MCDC:

Countering Weapons of Mass Destruction

Guidebook

understand • cooperate • succeed

chemical•biological•radiological•nuclear

JUNE2021

Countering Weapons of Mass Destruction (CWMD) Guidebook

A Multinational Capability Development Campaign project

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Distribution Statement

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Executive Summary

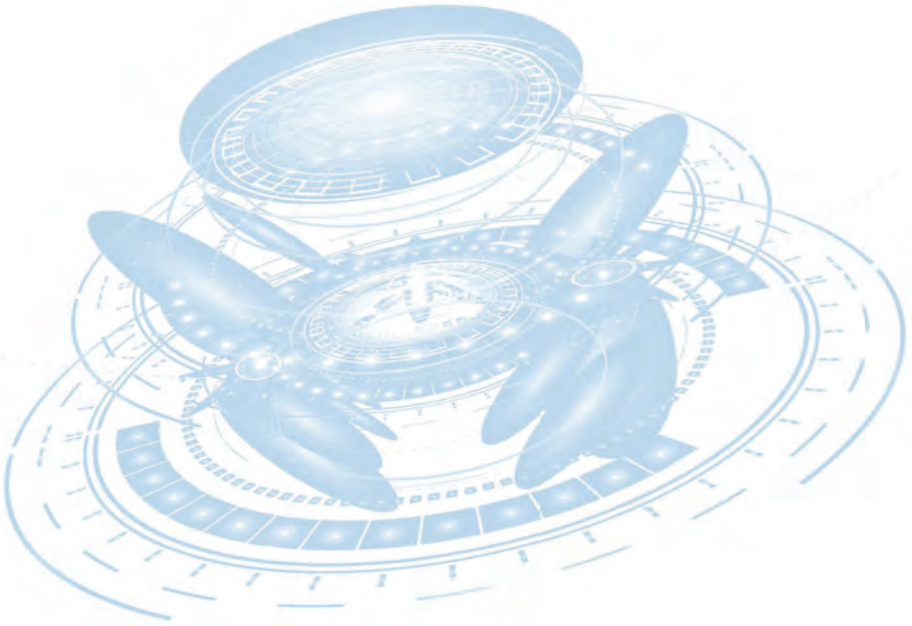
This Guidebook provides military and civilian leaders and planners with an overview of recommended tools, tactics, techniques, and procedures for countering weapons of mass destruction (CWMD).

Before the later part of the 20th century, only nation states possessed the resources to develop and employ chemical, biological, radiological, and nuclear (CBRN) weapons. These nations focused primarily on efforts to protect their forces and prepare them to operate in CBRN environments. In addition, alliances of these nations developed strategies, organisations, military plans, and protective equipment to respond to CBRN incidents.

In the 21st century, technological advances and the trans-regional and global nature of weapons of mass destruction (WMD) enable both state and non-state actors of concern to develop and employ WMD. This requires allies and partners, including civil stakeholders, multinational organisations, and militaries to work together to prevent and mitigate the threat from WMD. Countering weapons of mass destruction cannot be viewed as a unique mission to be executed only by specialized forces and organisations. Instead, allies and partners should develop and implement a whole-of-government and multinational approach, in order to effectively understand and counter the threat from WMD.

This Guidebook examines the WMD threat and introduces recommended tools, processes, and activities to counter WMD. It presents a broad span of CWMD-related topics to inform leaders and planners at the operational and strategic levels of the CWMD mission. Topics include: a study of the strategic WMD environment and the WMD activity continuum; the competition continuum; an introduction to the elements of national power; identification of the range of CWMD activities; a review of legal instruments for CWMD; an application of CWMD by military leaders; and terminology.

Contents



1. Terminology

There are several definitions of the term "Weapons of Mass Destruction," along with numerous related terms and concepts.[1] Nations and organisations have developed entire lexicons around their own accepted definitions, adding to the already-difficult task of gaining a common understanding of WMD and cooperating at the multinational level. It is not possible to list all nations' and organisations' definitions in this Guidebook, nor to explain all similarities or differences in terminology. As an introduction to the topic of this guidebook the most relevant and frequently used terms are defined below. Additional definitions are provided in the Lexicon at the back of this document.

Weapons of Mass Destruction (WMD)

There is no universally agreed definition of the term "weapons of mass destruction." The term appears as "*weapons adaptable to mass destruction*" in the very first resolution passed by the United Nations (UN) General Assembly in 1946.[2] Two years later, in 1948, the term "weapons of mass destruction" (WMD) was officially introduced by the United Nations as:

"atomic explosive weapons, radioactive material weapons, lethal chemical and biological weapons, and any weapons developed in the future which have characteristics comparable in destructive effect to those of the atomic bomb or other weapons mentioned above." [3]

The UN definition reflects the most common use of the phrase WMD as a collective term for chemical, biological, radiological, and nuclear weapons, and it remains the definition in use today for purposes of disarmament diplomacy.

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1 W. Seth Carus. *Occasional Paper 8 Defining "Weapons of Mass Destruction",* National Defense University Press, Jan 2012, ndupress.ndu.edu/Portals/68/Documents/occasional/cswmd/CSWMD_OccationalPaper-8.pdf.

2 "Establishment of a Commission to Deal with the Problems Raised by the Discovery of Atomic Energy." *United Nations Digital Library*, United Nations, 1946, undocs.org/en/A/RES/1(I).

3 "Resolutions Adopted by the Security Council in 1948 Security Council." *United Nations Digital Library*, United Nations Security Council, digitallibrary.un.org/record/755665/files/S_C.3_32_Rev.1-EN.pdf.

In the North Atlantic Treaty Organisation (NATO) Terminology Database and the NATO Glossary of Terms and Definitions (AAP-06 Edition 2020), WMD is defined as:

"A weapon that is able to cause widespread devastation and loss of life." [4/5]

For the purpose of this Guidebook, which is intended primarily for military leaders and planners, "weapons of mass destruction" are defined as:

"Chemical, biological, radiological, or nuclear weapons capable of a high order of destruction or causing mass casualties, excluding the means of transporting or propelling the weapon where such means are a separable or divisible part from the weapon." [6]

French troops using a British-made Vermorel sprayer to neutralize chlorine gas, November 26, 1918. (Photo courtesy of the US National Archives)

4 "NATO Terminology Database." *NATOTermOTAN,* North Atlantic Treaty Organization, 2021, nso.nato.int/natoterm/Web.mvc.

5 NATO Standardization Office (NSO). NATO Glossary of Terms and Definitions (AAP-06), 2020 ed., NATO Terminology Office, 2020.

6 *DOD Dictionary of Military and Associated Terms, January 2021.* Office of the Chairman of the Joint Chiefs of Staff, Jan. 2021, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf.

This Guidebook does not address WMD in any broader context; it does not address high yield explosives, pharmaceuticals, cyber operations, or other weapons which may cause highly destructive or disruptive effects.

Countering Weapons of Mass Destruction (CWMD)

Just as there is no universally agreed definition of "weapons of mass destruction," there is no universally agreed definition for "countering weapons of mass destruction." However, in order to scope the contents of this Guidebook, and in accordance with the definition of WMD cited above, CWMD can be defined as:

"Efforts curtail the conceptualization, development, possession, proliferation, use, and effects of weapons of mass destruction, related expertise, materials, technologies, and means of delivery."

Non-proliferation (NP), Counter-proliferation (CP) and CBRN Response

The international community has many tools to counter WMD threats; international diplomacy, United Nations Security Council Resolutions (UNSCR), and control regimes related to chemical, biological, radiological, and nuclear weapons form a foundation for preventing their proliferation and use. The ability to act quickly to counter new threats, or effectively respond to a CBRN incident, is essential to defending the international community against the CBRN threat. Although related, NP and CP are not synonymous and should not be used interchangeably with CWMD. For the purpose of this Guidebook, these terms are defined below, and more detailed information on NP and CP control regimes may be found in Appendix B (Legal and Regulatory Instruments).

- ***Non-proliferation (NP):*** Actions to prevent the acquisition of weapons of mass destruction by dissuading or impeding access to, or distribution of, sensitive technologies, material, and expertise.[7]
- ***Counter-proliferation (CP):*** Those actions taken to reduce the risks posed by extant weapons of mass destruction.[8]

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[7] *DOD Dictionary of Military and Associated Terms, January 2021.* Office of the Chairman of the Joint Chiefs of Staff, Jan. 2021, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf.

[8] *DOD Dictionary of Military and Associated Terms, January 2021.* Office of the Chairman of the Joint Chiefs of Staff, Jan. 2021, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf.

- ***Chemical, Biological, Radiological, and Nuclear Response (CBRN Response).*** In countering weapons of mass destruction, the activities to attribute responsibility for an event, minimize effects, sustain operations, and support follow on actions.[9]

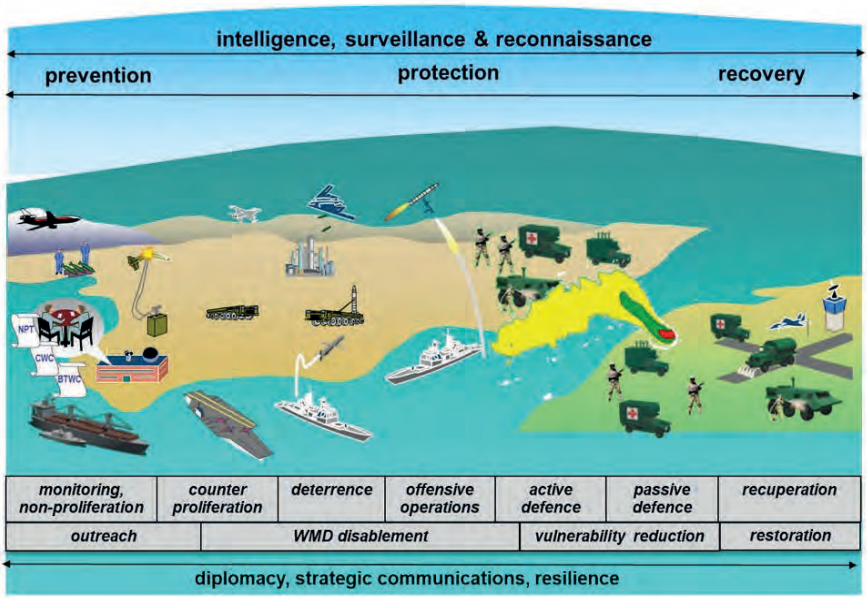

Figure 1. Spectrum of Counter WMD and Non-Proliferation Activities (NATO Weapons of Mass Destruction Non-Proliferation Centre (WMDC).

Other Key Definitions

Definitions of some additional terms are also necessary to ensure a common understanding of the strategic environment and the concepts and activities described in the following chapters. As with the key terms defined above, the terms below may be defined differently by different nations and organisations.

Actor of Concern: Nation-sponsored or independent organisations, individuals, or groups of individuals that carry out activities that, left unaddressed, pose a potential threat to national and regional security. In the WMD context, such groups or persons pose a threat of developing, ac-

[9] "Joint Publication 3-40, Joint Countering Weapons of Mass Destruction." *Joint Electronic Library,* Office of the Joint Chiefs of Staff, 2019, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_40.pdf?ver=2020-04-09-140128-347.

quiring, proliferating, or employing WMD, related expertise, materials, technologies, or means of delivery.

Chemical, Biological, Radiological, Nuclear Defence (CBRND): Measures taken to minimize or negate the vulnerabilities to, and/or effects of, a chemical, biological, radiological, or nuclear hazard or incident.[10] Also called CBRN defence.

Deterrence: The prevention of action by the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits.[11]

WMD Pathways: Networks (links among individuals, groups, organisations, governmental entities, etc.) encompassing ideas, materials, technologies, facilities, processes, products, and events that enable actors of concern to conceptualize, develop, possess, and proliferate WMD and related capabilities.

Jordan Armed Forces Royal Engineer Corps and Colorado National Guard Soldiers conduct an exercise at the Chemical, Biological, Radiological and Nuclear Training Centre of Excellence in Jordan. (Photo courtesy of Colorado Army National Guard)

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[10] *DOD Dictionary of Military and Associated Terms, January 2021.* Office of the Chairman of the Joint Chiefs of Staff, Jan. 2021, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf.

[11] *DOD Dictionary of Military and Associated Terms, January 2021.* Office of the Chairman of the Joint Chiefs of Staff, Jan. 2021, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf.

WMD Activity Continuum: The WMD activity continuum is a complex but identifiable process with activities that together constitute the progression from conceptualization to use. In general, the WMD continuum includes intent; infrastructure and expertise development; production; weaponization; delivery system; and use.[12] These activities are not necessarily sequential, and actors of concern may, at any point along the continuum, bypass one or more of the steps by acquiring (by theft, barter, or purchase) the capability thereby accelerating the WMD development process.

[12] "Joint Publication 3-40, Joint Countering Weapons of Mass Destruction." *Joint Electronic Library,* Office of the Joint Chiefs of Staff, 2019, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_40.pdf?ver=2020-04-09-140128-347.

2. Strategic Environment

International Order

In the decades following World War II (WWII), allies and like-minded nations constructed an international system wherein treaties, customs, and international norms were established to safeguard their liberty and protect their citizens from aggression and coercion. Although the international system has evolved considerably, especially since the end of the Cold War, the multinational network of alliances and partnerships formed during the post-WWII period remains the backbone of global security. However, this long-standing international order is increasingly threatened by adversaries ranging from nation-sponsored or independent organisations to individuals or group of individuals seeking to upend the status quo in their efforts to gain political, military, and economic advantage. These state and non-state actors of concern pose unique challenges to global security and many have become adept at exploiting the existing international system to extract benefits, while simultaneously undercutting the foundational principles of liberty and free trade that underpin the international system.

