	X	X	X				X		X	X	X		X		X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	
Recover																	X	X	X	X											X	X		X	X	X	X	X	
JICWMD LOO																																							
Fight for Intelligence	X	X	X			X			X	X	X	X	X	X		X		X										X											
Shape and Assure				X		X		X	X			X	X	X												X	X		X			X							
Impose Cost	X				X	X				X	X	X							X	X						X													
Deny Benefits	X				X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Glossary

Section I

Abbreviations

ARCIC	Army Capabilities Integration Center
BCT	brigade combat team
C	CBRN specialized units (operating force; tactical)
C2	command and control
CBA	capabilities based assessment
CBRN	chemical, biological, radiological, and nuclear
CBRNE	chemical, biological, radiological, nuclear, and high-yield explosive
CCP	concept capability plan
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Manual
CM	consequence management
COP	common operational picture
CWMD	combating weapons of mass destruction
DA	Department of the Army
DAWG	Deputy Secretary of Defense advisory working group
DOD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Instruction
DOTMLPF	doctrine, organization, training, materiel, leadership and education, personnel, and facilities 2
FM	field manual
G	generating force (all)
GIG	global information grid
ICDT	integrated capabilities development team
IQL	integrated question list
ISR	intelligence, surveillance, and reconnaissance
JCIDS	Joint Capabilities Integration and Development System
JFC	joint force commander
JIC	joint integrating concept
JICCWMD	Joint Integrating Concept for Combating Weapons of Mass Destruction
JIIM	joint, interagency, intergovernmental, and multinational
JOA	joint operating area
JOE	joint operational environment
JP	joint publication
LOO	line of operation
MANSCEN	Maneuver Support Center
N	national
NATO	North Atlantic Treaty Organization
NEBC	network-enabled battle command
NMSCWMD	National Military Strategy for Combating Weapons of Mass Destruction

O	operational units (operating force units; division equivalent for constructive visualization)
PPE	personal protective equipment
ROE	rules of engagement
S	strategic
SA	situational awareness
SME	subject matter expert
SOF	special operations forces
SU	situational understanding
T	tactical units (operating force units; BCT equivalent for constructive visualization purposes)
TIM	toxic industrial material
TRADOC	United States Training and Doctrine Command
UAS	unmanned aerial system
UGS	unmanned ground system
U.S.	United States
USJFCOM	U.S. joint forces command
WMD	weapons of mass destruction

Section II

Terms

active defense

WMD active defense measures include, but are not limited to, missile defense (ballistic and cruise), air defense, special operations, and security operations to defend against conventionally and unconventionally delivered WMD. A layered, networked defensive capability will incorporate networked homeland and regional land, sea, air, and space-based systems, and will employ both lethal and non-lethal means of defeating the delivery of WMD. (NMSCWMD).

active protection

The future Modular Force must not rely only upon passive capabilities but should increasingly utilize active capabilities to counter an adversary before threats are capable of affecting friendly operations. Active capabilities that detect a threat at the earliest moment and act against it are essential. Active capabilities will be found at the platform and unit level, and will protect in both static and mobile situations. This active protection may also be achieved, in part, through seizing the initiative, and conducting simultaneous, continuous, and distributed operations. (TRADOC Pam 525-3-5).

combating weapons of mass destruction

The integrated and dynamic activities of the DOD across the full range of counter proliferation, nonproliferation, and consequence management efforts to counter WMD, their means of delivery, and related materials. (NMSCWMD).

consequence management (CWMD pillar)

The U.S. must be prepared to respond to the use of WMD against our citizens, our military forces, and those of friends and allies. We will develop and maintain the capability to reduce to

the extent possible the potentially horrific consequences of WMD attacks both foreign and domestic. (National Strategy for Combating Weapons of Mass Destruction).

counterforce

Operations to positively identify and select WMD targets such as leadership, expertise, acquisition, weaponization, facility preparation, production, infrastructure, exportation, deployment, and delivery systems. Further, it entails matching the means (lethal or non-lethal), conducting the attack, and assessing damages to include any consequences from collateral damage. (*JICCWMD*).

counter proliferation (CWMD pillar)

The possession and increased likelihood of use of WMD by hostile states and terrorists are realities of the contemporary security environment. It is therefore critical that the U.S. military and appropriate civilian agencies be prepared to deter and defend against the full range of possible WMD employment scenarios. Ensure all needed capabilities to combat WMD are fully integrated into the emerging defense transformation plan and into our homeland security posture. Counter proliferation will also be fully integrated into the basic doctrine, training, and equipping of all forces, in order to ensure that they can sustain operations to decisively defeat WMD-armed adversaries. (National Strategy for Combating Weapons of Mass Destruction).