Today, multinational partner military advantages are eroding as competitors advance their strategic, conventional, and irregular capabilities. As a result, multinational partners should acknowledge that the increased likelihood of challenges to the international order may lead to increased global instability – creating a security environment more complex and volatile than any we have experienced in the past. Strategic competition between states, not terrorism, is now the primary threat confronting multinational security and prosperity.

Current and Future Strategic Environment

Challenges to the international order, increasingly manifested below the level of armed conflict, are occurring across the competition continuum. (See Chapter 4, The Competition Continuum) It is here, in the steady state competition, that the multinational CWMD community should develop and hone joint and combined capabilities to confront and defeat entities seeking to exploit and undermine the international system. Effective competition below the level of armed conflict is necessary to prevent crises and manage destabilizing events. While it is essential that multinational partners continue to invest in the modernization and readiness of their military capabilities, improving the ability to compete below the level

… artificial intelligence, 3D printing and synthetic biology will bring profound changes to our everyday lives and benefits to missions of people. However, their potential for misuse could bring destruction. The nexus between these emerging technologies and WMD needs close examination and action.

UN Secretary-General Ban Ki-Moon, 2006

of armed conflict is of critical importance in facing today's evolving threats.

Adversaries seeking to acquire WMD often perceive these weapons as providing deterrence and warfighting remedies needed to counter or maintain political influence and military overmatch. Indeed, their potential for massively destructive effects is the defining characteristic that makes WMD an appealing option for state and non-state actors of concern seeking increased power and influence. Given this widely held perception of the political and military value of WMD, a varied range of adversaries from great powers to violent extremist organisations are engaged in efforts to develop and/or acquire these capabilities in order to strengthen their challenges against existing power structures. Demand for WMD, when aligned with the security-related trends of a weakening post-WWII international order and widespread technological advances, points to an evolving and increasingly dangerous global WMD threat environment.

Successful efforts to counter dynamic WMD threats increasingly require the coordination of multinational partners who share common interests in upholding international norms and strengthening international efforts to counter WMD. Shared norms serve as the foundation for WMD-related non-proliferation, counter-proliferation, and arms control regimes. Despite ongoing multinational efforts to uphold these international norms, they have been weakened by recent WMD events. The use of Sarin in the Syrian Civil War[13] and the employment of Novichok as an assassination tool[14] are recent examples that suggest a marked erosion of

13 "Syria War: OPCW Says Sarin Was Used in March 2017 Attack." *BBC News,* BBC, 13 June 2018, www.bbc.com/news/world-middle-east-44471985.

14 Deutsch, Anthony. "Chemical Weapons Body Confirms Nerve Agent Novichok in Navalny's Blood." *Reuters*, Thomson Reuters, 6 October 2020, www.reuters.com/article/us-russia-politics-navalny-chemicalweapo/chemical-weapons-body-confirms-nerve-agent-novichok-in-navalnys-blood-idUSKBN26R2GQ.

the norms against the use of chemical warfare agents. The rapid spread of a novel coronavirus around the world is a timely and all-too-real example of the devastating effects that could be achieved through the malign employment of a novel biological agent.

Emerging Technologies

Amidst these challenges is an explosion of emerging technologies across multiple industrial, informational, and research sectors. These emerging technologies are enabling both the creation of new developmental and acquisition pathways for existing WMD and the production of novel capabilities, particularly in areas of chemical and biological warfare. The increasing industry acceptance of advanced additive manufacturing techniques pose new challenges in combating WMD proliferation. While actual CBRN substances such as weapons grade uranium are not produced by additive manufacturing, a limited but not insignificant quantity of WMD related supporting materials and structures could be generated via additive manufacturing without the traditional indicators such as end-use delivery shipments or being part of a restricted items listing.[15]

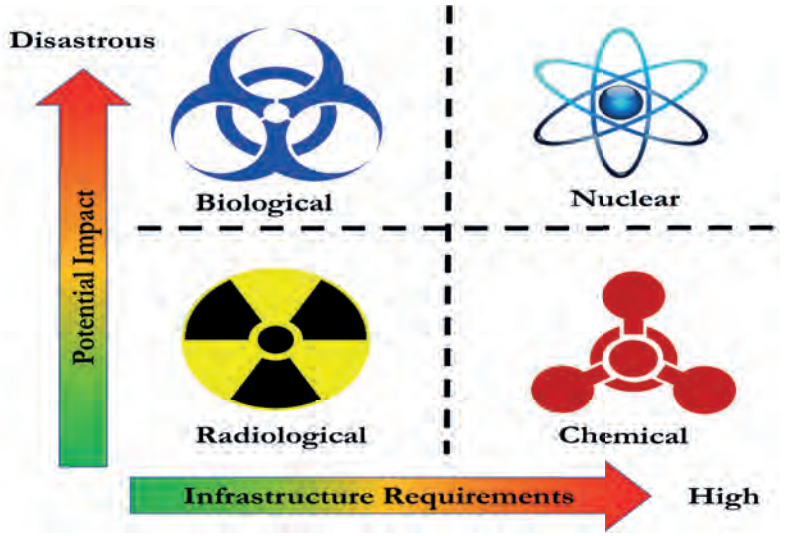


Figure 2. Illustration of the potential impact of CBRN use, versus cost (Infrastructure) of production.

15 Daase, Christopher, et al. "WMD Capabilities Enabled by Additive Manufacturing." *James Martin Center for Nonproliferation Studies*, 10 September 2019, nonproliferation.org/wmd-capabilities-enabled-by-additive-manufacturing/.

US Chemical operation specialists with the 83rd Chemical Battalion, Fort Stewart, Georgia, ensure that the Talon robot is decontaminated after completing a chemical analysis. (Photo by Justin Geiger, courtesy of the US Army 7th Mobile Public Affairs Detachment)

Scientific and engineering advances in additive manufacturing (3D printing), synthetic biology and genetic engineering, and quantum computing represent but a few transformational technologies with the potential to alter the global WMD environment. While many emerging technologies offer promise in terms of enhanced CBRN defence, detection, and defeat capabilities, they simultaneously create a world of increasing uncertainty and danger as adversaries develop and field novel WMD capabilities.

Global Connectivity

Increasing global connectivity and the pervasiveness of dual-use technology have broad implications, including those associated with WMD. For example, as additive manufacturing matures, the unrestricted flow of information will provide a range of state and non-state actors with the ability to manufacture parts needed for WMD production. The wide and rapid diffusion of complex engineering designs, coupled with the ability to manufacture parts with a high degree of precision, will result in a broader range of entities with the knowledge and capability to develop WMD. The unprecedented level of global connectivity, together with the dual-use nature of many new technologies, will result in the development of new WMD and WMD pathways. WMD development processes and pathways will be both easier and faster to establish; meanwhile, detection and interdiction are becoming more difficult.

Once the purview of state weapons programs, WMD have become an increasingly distributed threat, largely due to the trends outlined above, with certain capabilities available to non-state actors of concern, and even to individuals. The Islamic State of Iraq and Syria's (ISIS') manufacture and use of chemical weapons[16] reaffirms that non-state actors of concern perceive the operational and strategic value of WMD and can obtain the knowledge and resources to develop them. As the distributed nature of WMD threats increases, so too do the number and type of potential global WMD pathways. The expanding number and complexity of pathways compels the need for a coordinated, multinational, and multi-organisational response.

Multinational, Multi-Organisational Approach

No single state possesses the depth and breadth of capability needed to fully respond to the wide range of WMD threats. Effective CWMD efforts should be both multinational and multi-organisational to address the full range of WMD threats in the present and future global operating environments. Within the multinational context, each state should apply a whole-of-government approach to leverage appropriate national resources, including military capabilities.

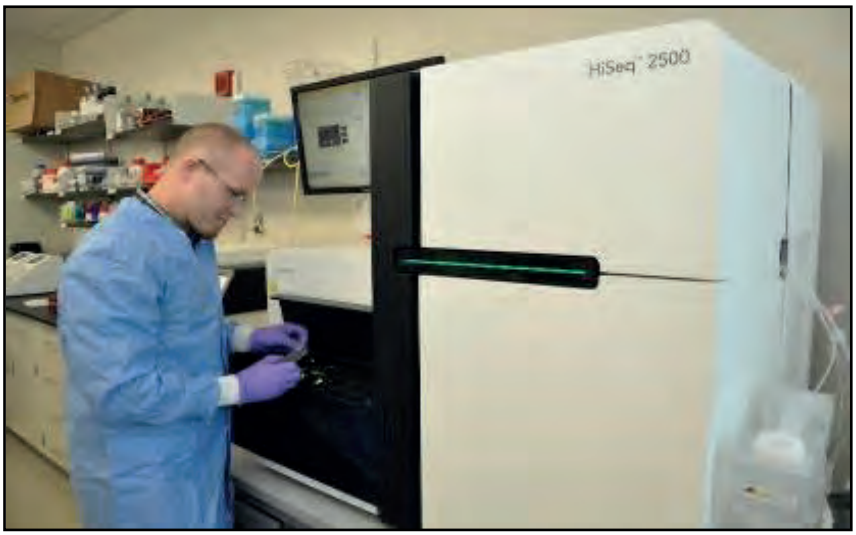
This approach to CWMD provides more capabilities to prevent acquisition, respond to crises, and contain and reduce threats when military options are not feasible, appropriate, or capable of addressing WMD threats. For instance, when attempting to identify the procurement of dual-use chemicals or components, financial monitoring of commercial transactions may yield more actionable intelligence than traditional military intelligence, surveillance, and reconnaissance capabilities.[17] National and multinational law enforcement agencies, border patrol assets, and public health organisations are frequently better situated to provide capabilities needed for tracking and responding to local, national, and international WMD threats. Departments of state and ministries of foreign affairs also play a critical role in upholding existing norms against the proliferation and use of WMD. Diplomats play a crucial role in modifying and/or updating the

16 "Government, 'Islamic State' Known to Have Used Gas in Syria, Organisation for Prohibition of Chemical Weapons Head Tells Security Council |Meetings Coverage and Press Releases." *United Nations,* United Nations, 7 November 2017, www.un.org/press/en/2017/sc13060.doc.htm.

17 Brewer, Jonathan. *The Financing of Nuclear and Other Weapons of Mass Destruction Proliferation*. Center for a New American Security, 2018, www.gov.gg/CHttpHandler.ashx?id=122753&p=0.

international conventions and regimes to include new classes of chemical threats or biological agents as the threat environment evolves. Within the whole-of-government architecture for addressing WMD threats, combined military forces will continue to play a key role. For example, maritime interdiction of shipments of WMD or precursor materials is a key tool for disrupting proliferation pathways. Although the range of military options may be limited during steady state competition, the military's CWMD roles and missions will increase during crisis response and armed conflict.

Multinational partners, including military organisations, will benefit from a common understanding and lexicon for addressing the increasingly dynamic threat environment. As WMD pathways grow in number and complexity around the world, cooperation between multinational and multi-organisational partners to counter transregional threats is essential for reducing risk to all partner nations. To that end, CWMD activities should expand upon existing military-to-military engagements and intelligence information sharing to include regular collaborations across other state institutions engaged in countering WMD. Multinational and multi-organisational cooperation and collaboration will not only enhance opportunities to disrupt pathways but will also serve to increase the national capacity and resiliency of all partner nations.



Research Biochemist with United States School of Aerospace Medicine, operates one of the lab's genome sequencers. (Photo by Will Huntington, courtesy of the US Air Force)

3. The WMD Challenge

Although the characteristics of the WMD threat are continuously evolving, state and non-state actors of concern seek to develop and acquire WMD through pathways, as described by the WMD activity continuum below. This chapter provides a general overview of the WMD threat, including actors of concern, the continuum of activities describing WMD development, and WMD proliferation and procurement networks and pathways. This chapter also provides an overview of the evolving threat posed by WMD.

WMD Actors of Concern

Actors of concern consist of state and non-state entities that carry out activities that, left unaddressed, pose a potential threat to national, regional, or global security. In the WMD context, an actor of concern poses a threat of developing, acquiring, proliferating, or using WMD, related expertise, materials, technologies, or means of delivery. In order to use WMD, an actor of concern must possess one or more weapons, a viable delivery capability, and the resources necessary for command and control of the weapon system.

State Actors of Concern. States may view WMD possession as a source of strategic leverage, international prestige, regional dominance, or deterrence. This may be accomplished through the threat or actual use of WMD. States may use irregular means, including proxies (state or non-state), to deliver WMD to avoid attribution. States that have developed WMD or were once recipients of WMD-related technologies and materials, may aim to reduce their dependencies on foreign suppliers and may begin to indigenously produce and export these same technologies. In the 21st century, this is made easier due to the availability of information and advanced technology. If instability increases in or around a WMD possessor state, full control of WMD may be jeopardized, leading to theft by or proliferation to non-state actors of concern.

Non-State Actors of Concern. The WMD acquisition and development efforts of non-state entities differ from conventional state programs in their organisation, scale, and resourcing. Production and storage facilities used by non-state actors of concern, such as clandestine laboratories, can operate within a limited space, using common, dual-use, or improvised equipment and material. Detecting and disrupting networks, including

small-scale production facilities, is a significant challenge. Non-state actors of concern can operate independently, with state support, or as proxies of state actors of concern. Non-state actors of concern are likely to use WMD in an unconventional manner as an improvised threat. This can include using chemical, biological, or radiological (CBR) material as enhancements to improvised explosive devices, or the use of a WMD that is no longer in the control of a competent authority or custodian or that has been modified from its designated firing sequence, or use of CBRN material to have a WMD effect.