decisionmaking calculus

The reasoning process, (to include biases and values), that leads an actor to selection of a particular course of action. It consists of three primary elements: perceived benefits of a course of action, perceived costs of a course of action and perceived consequences of restraint. (*JICCWMD*, and derived from Deterrence Operations JOC).

disparate sensors

Disparate sensors exist for specific purposes not related to CBRN (meteorological, fire control, and others) that, when combined with CBRN sensor data, produce a synergistic data improvement. (TRADOC Pam 525-66).

fusion

Fusion, by definition (reference TRADOC Pam 525-3-66), is a series of processes to transform observable data into more detailed and refined information, knowledge, and understanding. There are six levels of fusion (0-5). However, it is levels 1 through 3 that add progressively greater meaning and involve more analysis. Level 4 is continuous and occurs at all levels of fusion.

generating force

The generating force consists of those organizations whose primary mission is to generate and sustain the operational Army's capabilities for employment by JFCs. (FM 1-01)

global information grid

Globally interconnected, end-to-end set of information capabilities, associated processes, and personnel for collecting, processing, storing, disseminating and managing information on demand to warfighters, policy makers, and support personnel. The GIG supports DOD National

security, and related intelligence community missions and functions (strategic, operational, tactical, and business), in war and in peace. The GIG provides capabilities from all operating locations (bases, posts, camps, stations, facilities, mobile platforms, and deployed sites). The GIG provides interfaces to coalition, allied, and non-DOD users and systems.

hybrid force

The evolving 2015-2024 Army force that will contain a number of unit configurations until it fully transitions to the future Modular Force configuration in the 2030 timeframe. (TRADOC Pam 525-3-4).

latency

The time that elapses between a stimulus and the response to it. A time delay between the moment something is initiated and the moment one of its effects begins or becomes detectable. The lag time or turnaround time from detection to receipt by the user. (ISR CCP).

layered approach

Combating WMD networks through integration of multiple operations to generate combinations of direct and indirect effects. The layered application of CWMD operations contributes to thinning out the threat (via offensive operations, interdiction, elimination and active defense), so that the effects of any employed residual WMD are minimal. Forces will survive and operate in CBRN contaminated environments through the means of passive defense; and, other forces may be leveraged to respond to requests for consequence management assistance. (*JICCWMD*).

line of operation

A logical line that connects actions on nodes and decisive points related in time and purpose with an objective(s). A physical line that defines the interior or exterior orientation of the force in relation to the enemy or that connects actions on nodes decisive points related in time and space to an objective(s). (*JICCWMD*).

National Military Strategy to Combat Weapons of Mass Destruction

The National Military Strategy to CWMD is derived from the DOD mission to dissuade, deter and defeat those who seek to harm the U.S., its allies, and partners through WMD use or threat of use and, if attacked, to mitigate the effects and restore deterrence. (NMSCWMD).

network-enabled battle command

An integrated battle command and information systems ISR network, vertically and horizontally integrated from the strategic to the tactical level ensuring: the ability to draw and share information in near real time from a wide variety of automated and manual sources, on-board sensors, manned, and unmanned platforms. (TRADOC Pam 525-3-3).

nonproliferation (CWMD pillar)

The limitation of the production or spread of something, in this case, nuclear or chemical weapons. The U.S. must work to ensure treaty compliance and to with other states to improve their capability to prevent unauthorized transfers of WMD and missile technology, expertise, and material. (National Strategy for Combating Weapons of Mass Destruction).

non-state actors

Include terrorists, extremists, terrorist networks, transnational threats, nongovernmental organizations, businesses, rogue scientists and technicians, as well as individuals acting independently of any organization. (NMSCWMD).

offensive operations

WMD offensive operations may include lethal and nonlethal options to deter or defeat a WMD threat or subsequent use of WMD. Offensive operations encompass the detection, identification, disruption, and destruction of an adversary's WMD assets, means of delivery, associated facilities and other high value targets necessary to achieve the desired effects and objectives. Offensive operations may be conducted at any time, across the spectrum of conflict. (NMSCWMD).

operating forces

Those forces whose primary missions are to participate in combat and its integral supporting elements. (JP 1-02).

passive defense

WMD passive defense includes measures to minimize or negate the vulnerability and minimize effects of WMD use against U.S., partner, and allied forces, as well as U.S. military interests, installations, and critical infrastructure. Passive defense operations are addressed extensively in joint and military department doctrine, and are organized around four key capabilities of sense, shape, shield, and sustain. Success in passive defense operations depends on the effective integration of equipment, trained personnel, and proven techniques, tactics, and procedures. In addition, passive defense capabilities contribute to the success of other combating WMD missions, including interdiction, elimination, and consequence management. (NMSCWMD).

reachback

The process of obtaining products, services, and applications, or forces, or equipment, or material from organizations that are not forward deployed (JP 1-02).

scalable

With reference to protective clothing, the concept of providing varying levels of protection based upon the perceived threat and risk analysis. This could include use of tailorable, less cumbersome PPE providing short-term protection until sensors indicate the need either to switch to a higher level of PPE or to remove PPE clothing and masks.

security cooperation and partner activities

Security cooperation and partner activities are those military activities that support international efforts to combat WMD. These activities promote improved partnership capacity to combat WMD across the eight mission areas. (NMSCWMD).

site assessment

Site assessment includes early, on-site aspects of site exploitation in which the site is characterized as to threats present and types of evidence that are or may be available. (FM 3-90.15).

site exploitation

Site exploitation consists of a related series of activities inside a captured site. These activities exploit personnel, documents, electronic data, and material captured at the site, while neutralizing any threat posed by the site or its contents. While the physical process of exploiting the site begins at the site, full exploitation may involve teams of experts located around the world. Site exploitation is a combined-arms operation requiring preparation, planning, assessment, coordination, and execution oversight by commanders and their staffs. (FM 3-90.15)

situational awareness

Immediate knowledge of the conditions of the operation, constrained geographically and in time. It is based on information and knowledge products, such as the COP and running estimates. (FM 3-0).

situational understanding

Situational understanding is the product of applying analysis and judgment to relevant information to determine the relationships among the mission variables to facilitate decisionmaking. It enables commanders to determine the implications of what is happening and forecast what may happen. Situational understanding enhances decisionmaking by identifying opportunities, threats to the force or mission accomplishment, and information gaps. (FM 3-0).

threat reduction cooperation

Activities undertaken with the consent and cooperation of host nation authorities to enhance physical security; emplace detection equipment; and reduce, dismantle, redirect, and improve protection of a state's existing WMD programs, stockpiles and capabilities. (NMSCWMD).

toxic industrial chemical

Chemical developed or manufactured for use in industrial operations or research by industry, government, or academia and are not primarily manufactured for the specific purpose of producing human casualties or rendering equipment, facilities, or areas dangerous for human use. (JP 3-11).

toxic industrial material

A generic term for toxic or radioactive substances in solid, liquid, aerosolized, or gaseous form that may be used, or stored for use, for industrial, commercial, medical, military, or domestic purposes. Toxic industrial material may be chemical, biological, or radioactive and described as toxic industrial chemical, toxic industrial biological or toxic industrial radiological. (JP 3-11).

weapons of mass destruction

Weapons capable of a high order of destruction and of being used in such a manner as to destroy large numbers of people. Weapons of mass destruction can be high-yield explosives or nuclear, biological, chemical, or radiological weapons, but exclude the means of transporting or propelling the weapon where such means is a separable and divisible part of the weapon. (JP 1-02).

weapons of mass destruction consequence management

WMD consequence management includes those actions taken to reduce the effects of a WMD attack or event, including TIM, and assist in the restoration of essential operations and services at home and abroad. Domestic consequence management operations are those conducted within the continental U.S., Alaska, Hawaii, the District of Columbia, the Commonwealth of Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Marian Islands. Foreign consequence management operations are conducted outside the U.S. and its territories. (NMSCWMD).

weapons of mass destruction elimination

Systematically locate, characterize, secure, disable, and destroy a state or non-state actor's WMD programs and related capabilities in hostile or uncertain environments. The priority for elimination activities is to reduce or eliminate the threat to the U.S. and to support military and national objectives. (NMSCWMD).

weapons of mass destruction interdiction

Operations are designed to stop the transit of WMD, delivery systems, associated and dual-use technologies, materials, and expertise between states of concern and between state and non-state actors, whether undertaken by the military or by other agencies of government. The focus of interdiction extends beyond traditional military interdiction conducted during hostilities to encompass peacetime military interdiction of dual-use materials. (NMSCWMD).

weapons of mass destruction network

Complex and adaptive WMD are composed of finance, science and technology, logistics, weapons delivery, ISR, and C2 components. These networks may be small or extremely large and they can be transnational. Nodes and links in networks may specialize or may participate in multiple functions. These enabling networks are adaptive, responding to changes in their environment, and learning, acquiring new knowledge through study. These networks are also selectively active, lying dormant when their support is not required and becoming active as the WMD development process requires. This adaptability and selective activation requires characteristics of connectivity and interoperability. These characteristics allow the network to function, but they also create vulnerabilities because the intersection of tasks creates risk of exposure. (JICCWMD).

Section III**Special abbreviations and terms**

This section contains no entries.