Networks and WMD Pathways

Networks are individuals, groups, and organisations and the connections between them. All networks are dynamic, continuously adapting to changes in the environment. Networks may be limited in their duration and may be dissolved once their purposes are achieved.

Those networks, or parts of networks, which enable the conceptualization, development, production, and/or proliferation of WMD and related capabilities are categorized as 'WMD pathways'. Recognition and appreciation of WMD pathways, and their interconnectivity, guides the development of the means to illuminate, monitor, and, if necessary, interdict, disrupt, and destroy them. WMD pathways take advantage of permissive environ-

Soldiers in the Polish Multi-role exploitation Reconnaissance Team conduct a security check on each other for radiation during CBRN training in Lisbon, Portugal in October 2015, during NATO exercise Trident Juncture 15. (Photo courtesy of the Allied Joint Force Command Brunssum)

ments, including preexisting networks (both licit and illicit) that wittingly or unwittingly facilitate the transnational or transregional movement of people, material, information, and money. The dual-use nature of some legitimate technologies and materials may complicate efforts to identify and counter WMD pathways.

The use of legitimate networks for nefarious purposes presents a challenge to allies and partners conducting CWMD. Decisions to counter a given element of a network may create unintended consequences if not thoroughly analysed. For example, if a legitimate transportation route is used as part of a WMD pathway, allies and partners conducting CWMD should attempt to minimize the disruption of legitimate movement of goods.

WMD Activity Continuum

The WMD activity continuum is a model that describes the progress of an adversary towards acquiring a WMD capability. Though not necessarily sequential, the WMD activity continuum covers the spectrum of WMD activities from intent to use. These activities encompass intent, infrastructure, expertise, production, weaponization, delivery systems, and use. Once an adversary has achieved the capability to deploy a WMD, the continuum also accounts for qualitative and quantitative capability improvements.[18]

- Intent. The desire or decision to develop and/or acquire WMD.
- Infrastructure. The development and establishment of specialized facilities, equipment, raw materials, organisations, and logistics, as well as financial means to support WMD development and/or acquisition.
- Expertise. The development or acquisition of technical expertise required to support WMD development and/or acquisition.
- Production. The design and manufacture of components and materials necessary to construct and maintain WMD.

[18] "Joint Publication 3-40, Joint Countering Weapons of Mass Destruction." *Joint Electronic Library,* Office of the Joint Chiefs of Staff, 2019, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_40.pdf?ver=2020-04-09-140128-347.

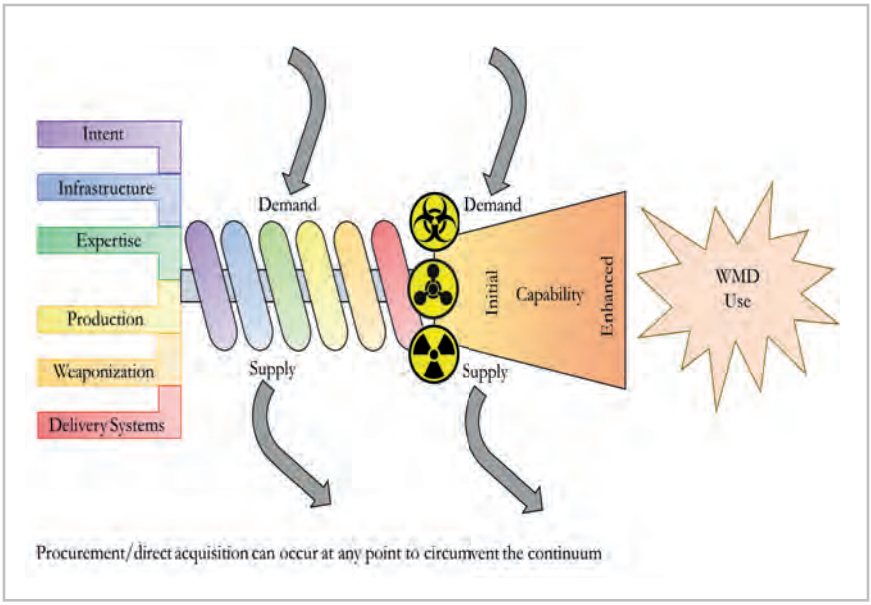


Figure 3. Representation of the Weapons of Mass Destruction Activity Continuum. Image derived from Joint Publication 3-40, Joint Countering Weapons of Mass Destruction, 27 November 2019.

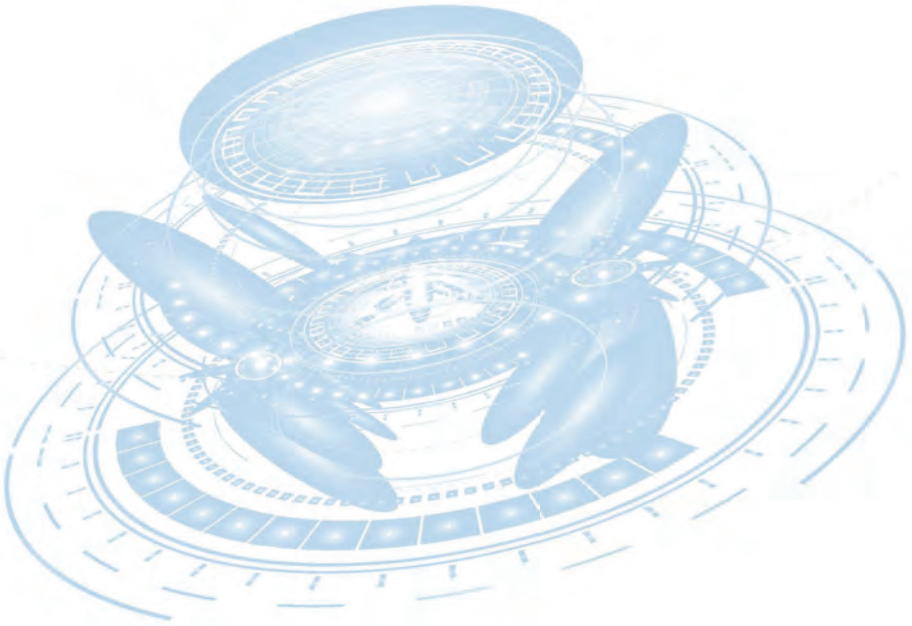
- Weaponization. The conversion of critical components, chemical/biological agents, or radiological/fissile material into a weapon.
- Delivery Systems. The development of mechanisms to mate a weapon with a system capable of delivering it to a specified target.
- Use. The employment of WMD in an attack.

Actors of concern may conduct multiple activities simultaneously to reduce the time needed to achieve a capability. Acquisition of advanced technologies can enable entities to bypass technological hurdles inherent in WMD development. Actors of concern can also circumvent WMD development entirely by directly acquiring a weapons capability from another entity. Additionally, advanced development of dual-use infrastructure, expertise, production, and delivery systems may expedite the development and proliferation of WMD and complicate allies' and partners' abilities to identify or counter these WMD activities.

Evolving Threat of WMD

As described in the previous chapter, the global security environment is becoming more complex and threatened by actors of concern pursuing WMD, delivery systems, and related CBRN technologies. WMD is a transregional problem that challenges allies, partners, and international organisations. Given these challenges, allies and partners should take a multinational, multi-organisational approach, leveraging all relevant capabilities and activities to effectively counter WMD.

Swedish CBRN-expert in a mobile analysis laboratory with equipment to analyse soil, air, water, vegetation, and smear samples. (Photo by Jimmy Croona, courtesy of the Swedish Armed Forces)



4. The Competition Continuum

Rather than a world either at peace or at war, the competition continuum describes a world of enduring competition conducted through a mixture of cooperation, competition below armed conflict, and armed conflict.[19] The descriptors refer to the relationships that exist between nations in terms of specific policy objectives. This description also allows for simultaneous interactions with nations at different points along the competition continuum. For instance, a nation might be competing below the level of armed conflict with another regarding some interests, such as freedom of navigation in disputed areas, and cooperation in other areas of mutual interest, such as counter-piracy. By providing a lexicon to describe this complexity, the competition continuum facilitates shared understanding, both within a nation's government and with partners who often have a leading role. This will enable better communication, planning, and decision making.

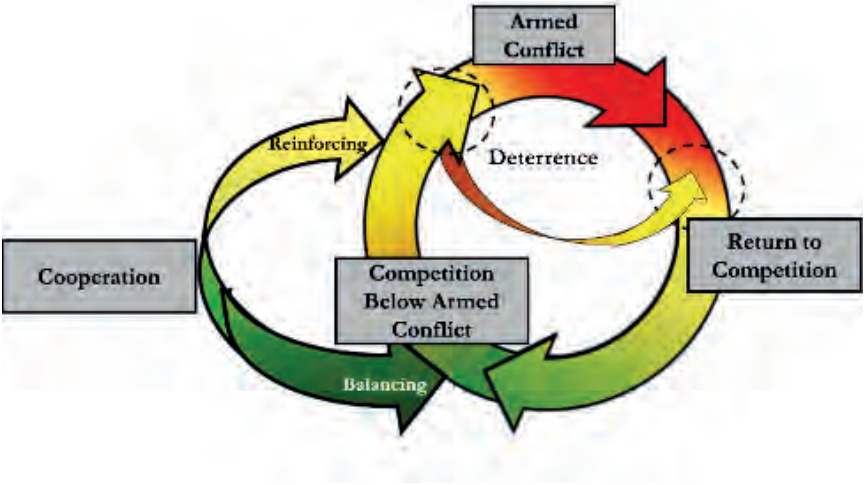


Figure 4. Illustration of the Competition Continuum. Derived from Kelly McCoy article "In the Beginning, there was Competition: The Old Idea behind the New American Way of War (Modern War Institute, 11 April 2018).

[19] "Joint Doctrine Note 1-19, Competition Continuum." *Joint Electronic Library*, Office of the Joint Chiefs of Staff, 3 June 2019, www.jcs.mil/Portals/36/Documents/Doctrine/jdn_jg/jdn1_19.pdf?ver=2019-06-03-133547-197.

The competition continuum describes the environment in which allies, and partners apply the instruments of national power (Diplomatic, Informational, Military, Economic, Financial, Intelligence, and Law Enforcement [DIMEFIL]) to achieve objectives. In practice, all instruments of national power should function together as an interrelated and integrated whole. For instance, competition below armed conflict might be addressed through a mixture of DIMEFIL activities. The elements of the competition continuum are Cooperation, Competition Below Armed Conflict, and Armed Conflict.

Cooperation

Cooperation can be defined as situations in which individuals, groups, and/or nations take actions together in pursuit of common objectives. Within cooperation, activities may include security cooperation, multinational training and exercises, information sharing, trade agreements, personnel exchange programs, and other peaceful military engagement activities. Military cooperation may also occur in the form of multinational operations and activities during armed conflict or competition with a common adversary.[20]

Competition Below Armed Conflict

Competition below the level of armed conflict can be defined as situations in which individuals, groups, and/or nations take actions outside of armed conflict against one another in pursuit of policy objectives. These actions are typically nonviolent and conducted under greater legal or policy constraints than in armed conflict but can include violent action by military forces or sponsorship of surrogates or proxies. Competition below armed conflict may seek to achieve mutually incompatible objectives, while seeking to avoid armed conflict. Examples of such activities include military engagements, diplomatic and economic activities, political subversion, intelligence and counterintelligence activities, operations in cyberspace and the information environment, and other nonviolent activities. Concurrent with competition below armed conflict, potentially hostile entities may engage in forms of indirect armed conflict (e.g., external support of an indigenous insurgency, counterinsurgency, or resistance movement)

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[20] McCoy, Kelly. "In the Beginning, There Was Competition: The Old Idea Behind the New American Way of War." Modern War Institute, 11 Apr. 2018, mwi.usma.edu/beginning-competition-old-idea-behind-new-American-way-war.

through proxies or surrogates that engage each other or the sponsor's adversaries in direct armed conflict.

Armed Conflict

Armed conflict can be defined as situations in which individuals, groups, and/or nations take actions against one another in pursuit of policy objectives in which law and policy permit the employment of military force in ways commonly employed in declared war or hostilities.

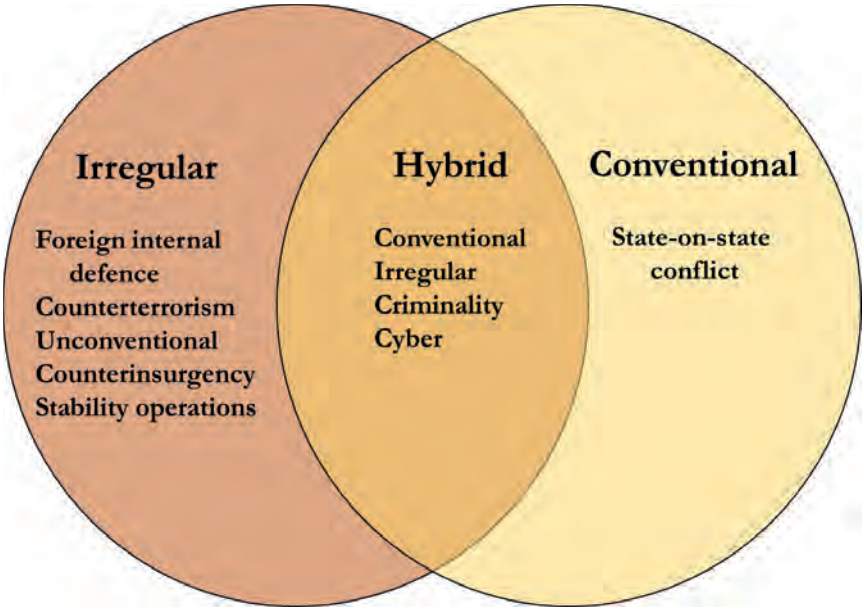

Figure 5. Illustration of the Hybrid Warfare Concept. Image derived from Government Accountability Office (GAO)-10-1036R, Briefing to the Subcommittee on Terrorism, Unconventional Threats and Capabilities, Committee on Armed Services, House of Representatives, 10 September 2010.

Application of the Competition Continuum

The competition continuum is not a three-part model substitute for the two-part peace/war model. Cooperation, competition below armed conflict, and armed conflict can occur simultaneously. Cooperation and competition below armed conflict are always occurring and so the presence or absence of armed conflict is the only variable element. Therefore, the notion of a nation being either "in competition" or "in conflict" refers to

whether the nation is or is not using armed force to achieve policy objectives.

While nations are the principal participants on the global stage, state and non-state WMD actors of concern also threaten the world's security environment with increasingly sophisticated capabilities. Terrorists, transnational criminal organisations, cyber hackers, and other malicious non-state actors of concern have transformed global affairs with increased capabilities. There is a positive side to this as well, as allies and partners in CWMD are also more than just nation-states: multilateral organisations, non-governmental organisations, corporations, and strategic influencers provide opportunities for collaboration and partnership.

State and non-state actors of concern pursue activities which generate hybrid threats to destabilize international order, including WMD development and proliferation activities.[21] Even though state and non-state entities may differ generally in their means and ways, they show the capability to employ and harmonize various instruments of power against specific vulnerabilities to create the desired effects. Hybrid warfare is, by definition, asymmetric and uses multiple instruments of power, and accentuates this with imagination, uncertainty, and ambiguity. This emphasizes that countering hybrid threats is different from a force-oriented conflict where the strength of opposing forces is measured, either qualitatively or quantitatively, with the objective to degrade the opponent's capabilities and capacities. Hybrid warfare uses the different means of power as available to the actor of concern, tailored to the critical vulnerabilities of the target system. In this sense, WMD are an additional means to achieve effects through their sheer existence. Either the threat to use or an actual or perceived use of WMD can degrade the effectiveness of governance, trade, and the use of force, and public support can be affected. Nevertheless, history shows that an actor of concern armed with WMD is less likely to be attacked kinetically as it imposes additional risks which may outweigh the benefits.

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21 "Counter Hybrid Warfare." Edited by Sean Monaghan, *Countering Hybrid Warfare Project,* Multinational Capability Development Project, Mar. 2019, assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784299/concepts_mcdc_countering_hybrid_warfare.pdf.

5. CWMD Through All Means of National Power

Introduction to DIMEFIL

The preferred course of action for CWMD is preventing the acquisition of WMD by any state or non-state actor of concern. Nevertheless, prevention is not always possible when WMD threats already exist or are evolving. CWMD is essential to avert the use of these weapons and to ensure that they can be managed and reduced reliably and over time. In this endeavour, military and non-military approaches to CWMD are not rival courses of action. Rather, they echo the environments where specific requirements emerge and evolve over time and expose the need for all elements of national power across DIMEFIL required to reduce WMD threats in the complex and ever-changing world. To effectively counter WMD, all elements of national power, not just military methods, should be integrated into a multinational, multi-organisational approach.

- Diplomatic. Diplomacy is the principal instrument for engaging with other state and non-state entities to advance a nation's values, interests, and objectives, and to solicit foreign support for military operations. Diplomacy is a principal means of organizing coalitions and alliances, which may include state and non-state entities, such as partners, allies, surrogates, and/or proxies. Use of the Diplomatic instrument may include travel restrictions for political officials, expulsion of diplomats, suspension of memberships, or the withdrawal of voting rights of individual states in international organisations. The credible threat of force reinforces, and in some cases, enables the diplomatic process.

- Informational. The information instrument of national power is the advancement of national interests, policies, and objectives by understanding and engaging key audiences through coordinated programs, plans, themes, messages, and products. Previously considered in the context of conventional nation-states, the concept of information as an instrument of national power now extends to non-state entities that are using information to further their causes. Commanders provide guidance and their staffs develop the approach for achieving information-related objectives and ensuring the integrity and consistency of themes, messages, images, and actions to the lowest level through the integration

War is not merely a political act but a real political instrument, a continuation of political intercourse, a carrying out of the same by other means.

Carl von Clausewitz

and synchronization of relevant information-related capabilities. Considering the messages that words, images, and actions communicate is integral to military planning and operations and should be coordinated and synchronized with multinational partners.

- Military. The military instrument of national power is the use of a nation's Armed Forces at home and abroad in support of its national security goals. The ultimate purpose of a nation's military is to fight and win the nation's wars. Fundamentally, the military instrument is coercive in nature, to include the integral aspect of military capability that opposes external coercion. Coercion generates effects through the application of force (to include the threat of force) to compel an adversary or prevent being compelled by an adversary. Military strength remains vital to the credibility of conventional deterrence (by denial and punishment). Military action should be attuned to ensure proportionality, while maximizing the coercive potential of the military instrument to target the vulnerabilities of actors of concern. The full range of military force options can be used to respond to WMD threats, depending on the strategic goals to be achieved. Military force can contribute to resilience measures, deterrence, prevention, protection, and recovery activities. To maximize resiliency, the population must be aware of, and involved in, resilience-building and preparatory measures. The military also has various capabilities that are useful in non-conflict situations (such as in foreign relief).

- Economic. The economic instrument of national power focuses on furthering or constraining others' prosperity. This includes trade of goods and services and aid given to other entities to increase the recipient's capability and/or capacity. The economic instrument of power concerns issues such as regional and bilateral trade, infrastructure development, and foreign investment. Examples of the use of the economic instrument of power might

include enacting trade sanctions, enacting restrictions on technology transfers, and reducing security assistance programs. A strong economy with free access to global markets and resources is a fundamental engine of the general welfare. In the international arena, a nation's government works with the governments of other nations and international financial institutions to encourage economic growth, raise standards of living, and predict and prevent, to the extent possible, economic and financial crises. Economic measures against WMD threats include the denial of access to key components of WMD programs, the limitation of knowledge transfers, and the execution of economic countermeasures against proliferators. In this endeavour, raising situational awareness on WMD threats within governmental agencies and private companies is important. Identification and exploitation of corruption is also vital: corrupt systems weaken resilience, undermine trust, and can be exploited by actors of concern.

- Financial. The financial instrument of national power is the use of banking and other financial institutions, including access to markets and funds, to achieve national objectives. This can include freezing or seizing funds, disrupting funding sources, and interdicting financial transfers. Leveraging financial information from export control mechanisms can disclose networks between individuals or companies involved in suspicious financial activities and those pursuing the import or export of sensitive technologies or materials. Export control information can be used to recognise proliferation financing patterns, which will assist disrupting illicit trafficking and proliferation. Application of the financial instrument of national power also includes application of financial sanctions. Sanctions and financial penalties are of specific importance to counter proliferation finance and their control pathways. Adverse second-order effects of sanctions may have to be absorbed to create the intended primary effect. Military forces may be called on to support enforcement of sanctions or other financial activities.

- Intelligence. Intelligence is the collection, processing, integration, evaluation, analysis, and interpretation of available information concerning foreign entities, including hostile or potentially hostile state and non-state actors of concern, or areas of actual or potential operations. Intelligence is essential for the accurate and early detection, characterization, and disruption of state and non-state

Swedish conscripts from a CBRN-reconnaissance platoon during a chemical detection exercise with an AP2CE. (Photo by Jimmy Croona, courtesy of the Swedish Armed Forces)

actors of concern engaged in WMD pathway activities. Due to the complex nature of CWMD, a multi-disciplinary approach to related intelligence is essential. Intelligence processes need to be coordinated and shared at an inter-agency, national governmental, and international level. International agencies, such as INTERPOL, connect their worldwide network of member countries, maintaining close partnerships with other international agencies and initiatives, to share WMD-related information and intelligence to law enforcement agencies.

- Law Enforcement. The law enforcement instrument of national power is the use of organisations chartered and empowered to enforce a nation's laws. Depending on capabilities and legal authorities, military forces may be called upon to support national or local law enforcement entities, either in their own country or in support of allies and partners.

Multinational, Multi-Organisational CWMD

The routine interaction of all instruments of national power is fundamental to national activities in the strategic security environment. The military instrument's role increases relative to the other instruments as crises develop and the need to compel a potential adversary through force increases. A nation's ability to achieve its national strategic objectives depends on employing the instruments of national power discussed herein in effective combinations and in all possible situations from cooperation to conflict.

Military power is integrated with other instruments of national power to advance and defend national values, interests, and objectives. To accomplish this integration, armed forces interact with the other ministries, departments, and agencies to develop a mutual understanding of the capabilities, limitations, and consequences of military and civilian actions. Political and military leaders should consider the employment of military force in operations characterized by a complex, interconnected, and global operational environment. The application of military force to coerce an adversary should be carefully integrated with the other instruments of national power to achieve objectives.

Decision makers should be aware of persisting uncertainties as it pertains to the comprehensiveness of task accomplishment. As a result, CWMD should incorporate instruments for effective verification and monitoring, preferably including access to people, documents, dual-use materials, as well as plans for the redirection of scientists to peaceful purposes. Decision makers should also recognise that short-term CWMD goals and desired long-term effects are usually different and could conflict with each other. This should be considered when developing the plans, especially if the responsibility for subsequent verification, monitoring, and redirection will fall to different authorities.

Governments should think organisationally about the processes, mechanisms, people, and skills required for CWMD. The challenge of achieving a coherent, coordinated approach across government departments and between allies and partners should not be underestimated. Achieving a coordinated approach to CWMD will be easier if the appropriate organisations are prepared and understand their roles and responsibilities.

CWMD should not solely focus on weapons, their means of production, and their delivery systems, but should address an actor of concern's entire

WMD program. The same is also crucial during verification, monitoring, and redirection processes; these processes should include access to documents and personnel. It is equally important to ensure that former WMD program scientists, engineers, and specialists with sensitive WMD knowledge find and remain engaged in constructive and peaceful work. Otherwise, they may end up contributing to the further development or proliferation of WMD.

Several important factors must be incorporated into the scope of CWMD. These include a legal basis for action; adequate and timely resourcing; a specific, well-defined, and achievable mission; clearly defined political and economic relations with the target country; and an enforcement mechanism. To strengthen non-proliferation regimes and enhance international legitimacy, decision makers should rely to the greatest extent possible on existing international treaties, regimes, and agreements, while retaining as much flexibility, responsiveness, and agility as possible.

The challenges for CWMD will continually evolve with the changing geopolitical and strategic environment. Future successes will depend not only on the ability to realistically plan and prepare, but also to preserve and foster innovation, creativity, and collaboration across the international community.

6. CWMD Organizing Principles and Activities

The operational framework for CWMD consists of three organizing CWMD principles (Prevention; Protection; Response) carried out through specialized activities (WMD Development and Acquisition Defeat; Existing WMD Threat Management; CBRN Response), supported by two foundational activities (Maintain and Expand Technical Expertise; Cooperate with and Support Partners) and one crosscutting activity (Understand the Environment, Threats, and Vulnerabilities).

CWMD Organizing Principles

CWMD operations and activities utilize Prevention, Protection, and Response as CWMD organizing principles for planning. A focus on early cooperative action to shape the environment to dissuade actors of concern from pursuing WMD and to disrupt their efforts to develop and acquire WMD will reduce the reliance on measures that carry higher, political, military, and humanitarian risks. Recognizing that efforts to dissuade WMD development and acquisition may not always be successful, allies and partners should prepare a comprehensive set of capabilities to counter WMD. Allies and partners conduct a wide range of CWMD operations and activities against state and non-state actors of concern to counter the conceptualization, development, possession, proliferation, and use or threat of use and mitigate the effects of WMD.

Prevention. This organizing principle consists of the dissuasion of state or non-state actors of concern from pursuing the development or acquisition of WMD. Activities and operations in support of the Prevention organizing principle also extend beyond the attainment of WMD capabilities, disrupting proliferation from possessor state or non-state actors of concern

Swedish CBR Explosive Ordnance Disposal operator during training exercise. (Photo by Jimmy Croona, courtesy of the Swedish Armed Forces)

and deterring WMD use. Examples of activities conducted in support of Prevention include promoting treaty compliance and control regimes; impeding the transfer of materials of concern; restricting the supply of WMD-related capabilities; and conducting WMD acquisition and development defeat activities (referred to as Pathway Defeat in US doctrine) to delay, disrupt, destroy, or otherwise complicate networks, links, and nodes that support the conceptualization, development, production, and proliferation of WMD. Such activities will complicate access to WMD-related scientific expertise and technologies, infrastructure, and materials of concern. Prevention includes aspects of both non-proliferation and counter-proliferation. While non-proliferation is principally applied to preventing the acquisition or development of WMD by state or non-state actors of concern during the early WMD development stages, it may also be employed in latter stages. Counter-proliferation applies to those actions taken to thwart proliferation, stop or roll back current WMD programs, defeat delivery systems, and protect allies, partners, and their interests from the threat of or use of WMD. Counter-proliferation activities are principally applied after adversaries develop WMD, but they can also be applied early in the WMD development and acquisition stages.

Protection. This organizing principle consists of shielding allies, partners, and their interests from attack or coercion by WMD possessors. Concurrently, allies and partners conduct activities and operations to contain or reduce existing WMD stockpiles (referred to as WMD Defeat in US doctrine). Activities and operations in support of the Protection organizing principle, below armed conflict, may include building a layered and integrated WMD defence to disrupt WMD deployment and posturing forces to respond to WMD attacks. Central to planning for and execution of activities and operations in support of the Protect organizing principle are the ability to control, defeat, disable, and dispose of existing WMD capabilities, to include related delivery systems.

Response. This organizing principle consists of activities to support operations in a CBRN environment, to react to or mitigate the effects of a WMD or CBRN event, and to support efforts to attribute WMD attacks. Response emphasizes CBRN preparedness of personnel, capabilities, and forces to attribute, mitigate effects, and support and sustain operations during day-to-day activities. Leveraging capabilities to respond to CBRN incidents such as WMD use or toxic industrial incidents is critical. Building coalition capability and capacity to respond to such incidents is also essential and should influence planning priorities at all levels. Ensuring strong working relationships, confidence, and interoperability exist be-

tween allies and partners helps to minimize effects during WMD or CBRN crises, demonstrate resiliency, and contribute greatly to deterrence.

CWMD Specialized Activities

Allies and partners conduct the following specialized activities with the ultimate end-state of ensuring that they and their interests are neither coerced nor attacked by WMD. Specialized tasks are not unique to a specific organizing principle, but their effects may be greater when conducted in relation to any one organizing principle.[22]

WMD Development and Acquisition Defeat. This activity focuses on preventing actors of concern from developing or acquiring WMD capabilities and ensuring those without WMD do not obtain them. This activity comprises of operations to significantly reduce and ideally prevent the conceptualization, development, and acquisition of WMD. These actions are carried out to dissuade and deter adversaries from pursuing WMD development, acquisition, or use; delay development of WMD programs by adversaries; disrupt WMD program development by targeting key nodes; deny access to WMD technologies, materials, and expertise; and assure allies and partners. By examining WMD development and acquisition through the lens of people, places, and things, it is possible to detect efforts previously unidentified, emerging WMD actors of concern, and take action to complicate, disrupt, or stop progress toward WMD development.

Existing WMD Threat Management. This activity emphasises the containment and reduction of risks posed by existing WMD stockpiles. These efforts involve containing, reducing, reversing, neutralizing, or destroying existing WMD and the ability to stockpile, transfer, or employ WMD.

CBRN Response. CBRN Response focuses on defending from, responding to, and recovering from WMD use when deterrence fails. The commander postures and prepares forces, and mitigates CBRN effects to operate effectively in any given environment. This commander may also be called upon to support response efforts of allies or partners, provide support to civil authorities, or assist with forensic attribution.

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[22] "Joint Publication 3-40, Joint Countering Weapons of Mass Destruction." *Joint Electronic Library,* Office of the Joint Chiefs of Staff, 2019, www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_40.pdf?ver=2020-04-09-140128-347.

Foundational and Crosscutting Activities

Allies and partners leverage foundational and crosscutting activities to support the specialized CWMD activities. These activities are not specific to CWMD but serve to advance CWMD efforts. Foundational and Crosscutting activities and tasks for CWMD consist of:

Foundational Activity 1: Maintain and Expand Technical Expertise. This activity focuses on nurturing and sustaining the intellectual capital provided by allied and partner CWMD experts. This knowledge and associated skill sets provide the necessary expertise for CWMD-related planning, research and development, programming, exercising, system integration, analysis, reach back, mission execution, and assessments. Maintaining expertise requires long-term commitment to recruiting, developing, and retaining high-quality personnel.

Foundational Activity 2: Cooperate with and Support Partners. This activity focuses on performing CWMD activities and tasks in full cooperation between partner nations. This activity promotes common threat awareness, builds CWMD self-sufficiency, improves military interoperability, enhances military and civilian preparedness, enhances deterrence, and, in some cases, facilitates security of CBRN and dual-use materials. Allies and partners will coordinate to ensure tasks associated with this activity are successfully conducted within military engagement, security cooperation, and deterrence operations and activities across the competition continuum. Allies and partners should seek to strengthen existing relationships and support programs to build the foundation for future partnering opportunities. Cooperation should include other allies and partners in planning and execution processes as early as possible. Allies and partners can then leverage existing activities, such as multinational training and exercises, to strengthen relationships and improve regional capabilities and capacity to achieve CWMD objectives.

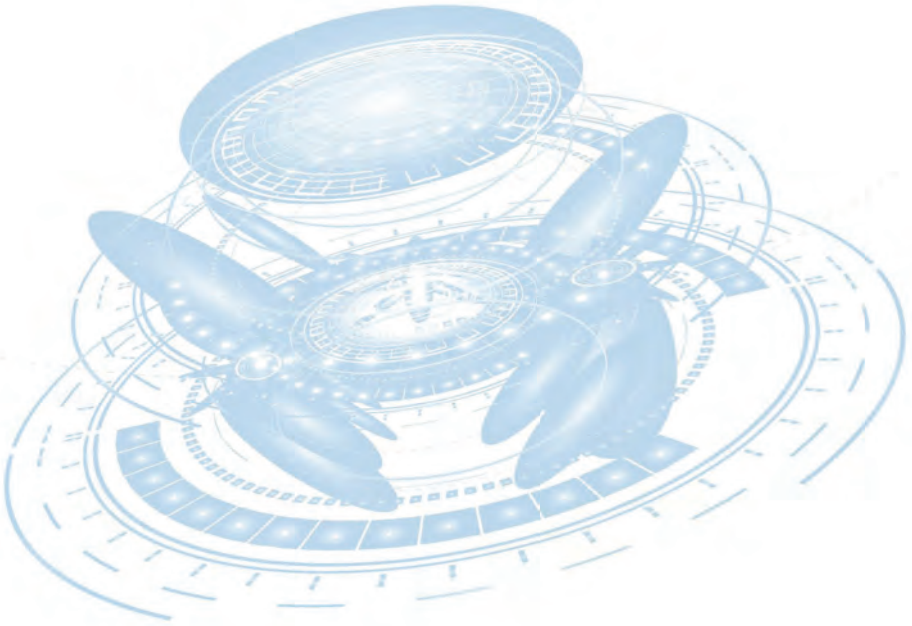
Crosscutting Activity: Understand the Environment, Threats, and Vulnerabilities. This activity focuses on developing and maintaining a comprehensive understanding of the WMD actors of concern and materials that affect the operating environment. To accomplish this, allies and partners need to locate, identify, characterize, assess, and predict threats against friendly vulnerabilities. Capabilities that support these tasks include detection; modelling; identity intelligence; detailed operational planning; and analysis of materials, precursors, and agents related to WMD proliferation, development, or use. Allies and partners may use a combination of forces

and capabilities such as intelligence, surveillance, and reconnaissance assets; interagency experts; conventional forces; and Special Operations Forces (SOF) in support of this activity. This activity is an iterative process undertaken continually throughout the planning process and during execution of operations and activities.

Military CWMD Activities in the DIMEFIL Context

Proactive actions can be taken at every stage of the WMD activity continuum to counter WMD development, proliferation, or use successfully. CBRN defence activities, including CBRN reconnaissance and surveillance provide hazard awareness and understanding of threats in order to posture forces. Furthermore, allies and partners should bear in mind international non-proliferation rules and dual-use technologies and capabilities may complicate CWMD activities (e.g., Article IV of the Treaty on the Non-proliferation of Nuclear Weapons acknowledges its signatories' right to develop nuclear energy for peaceful purposes, which may also mask the development of fissile material for warheads).

States with existing WMD capabilities may begin to indigenously produce and export these same or related capabilities to other actors of concern. The ability and willingness of these states to export WMD-related capabilities to other states outside of, or in noncompliance with, international non-proliferation rules are a serious threat. Furthermore, a proliferation threat exists from non-state entities who proliferate WMD-related technologies and materials, which increases the risks of terrorists acquiring WMD. While difficult to detect, WMD proliferation that occurs outside of international controls remains a significant concern.



7. Legal Framework for CWMD

The legal and regulatory instruments for CWMD include national and international laws, treaties, conventions, and regimes. These instruments can be unilateral, bilateral, or multilateral. UNSCRs establish standards and objectives which are binding on all member nations. The Security Council may vote to impose sanctions when resolutions are violated. Sanctions are used to apply pressure on a nation or entity to comply with the objectives established by the Security Council without resorting to the use of force. Sanctions thus offer the Security Council an important instrument to enforce its decisions. In some cases, the Security Council may authorize the use of force to enforce standards, or to maintain or restore international peace and security. UN sanctions often apply to components, precursor materials, or other resources which aid in the financing, resourcing, development, or proliferation of WMD. Examples include UNSCR 2375 which restricts refined petroleum supply to North Korea, and UNSCR 2231 which calls for Iran to refrain from activity related to nuclear-capable missiles.

UN Security Council meeting. (Photo by Eskinder Debebe, courtesy of the United Nations)

In addition to UNSCRs, multinational treaties, regimes, and conventions provide a broad range of controls, guidelines, and best practices which are agreed to and monitored by nations, intergovernmental organisations, and multinational organisations. It is important for military planners to be knowledgeable of the objectives, materials, and controls covered by these instruments; the organisations which monitor compliance; and the procedures for reporting non-compliance. It is likely that civilian agencies and organisations will have the responsibility and authority for monitoring and reporting non-compliance. While the military may play a role in identifying and reporting non-compliance, it is unlikely that the military will have a role in enforcement during periods of stability. Military organisations may have an increasing role in CWMD as crises develop or as directed by national or

Our ultimate goal is a world free of nuclear weapons. Together, we have reduced the number of nuclear weapons in Europe by more than 90 percent over the past 30 years. But in an uncertain world, these weapons continue to play a vital role in preserving peace.

Secretary General Jens Stoltenberg,
NATO Annual WMD Conference, November 2020

multinational authorities. The CWMD community, including both civilian and military organisations, should work together proactively and consistently in order to effectively utilize the legal instruments to counter WMD.

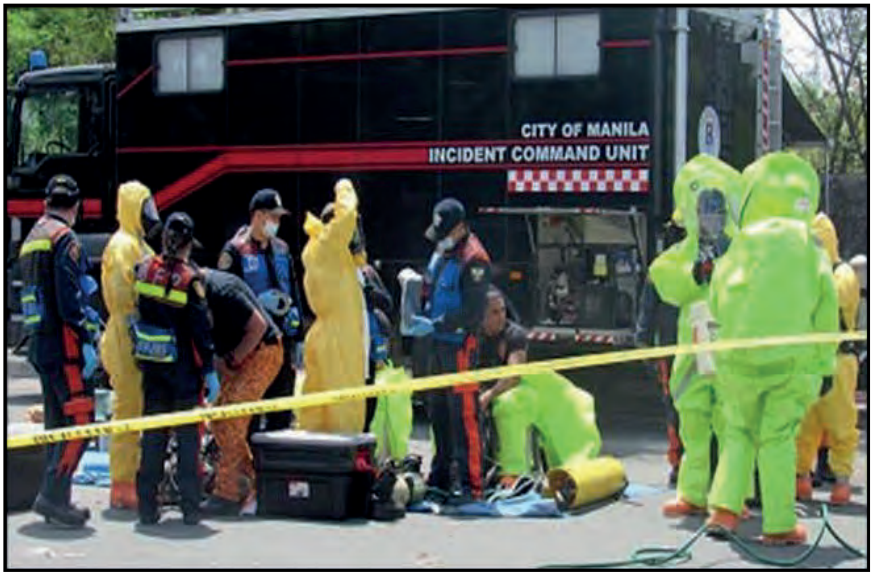
Nations and organisations may have differing interpretations of rights, standards, and obligations under international law that will require sensitivity, cooperation, and negotiation. Legal and political advisors should be consulted early when planning or supporting any CWMD activity. This includes consultations with multinational partners, Host nation governments, and international organisations such as the International Atomic Energy Agency (IAEA), the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO), and the Organisation for the Prohibition of Chemical Weapons (OPCW). Additionally, legal advisors should be consulted to ensure international environmental laws, the international law of the sea, international air law, and specific national laws and regulations regarding WMD, hazardous materials, and environmental protection are taken into consideration.

The cornerstone Resolutions, Treaties, Conventions, Regimes, and Agreements which support CWMD are summarized in Appendix B (Legal and Regulatory Instruments). These lists are not all-inclusive, nor are they intended to replace legal guidance. CWMD planners should consult legal advisors early in the planning process for more complete information and guidance pertaining to these legal and regulatory instruments.

8. Application for Military Leaders

State and non-state entities engage in hybrid warfare, to include WMD development and proliferation activities. Even though both may differ generally in their means and ways, they all show the capability to employ and harmonize various instruments of power against specific vulnerabilities to create the desired effects. Hybrid warfare is asymmetric and uses multiple instruments of power, and accentuates this with imagination, uncertainty, and ambiguity. Hybrid warfare is different from force-based symmetric warfare where the strength of opposing forces is measured, either qualitatively or quantitatively, with the objective to degrade the opponent's capabilities and capacities. Even though camouflage, concealment, and deception are elements of all warfare, they are most dominant in hybrid warfare. Hybrid warfare uses the different means of power available to the actor of concern, customized to the critical vulnerabilities of the specific target. In this sense the different instruments of power are used in various domains and on multiple levels simultaneously. WMD are an additional means to achieve effects through their sheer existence. Either with the threat to use or an actual or perceived use, degradation of effectiveness of governance, trade, use of force and public support can be accomplished. This may amplify other hybrid capabilities or only be used as deterrence. Nevertheless, history shows that an actor of concern armed with WMD is less likely to be kinetically attacked as it would impose additional risks which may outweigh the benefits.

Historically, militaries have focused on CBRN defence and response; that is defending from and mitigating the effects of a WMD attack. While this is an important part of addressing the threat from WMD, it is not sufficient. A comprehensive approach to countering WMD threats includes conducting actions as early as possible to ensure that a WMD attack does not occur. Implementing a WMD development and acquisition defeat approach is the most effective in countering the threat from WMD in that it prevents actors of concern from acquiring WMD capabilities and ensure those without WMD do not obtain them. Nevertheless, prevention is not always successful, and cannot be applied to actors of concern who already have WMD capabilities. In this case, capabilities to protect allies and partners from existing WMD threats by securing and reducing them are also required. Resilience and preventive measures require both physical and non-physical protection measures. Physical protection measures ensure the security of physical, organisational, and digital infrastructure, while non-physical measures include legislation, financial transparency, and trade



Personnel from the US Defense Threat Reduction Agency (DTRA) assist interagency representatives of the Philippine government in conducting a Chemical, Biological, Radiological, and Nuclear (CBRN) exercise in Manila in July 2019. (Photo courtesy of the Defense Threat Reduction Agency)

regulation. Targeted intelligence gathering can enhance situational awareness on the existence and forms of WMD programs and WMD pathways.

Another common misconception is that CWMD activities are conducted only by institutions explicitly linked to CBRN defence or WMD. The CWMD Activities described in Chapter 6 and the CWMD Tasks described in Appendix A include specialized military and warfighting functions, but also include some common functions that are applied to the WMD threat. For example, disabling a WMD device by accessing and performing diagnostics and disablement procedures requires specialized training and equipment to accomplish. Maintaining security of the WMD components once the device is no longer viable, however does not require specialized CBRN or WMD expertise. Additionally, since other elements of the WMD activity continuum described in Chapter 3 include personnel and information, existing military doctrine for addressing those can be used.

This does not, however, discount the importance of specialized and technical CWMD capabilities. Some CWMD activities and tasks can only be effectively accomplished by high-demand, low-density capabilities with specialized technical competencies and skills. Commanders should ensure

the appropriate mix of military capabilities to ensure scarce capabilities are available when required. Depending on the specific circumstances, assets conducting CMWD activities should be resilient enough to continue to operate in a contaminated environment resulting from an accidental or intentional release of CBRN material and decontaminate once activities are complete.

CWMD efforts cannot focus exclusively on reducing access to capacity. Pairing these efforts with norms and legal obligations, as well as with a strong security culture, builds accountability and reinforces deterrence. The rule of law is one of the foundations of democratic societies. Justice, accountability, and consequences at the international, national, institutional, and even individual levels represent the most effective way to affect WMD pathways. Public prosecution, like the public naming of suspects in the Skripal poisonings[23] or the publication of the prevented Ricin attack plans in Cologne[24] can be effective. Transparency, through public reporting of illegal activities and the successful response by authorities, strengthens the trust of the society in public institutions. Swift, accurate, and reliable prosecution is also vital to maintain trust in governance, security, and the application of the rule of law.

Strategic communications and engagement are essential public and proactive components of CWMD. Both can be focused both inwardly, towards society, and externally, towards actors of concern, their networks, and WMD pathways. In this context, proactive, truthful, and transparent cooperation with media is crucial. Measures to support informational openness and transparency can increase trust and access to information across society. Misinformation and disinformation can be countered through education and cooperation, and exposed through transparency, with legal action available to impose penalties.

Proper preparation requires resources, especially investments in specialized technology. The political, legal, and environmental sensitivities involved in CWMD significantly complicate the task; there is no one size fits

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23 Tetrault-Farber, Gabrielle. "Factbox-Who Are the Skripal Poisoning Suspects Allegedly Behind Deadly Czech Blast?" Edited by Frances Kerry, US News & World Report, Thomson Reuters, 18 Apr. 2021, www.usnews.com/news/world/articles/2021-04-18/factbox-who-are-the-skripal-poisoning-suspects-allegedly-behind-czech-blast.

24 Huggler, Justin. "Ricin Terror Plot Foiled by Police in Germany." *The Telegraph*, Telegraph Media Group, 12 June 2019, www.telegraph.co.uk/global-health/terror-and-security/islamist-extremist-ricin-plt-foiled-german-police/.

all solution, and very limited off-the-shelf solution capabilities exist. Continued research and development are crucial, especially to develop highly adaptable detection and destruction technologies. Maintaining an up to date and efficient technical base is vital to ensuring that critical CWMD capabilities advance to meet the evolving threat and remain sufficiently available.

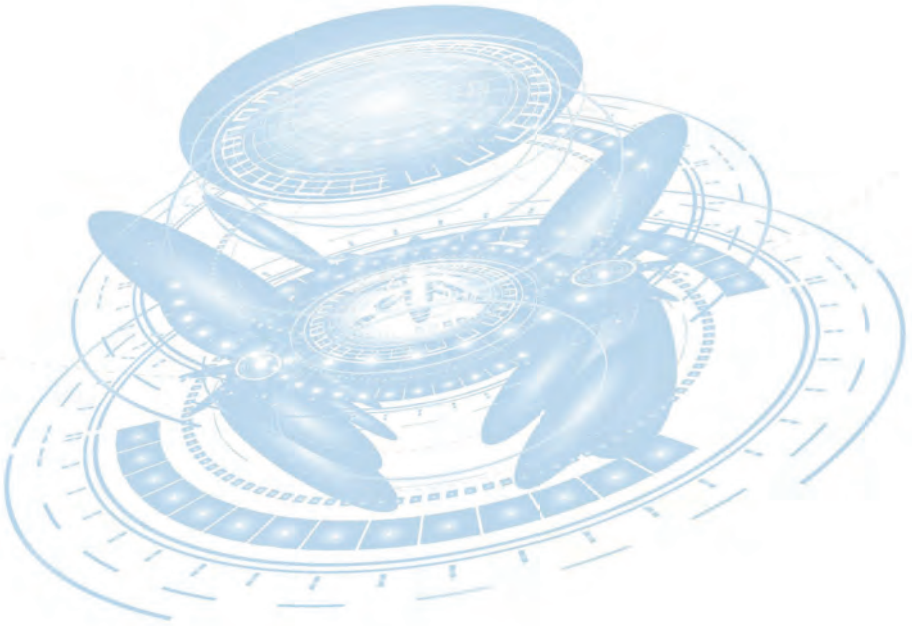
CWMD capabilities gaps remain, such as insufficient diagnostic and analytical capabilities to detect, identify, and characterize WMD and WMD programs in a timely manner. Biological weapons especially pose a challenge in a globalized world. Developing means to close identified CWMD gaps should rank high among priorities for research and development.

Due to the trends in the changing environment described in Chapter 2, the broad scope of the WMD threat described in Chapter 3, and the limitations of military authorities and capabilities, leaders should utilize all available capabilities to effectively counter the threat of WMD. Capabilities should be flexible and able to respond to opportunities or crises in a range of operating environments and conditions. Countering WMD may occur across the entire Competition Continuum described in Chapter 4. Each opportunity to counter WMD will be unique, based on risk, available capabilities and authorities, and the threat.

It is imperative that leaders also incorporate their CWMD efforts with all the other elements of national power. Proper implementation of national capabilities across DIMEFIL ensures that the appropriate tool is applied to ensure that the desired effects are achieved. First and foremost, all CWMD activities should be conducted within the legal instruments discussed in Chapter 7 and Appendix B. These instruments enable all other instruments of national power to be implemented effectively.

While not a biological weapon, parallels can be drawn from the rapid spread of the novel coronavirus around the world, emphasizing the need for a multi-organisational, multinational approach to countering the WMD threat. Commanders should ensure that they are coordinating and planning their organisations' efforts as part of a multinational, multi-organisational approach, as described in Chapter 5. No single nation or organisation has the resources, capabilities, access, or information to effectively counter the varied and widely dispersed WMD threats across the world.

Swedish Chemical, Biological, & Radiological Explosive Ordinance Disposal operator in bomb suit with additional chemical protection. (Photo by Jimmy Croona, courtesy of the Swedish Armed Forces)



Appendix A: CWMD Activities & Tasks

This appendix identifies tasks to provide additional detail to the CWMD activities described in Chapter 6 (CWMD Organizing Principles and Activities).

Specialized Activity 1: WMD Development and Acquisition Defeat

WMD development and acquisition defeat focuses on preventing actors of concern from developing or acquiring WMD capabilities and ensuring those who do not possess WMD do not obtain them. This activity comprises of operations to significantly reduce and ideally prevent the conceptualization, development, and acquisition of WMD. These actions are carried out to dissuade and deter adversaries from pursuing WMD development, acquisition, or use; delay development of WMD programs by adversaries; disrupt WMD program development by targeting key nodes; deny access to WMD technologies, materials, and expertise; and assure allies and partners. Though this activity primarily focuses on the prevention of WMD development, it also includes countering horizontal proliferation and/or procurement once an initial capability has been attained. The primary responsibility for efforts

Royal Australian Navy Boarding Party personnel demonstrate a search on a simulated suspect vessel during the Live Exercise demonstration at the Proliferation Security Initiative, Exercise Pacific Protector 17. (Photo courtesy of the Royal Australian Navy)

preceding WMD use differs depending on the situation. Therefore, commanders should closely work with other allies and partners to learn about their capabilities, as well as cooperate to fully understand the intricacies of pathways and associated networks to effectively counter WMD development, proliferation, and/or procurement. By examining WMD pathways through the lens of people, places, and things, it is possible to detect previously unidentified efforts, emerging WMD actors and take action to complicate, disrupt, or stop progress toward WMD development.

Dissuade and Deter Task Group. Allies and partners conduct efforts to persuade or convince potential actors of the futility or overwhelming cost of developing, acquiring, proliferating, or using WMD. These actions, which are employed early in WMD development and acquisition defeat, are intended to prevent potential actors of concern from making adverse geopolitical choices but may also serve to persuade known actors of concern from challenging global norms. Ideally, these pre-development actions may preclude the need to directly employ offensive capabilities against actors of concern.

- Dissuade. This task involves efforts and resources to prevent actors of concern from development conceptualization, acquisition, proliferation, or maintaining WMD capabilities.

- Deter. This task involves efforts and resources to prevent the use of WMD by actors of concern by creating a credible threat of unacceptable consequences resulting from WMD use and the belief that the costs of WMD use outweigh the potential benefits.

Disrupt. Allies and partners may choose to interrupt an actor of concern's development or acquisition of a WMD capability by preventing access to critical components. This may be done with direct action interdicting material en route. Disruption is particularly well suited for targeting key nodes in an actor of concern's network, such as transportation, leadership, logistics, or financial nodes.

Deny. Early in the WMD continuum, allies and partners frustrate and ultimately negate all paths to an actor of concern's acquisition or development ambitions. Though less effective and more costly and difficult, denying WMD proliferation, further qualitative or quantitative improvements, and WMD use may also take place in the Existing WMD Threat Management activity.

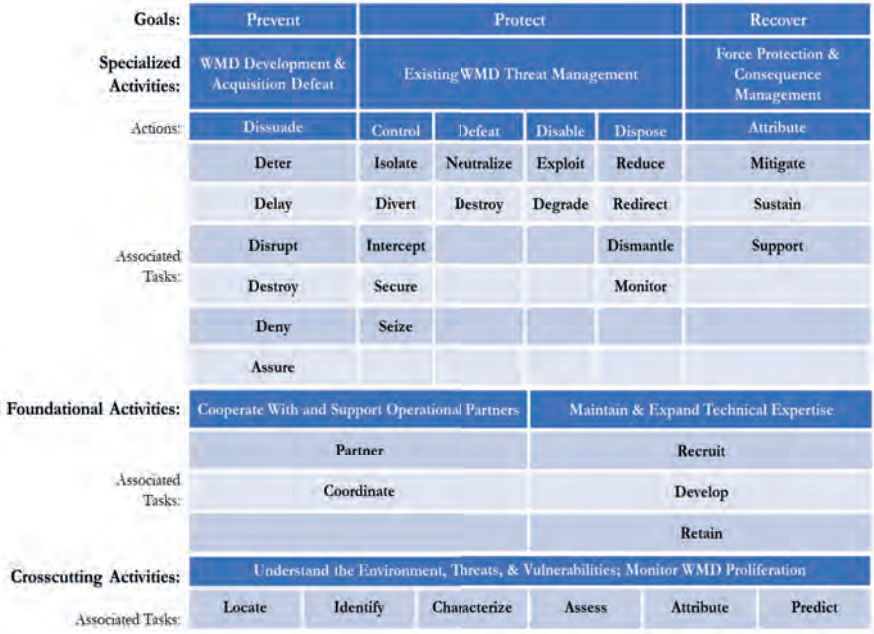


Figure 6. Countering Weapons of Mass Destruction Activities and Tasks. Image derived from Joint Publication 3-40, Joint Countering Weapons of Mass Destruction, 27 November 2019.

Assure. Allies and partners reassure friends and partners through force posture and the use of cooperative security agreements to extend deterrence for their protection. This reassurance serves to dissuade states from developing their own deterrent WMD capabilities.

Specialized Activity 2: Existing WMD Threat Management

Existing WMD Threat Management focuses on containing and reducing risks posed by existing WMD stockpiles. Whether supporting or leading, allies' and partners' efforts within this activity comprise containing, reducing, reversing, neutralizing, or destroying existing WMD and the ability to stockpile, transfer, or employ WMD. These efforts may range from threat reduction cooperation while operating in a permissive environment (during Cooperation or Competition Below Armed Conflict) to the execution of lethal options (during Armed Conflict).

Inspection of chemicals by Kanagawa Prefectural Police at the Proliferation Security Initiative exercise, Yokosuka, Japan 26 July 2018. (Photo courtesy of the Ministry of Foreign Affairs of Japan)

Control WMD Threats Task Group. Allies and partners isolate, divert, intercept, seize, and secure WMD, including related technology, materials, expertise, and means of delivery to prevent access to or movement of an actor of concern's program elements. Control may be executed throughout the competition continuum. It routinely relies on capabilities that are not specialized for CWMD but are nonetheless essential to CWMD success.

- Isolate. Allies and partners isolate and deny access to critical WMD program components to impede actors of concern from furthering WMD acquisition, development, proliferation, or use. This task includes conducting critical factors analyses of WMD programs to identify capabilities, requirements, and vulnerabilities that can be acted upon. Isolation operations may require the coordination of conventional forces and interagency and international partners, to include law enforcement and specialized technical capabilities. Isolation of WMD critical components may be necessary for follow-on CWMD activities and tasks.

- Divert. This task involves efforts and resources to change the intended course or destination of shipments of WMD, related technologies, materials, expertise, and/or means of delivery, either willingly or by force. Allies and partners may use a combination of operations to accomplish this task. In some cases, this may not require employment of force; rather, a show of force, the demonstration of military or governmental presence, or a formal communication of concern will create the desired effect. For example, diversion may result from activities such as cyberspace operations, maritime interception operations, or formal diplomatic actions (demarche).

- Intercept. Conventional forces and SOF may be necessary to stop the movement or proliferation of CBRN materials, WMD components, means of delivery, WMD-related personnel, or functional weapons. Such actions may require boarding, search, and detection capabilities to secure and seize shipments. Intercept efforts will likely involve non-military partners. This task may involve a combination of activities such as port inspections and checkpoints that would authorize inspections. This may include naval capabilities to carry out necessary technical inspections.

- Seize. Allies and partners use offensive action to obtain control and possession of WMD capabilities (e.g., a designated area, building, transport, materials, or personnel) to deny an actor of concern's access to WMD capabilities. Once a force seizes a WMD-related objective, it secures the objective and prepares it for follow-on actions such as exploitation and/or destruction.

- Secure. Allies and partners establish protective measures to prevent unauthorized access to targets or removal of WMD-related technologies, materials, or personnel. Security may be necessary to prevent use, proliferation, or looting of WMD capabilities or to prevent the compromise of physical evidence. The requirement to secure targets is a crucial mission-analysis consideration due to the potentially large force requirements and the balance of competing priorities.

Defeat WMD Threats Task Group. Allies and partners neutralize or destroy existing WMD to ensure that it can no longer be used. The preponderance of the scope and efforts take place within the Existing WMD Threat Management activity and the Protection organizing principle but,

as with every activity or task, aspects of it may bleed over into the Prevention and Response organizing principles. Within the Prevention organizing principle, allies and partners may defeat an actor of concern's ability to develop, acquire, proliferate, or use WMD by neutralizing or destroying nodes in the WMD network or program. Defeat may take place below the level of armed conflict or in conflict as either a standalone action or as part of a larger operation.

- Destroy. Allies and partners destroy WMD capabilities so they cannot perform their intended function without being entirely rebuilt. Such actions require a significant amount of planning and authorization prior to execution. Proper weaponeering and hazard modelling help determine the proper resources to employ, understand the potential consequences of execution, and minimize collateral damage. Allies and partners should consider national and strategic objectives of such an operation or campaign before deciding to destroy a WMD-related target. The Destroy task is also applicable to disabling WMD threats.

- Neutralize. Allies and partners use a combination of capabilities that create lethal and/or nonlethal effects to render actor of concern's WMD capabilities ineffective or unusable. Examples include making chemical and biological agents and materials harmless or making delivery systems unusable. When assigning assets to neutralize WMD, commanders specify an actor of concern's capability or material and the duration it should be rendered ineffective or unusable. Forces (including specialized units and equipment) required to neutralize a target vary according to the type and size of the target and desired effects.

Disable WMD Threats Task Group. Allies and partners exploit and degrade critical and at-risk components of a WMD program. Critical components are those that pose an immediate threat to friendly forces, while at-risk components are those components of a WMD program that are at risk of loss or proliferation. Allies and partners disable WMD program components to ensure these items are not used, lost, stolen, or proliferated. If follow-on activities to complete WMD program dismantlement are required, responsibility may be transferred to another organisation for final disposition. Allies and partners should establish control of the specified WMD target before disablement can be conducted.

- Exploit. Allies and partners seek to maximize the value of intelligence gained from personnel, data, information, and materials obtained during CWMD operations. Processing and exploitation of information, personnel, and/or materiel found during the conduct of CWMD operations may be conducted at various locations in conjunction with mission partners, as required, to produce timely, actionable intelligence.

- Degrade. Allies and partners seek to erode an actor of concern's ability to develop, proliferate, or use WMD by disrupting functionality of WMD or related capabilities. Degradation should ensure an actor of concern is not able to threaten friendly forces for a period. Typically, destruction and disposal of an actor's WMD capability are preferred to degradation, but factors such as time, resources, access, and security may necessitate only the most critical, at-risk elements be degraded and/or destroyed.

Dispose of WMD Threats Task Group. Allies and partners conduct and/or support a systematic effort to rid an actor of concern of the remnants (e.g., program elements, facilities, surplus, dual-use capacity, confiscated/seized cargo, equipment, delivery systems) of a WMD program.

US Air Force Institute of Technology students gather samples during a Countering Weapons of Mass Destruction course. (Photo by LTC Carol McClelland, courtesy of the US Army)

Typically, military forces set the conditions for disposition of an actor of concern's WMD program, but final disposition will probably require a larger international effort. This may include deliberate technical processes that reduce or dismantle production methods, materials, stockpiles, and technical infrastructure; establishment of protocols of reduction and compensation or agreements to return seized cargo; the redirection of WMD, related technologies, materials, or an actor of concern's efforts and expertise towards peaceful productive activities; and monitoring to ensure expertise or program elements are not reconstituted or reused in any illicit capacity.

- Reduce. Allies and partners conduct and/or support efforts to diminish an actor of concern's WMD program, improve the security of remaining capabilities and critical components, reduce costs of sustaining the program elements, and eliminate excess capacity or capability. Reduction programs and operations, such as demilitarization of stockpiles, may be led by non-military organisations. Allies and partners should coordinate military and non-military activities to make certain they are mutually supporting and do not conflict.

- Redirect. Allies and partners conduct and/or support repurposing facilities, expertise, and material associated with an actor of concern's WMD program elements. Redirection of expertise includes retaining personnel with WMD expertise (e.g., scientists and engineers) for new, legitimate employment. This is especially difficult when program elements have a dual-use nature. Depending on the operating environment, the lead for this effort will most likely have transitioned to a non-military organisation or another nation. Allied and partner militaries should be prepared to provide support as directed.

- Dismantle. Allies and partners conduct and/or support the process by which an actor of concern's WMD facility, stockpile, or program is systematically taken apart to a level that it can no longer operate for its intended purpose. Depending on the operating environment, the lead for this effort may have already transitioned to a non-military organisation or another nation. Allies and partners should be prepared to provide support as directed. If directed to execute this task, allies and partners may require specialized capabilities and will need to consider possible consequences of execution.

Swedish CBRN soldier marks the area of a chemical attack during a training exercise in Umeå, 2021. (Photo by Jimmy Croona, courtesy of the Swedish Armed Forces)

- Monitor. Allies and partners conduct and/or support continuous review and inspection of programs, personnel, and facilities to ensure they are not producing WMD and remnants of an actor of concern's WMD program are not being reconstituted or reused in any illicit capacity. Depending on information requirements, allies and partners may conduct intelligence, surveillance, and reconnaissance, or use other collection methods to support this task.

Specialized Activity 3: CBRN Response

CBRN Response focuses on defending from, responding to, and recovering from WMD use if, and when, deterrence fails. The commander postures and prepares forces and mitigates CBRN effects to operate and win in any given environment. The commander may also be called upon to support response efforts of allies or partners, as well as provide support to civil authorities and assist with forensic attribution.

Attribute. Allies and partners conduct and/or support efforts to determine the origin of the material or weapon, as well as the actor responsible for a CBRN event. The process derives forensic conclusions from analysis of collected samples and information from law enforcement and intelligence sources. Forensic-enabled intelligence collection, processing, exploitation, and analysis capabilities support the identification of CBRN sourcing and attribution. Joint forces directly support the attribution pro-

cess through intelligence (e.g., site exploitation), sample collection and transfer, and technical analysis. These forces require training, certification, specialized equipment and expertise, and, in some cases, the commander requests unique authorities prior to execution. These forces are identified early in the planning process. Attribution provides a dissuasion and deterrence value if properly signalled to actors of concern but as a capability is focused on response activities.

Mitigate. Allies and partners conduct and/or support efforts to lessen the effects of a CBRN incident or WMD attack. This task focuses on minimizing or negating the vulnerability to, and effects of, WMD attacks and CBRN incidents. These activities may support civil authorities and foreign governments.

Countering CBRN Field Training Exercise GOLDEN Mask in Baumholder, Germany. Nuclear Biological Chemical Reconnaissance Vehicle (NBCRV) Stryker assigned to the Regimental Engineering Squadron, 2nd Cavalry Regiment, is decontaminated by a German TEP-90 trailer-mounted mobile decontamination system. (Photo courtesy of the Bundeswehr CBRN Defence Command)

Sustain. Allies and partners conduct logistics and personnel efforts to maintain and prolong the capability to respond to CBRN incidents. In reference to military forces, sustainment is the ability to support operations in a CBRN environment and conduct recovery/reconstitution operations to regenerate unit combat readiness (e.g., detailed troop decontamination, detailed equipment decontamination, medical activities, and rest

and relaxation). These activities may also support civil authorities and foreign governments.

Support. In many scenarios, military forces will be directed to support another organisation in the conduct of operations to assist civil authorities when their own capabilities are insufficient to save lives and maintain essential government services. The commander should be aware of any standing agreement that may provide a means to deliver this support as required.

Foundational Activity 1: Maintain and Expand Technical Expertise

This activity focuses on nurturing and sustaining the intellectual capital provided by allied and partner CWMD experts. This knowledge and skill sets provide the necessary expertise for CWMD-related planning, research and development, programming, exercising, system integration, analysis, reachback, mission execution, and assessments. Maintaining expertise requires long-term commitment to recruiting, developing, and retaining high-quality personnel.

CWMD operations are dangerous and pose considerable risks to the personnel involved as well as nearby populations. The general base of qualified technical experts who can design and develop technologies to support CWMD has declined over the past years and is still shrinking and aging even further. At the same time, WMD threats continue to evolve as an effect of speedy technological evolution and innovation. Complex scientific procedures are no longer solely owned by elite government laboratories and highly trained scientists. Access to simple bench-science facilities, modest levels of education and vast knowledge bases can lead to rather sophisticated WMD capabilities. Even worse, this can help to conceal WMD programs and outmanoeuvre traditional approaches to detection, identification, characterization, and neutralization.

Recruit. Allies and partners conduct personnel efforts to acquire detailed, technical subject matter expertise to conduct and/or support CWMD. The goal of this task is to enlist young, highly academically trained military and civilian personnel into the CWMD community who can build upon the efforts of their predecessors to further strengthen allies' and partners' ability to effectively counter the threat of weapons of mass destruction around the world.

Exercise Fortune Guard 2014 - Proliferation Security Initiative exercise designed to build regional WMD counter-proliferation capacity. (Photo by Mass Communication Specialist 1st class Amanda Dunford, courtesy of the US Navy)

Develop. Allies and partners conduct education, training, and exercises to ensure that personnel have the detailed, technical subject matter expertise to conduct and/or support CWMD. The goal of this task is to provide opportunities for the CWMD community to broaden their expertise and experience through cooperative educational opportunities, exchange programs between organisations and nations, military exercises, etc.

Retain. Allies and partners conduct personnel efforts to ensure that subject matter experts are available to conduct and/or support CWMD and to reduce turnover of CWMD-trained personnel. The emphasis of this task is to ensure that the highest levels of CWMD expertise are maintained by allies and partners and not lost to more lucrative employment in other science and engineering disciplines.

Foundational Activity 2: Cooperate with and Support Partners

This activity focuses on performing CWMD activities and tasks in full cooperation with allies and partners. This activity promotes common threat awareness, builds CWMD self-sufficiency, improves military interoperability, enhances military and civilian preparedness, enhances deterrence, and, in some cases, facilitates security of CBRN and dual-use materials. Allies and partners should coordinate to ensure tasks associated with this activity are successfully conducted within military engagement, security cooperation, cooperative threat reduction, and deterrence operations

and activities across the competition continuum. Allies and partners should seek to strengthen existing relationships and support programs to build the foundation for future partnering opportunities. Cooperative efforts should include allies and partners in planning and execution processes as early as possible. Allies and partners can then leverage existing activities, such as multinational training and exercises, to strengthen relationships and improve regional capabilities and capacity to achieve CWMD objectives.

Partner. Allies and partners maintain partnerships and seek new relationships to build partner capacity in key areas that support CWMD across the competition continuum. Domestic and foreign security partnerships support the collective capability to deter, prevent, respond to, and defeat WMD threats and manage the effects of an attack. These integration activities may require a coordinated international military response to support non-proliferation efforts assigned by treaties, sanctions, and export control regimes and frameworks and national and international programs.

Coordinate. Allies and partners promote and improve common threat awareness, interoperability, and preparedness. Actions that support this task include operational planning with partners and security cooperation efforts that synchronize counter-proliferation activities such as interdiction.

Crosscutting Activity: Understand the Environment, Threats, and Vulnerabilities

This activity focuses on developing and maintaining a comprehensive understanding of the WMD actors and materials that affect the operational environment. To accomplish this, allies and partners need to locate, identify, characterize, assess, and predict threats against friendly vulnerabilities. Capabilities that support these tasks include detection; modelling; identity intelligence; detailed operational planning; and analysis of materials, precursors, and agents related to WMD proliferation, development, or use. Allies and partners may use a combination of forces and capabilities such as intelligence, surveillance, reconnaissance assets; subject matter experts; conventional forces; and SOF in support of this activity. This activity is an iterative process undertaken continually throughout the planning process and during execution of operations and activities.

Finding WMD and related components, including locating and characterizing program nodes and pathways, remains the principal challenge. CWMD requires precise and detailed intelligence, specifically about loca-

tions of materials and facilities as well as types, quantities, and sophistication of WMD capabilities. Just for completeness, this includes the understanding of expertise and WMD pathways gained to counter looting of expertise and evasion of personnel.

Indicators and warnings refer to intelligence activities that detect and report time-sensitive developments and that forewarn of hostile actions or intent. Key indicators are identified and monitored over time to establish a baseline of a potential adversary's routine activities and operations. Once relevant changes are detected, such as changes in the operational status or presence of undesirable activities, intelligence analysts can alert or issue an early warning to decision-makers enabling them to act in time.

The emphasis on WMD pathway camouflage, concealment, and deception, combined with non-military approaches, requires the design of indicators and warnings processes and methods aimed at detecting synchronized patterns of WMD-related activities. These activities are intentionally designed to fall outside and or below traditional detection thresholds until the WMD capability is robust enough to work as a deterrent. This requires coordinated and international information sharing.

The discovery of WMD pathway activities can usually be anticipated if evolving technology is analysed and assessed against its value for WMD developments. This process requires permanent attention of specialist intelligence analysts and subject experts. It involves capturing, filtering, and then correctly interpreting information related to a potential WMD pathway that has not been previously identified. If analysts have never seen this particular WMD pathway before, they cannot be equipped with indicators for a type of pattern that has never been discovered. Nevertheless, analysing technological developments can help to imagine new threats and pathways before they materialize.

CWMD requires analysis and decision-making with two crucial features. One, allies and partners conducting CWMD should overcome information -sharing obstructions to gather and store the widespread range of data required, and to cover the necessary scientific, technical, and operational expertise. Integrating data will facilitate detection of WMD pathways and understanding of novel or emerging technologies. Two, allies and partners should have adequate institutional authority for assessments and analysis to convince a variety of stakeholders, including some that may not customarily pay attention to threat assessments.

German Sampling and Identification of Biological, Chemical, and Radiological Agents (SIBCRA) team operating in a clandestine laboratory. (Photo courtesy of Bundeswehr CBRN Defense Command)

Locate. Allies and partners use SOF and intelligence collection assets to locate WMD-associated system nodes and program elements, to include production facilities, storage/stockpile sites, and key program personnel. Developing robust information sharing relationships particularly related to identity data, is an essential component to this task. The decision to develop and/or acquire WMD may be made by a small group of actors, organisations, or leaders. The likely compartmentalization and secrecy of such decisions can make it difficult to gather intelligence to identify and actor's intent.

Identify. Once a WMD-related element and capability is located, allies and partners use intelligence, in coordination with mission partners, to scope, categorize, and prioritize the posed threat. Confirmation of a threat will lead to further analysis to characterize and then assess specific elements of the program more effectively in follow-on tasks. During conflict, initial identification of CBRN materials will most likely be performed by conventional forces. Prior to execution, conventional forces should be made aware of the types of facilities, material, and munitions they may encounter so personnel protective equipment, security, and reporting are properly prepared.

Characterize. Allies and partners gain an understanding of an actor of concern's WMD program by mapping its individual components, internal linkages, and external associations through a variety of intelligence collection and analysis capabilities. This understanding should include the types of weapons and the materials, technology, and expertise associated with all aspects of an actor of concern's WMD capability. Allies and partners use characterization to inform assessment, attribution, and predictive analysis. During and after conflict, characterization occurs when the allies and partners have access to and can fully examine WMD facilities, stockpiles, weapons, and/or personnel. Understanding gained through this process conducted by specifically trained and designated forces, combined with subsequent definitive analyses at internationally recognised laboratories, provides overall characterization of a WMD program's size, scope, and type. Specialized, technical capabilities are used to construct a common operational picture presenting current information on the actors of concern, friendly forces, neutral elements, the environment, and geospatial information.

Assess. Analysis conducted in conjunction with mission partners helps allies and partners determine the threat posed by an actor of concern's WMD program. This includes an assessment of friendly vulnerabilities in relation to a specific actor's WMD capability and the overall operational environment. Allies and partners may use hazard estimation, measurement, and modelling systems, as well as multinational exercises, to assess the level of threat that an actor of concern's WMD poses to friendly forces and interests.

Predict. Specialized, technical capabilities forecast changes to actors of concern, friendly forces, neutral elements, the environment, and geospatial information. Allies and partners use modelling, diagnostics, intelligence, and analysis capabilities to understand the current environment, detect anomalies, and continually assess the WMD threat and related networks to extrapolate possible future threats.

Appendix B: Legal and Regulatory Instruments

The cornerstone legal and regulatory instruments for CWMD are summarized in Chapter 7. This Appendix provides an additional list of resolutions and treaties; however, it is not possible to list all relevant documents or to provide complete texts. Planners should use the links provided below to obtain complete documents and should consult with legal and political advisors when planning activities to support CWMD.

United Nations Security Council Resolutions (UNSCR)

The UNSCR summaries below are a small sample of the Resolutions pertaining to nuclear, chemical and biological weapons, non-proliferation, terrorism, financing, export controls, and the need for continuous cooperation at the national, regional and international level. A complete repository of all UNSCRs can be found at: www.un.org/securitycouncil/

UNSCR 1377 (2001): Declares that acts of international terrorism constitute one of the most serious threats to international peace and security in the twenty-first century. It stresses that acts of international terrorism are contrary to the purposes and principles of the Charter of the United Nations, and that the financing, planning and preparation of as well as any other form of support for acts of international terrorism are similarly contrary to the purposes and principles of the Charter of the United Nations. undocs.org/S/RES/1377(2001)

UNSCR 1540 (2004): The resolution establishes the obligations under Chapter VII of the UN Charter for all Member States to develop and enforce appropriate legal and regulatory measures against the proliferation of chemical, biological, radiological, and nuclear weapons and their means of delivery, in particular, to prevent the spread of weapons of mass destruction to non-state actors. The Security Council decided that all States shall refrain from providing any form of support to non-State actors that attempt to develop, acquire, manufacture, possess, transport, transfer, or use nuclear, chemical, or biological weapons and their means of delivery, in particular for terrorist purposes. The resolution requires all States to adopt and enforce appropriate laws to this effect as well as other effective measures to prevent the proliferation of these weapons and their means of delivery to non-State actors, in particularly for terrorist purposes. undocs.org/S/RES/1540(2004)

UNSCR 1673 (2006): Reaffirms that proliferation of nuclear, chemical, and biological weapons, as well as their means of delivery, constitutes a threat to international peace and security. Decides that the 1540 Committee shall intensify its efforts to promote the full implementation by all states of Resolution 1540 through a work programme which shall include the compilation of information on the status of states' implementation of all aspects of Resolution 1540, including accountability, physical protection, border controls, law enforcement efforts and national export and trans-shipment controls including controls on providing funds and services such as financing to such export and trans-shipment.
undocs.org/S/RES/1673(2006)

UNSCR 1810 (2008): Notes that international cooperation between states, in accordance with international law, is required to counter the illicit trafficking by non-State actors in nuclear, chemical, and biological weapons, their means of delivery, and related materials. UNSCR 1810 also states that the full implementation of Resolution 1540 by all States, including the adoption of national laws and measures to ensure implementation of these laws, is a long-term task that will require continuous efforts at national, regional, and international levels. It recognises the need to enhance coordination of efforts on national, regional, subregional, and international levels in order to strengthen the global response, including preventing the financing of proliferation-related activities.
undocs.org/S/RES/1810(2008)

UNSCR 1977 (2011): Emphasizes the need for States to take all appropriate national measures in accordance with their national authorities and legislation, and consistent with international law, to strengthen export controls, to control access to intangible transfers of technology and to information that could be used for weapons of mass destruction and their means of delivery, to prevent proliferation financing and shipments, and to secure sensitive materials. undocs.org/S/RES/1977(2011)

UNSCR 2118 (2013): Condemns in the strongest terms any use of chemical weapons in the Syrian Arab Republic and endorses the decision of the OPCW Executive Council which contains special procedures for the expeditious destruction of the Syrian Arab Republic's chemical weapons program. Resolution 2118 re-emphasizes the obligation under Resolution 1540 that all States shall refrain from providing any form of support to non-State actors that attempt to develop, acquire, manufacture, possess, transport, transfer or use weapons of mass destruction, including chemical weapons, and their means of delivery.
https://undocs.org/S/RES/2118(2013)

UNSCR 2231 (2015): The resolution endorsed the Joint Comprehensive Plan of Action (JCPOA) on the nuclear program of Iran. It provides for the termination of the provisions of previous Security Council resolutions on the Iranian nuclear issue and establishes specific restrictions that apply to all States without exception.
undocs.org/S/RES/2231(2015)

UNSCR 2325 (2016): The resolution reinforces UNSCR 1540 and emphasizes the importance of full implementation of UNSCR 1540 by all states. It calls upon all states to strengthen national non-proliferation regimes; to enact export control measures for materials related to nuclear, chemical, and biological weapons and their means of delivery; and to submit timely reports on their efforts. It calls for greater assistance for building state capacity in that regard, including through voluntary contributions, and for greater cooperation among all stakeholders, including civil society and academia. undocs.org/S/RES/2325(2016)

Treaties and Conventions

Treaties are agreements in written form between nations (or international agencies, such as the United Nations) that are intended to establish a relationship governed by international law. A convention is an accord between nations, which resembles a treaty: ordinarily applied to agreements prior to the execution of an official treaty or which serves as its foundation; or an international agreement for the regulation of international affairs of common interests not within the ambit of commercial transactions or politics.

Geneva Protocol (Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare) (1925): The Geneva Protocol is a treaty prohibiting the use of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices and extended to the use of bacteriological methods of warfare (chemical and biological weapons) in international armed conflicts. The Protocol does not prohibit the production or storage of such weapons, but merely forbids their use.
www.un.org/disarmament/wmd/bio/1925-geneva-protocol

Antarctic Treaty (1961): The Antarctic Treaty states that Antarctica shall be used for peaceful purposes only and that there will be freedom of scientific investigation in Antarctica and cooperation toward that end. It also prohibits the testing or use of nuclear weapons, or any militarization of Antarctica. It also states that no acts or activities taking place while the

present treaty is in force shall constitute a basis for asserting, supporting, or denying a claim to territorial sovereignty in Antarctica or create any rights of sovereignty in Antarctica. No new claim, or enlargement of an existing claim to territorial sovereignty in Antarctica shall be asserted while the present treaty is in force. https://www.ats.aq/e/antarctictreaty.html.

Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water (Limited Test Ban Treaty) (1963): Also known as the Partial Test Ban Treaty, this treaty prohibits nuclear weapons tests "or any other nuclear explosion" in the atmosphere, in outer space, and under water. While not banning tests underground, the treaty does prohibit nuclear explosions in this environment if they cause "radioactive debris to be present outside the territorial limits of the state under whose jurisdiction or control" the explosions were conducted.
2009-2017.state.gov/t/avc/trty/199116.htm#treaty

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty) (1967): The Outer Space Treaty forms the basis of international space law. As of June 2019, 109 countries are parties to the treaty, while another 23 have signed the treaty but have not completed ratification. Among the Outer Space Treaty's main points are that it prohibits the placing of nuclear weapons in space, it limits the use of the Moon and all other celestial bodies to peaceful purposes only, and establishes that space shall be free for exploration and use by all nations, but that no nation may claim sovereignty of outer space or any celestial body. The Outer Space Treaty does not ban military activities within space, military space forces, or the weaponization of space, except for the placement of weapons of mass destruction in space.
disarmament.un.org/treaties/t/outer_space

Treaty on the Non-Proliferation of Nuclear Weapons (Nuclear Non-Proliferation Treaty (NPT)) (1968): The NPT restricts the proliferation, development, and transfer of nuclear weapons, related materials, and technology. It aims to prevent the spread of nuclear weapons and weapons technology, to foster the peaceful uses of nuclear energy, and to further the goal of disarmament. The Treaty establishes a safeguards system under the responsibility of the IAEA, which also responsible for monitoring, on-site inspections, and reporting.
disarmament.un.org/treaties/t/npt/text

Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof (Seabed Treaty) (1971): The Seabed Treaty is a multilateral agreement between the United States, Soviet Union (now Russia), United Kingdom, and 91 other countries banning the emplacement of nuclear weapons or "weapons of mass destruction" on the ocean floor beyond a 12-mile (22.2 km) coastal zone. It allows signatories to observe all seabed "activities" of any other signatory beyond the 12-mile zone to ensure compliance.
disarmament.un.org/treaties/t/sea_bed/text

Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (Biological Weapons Convention (BWC)) (1972): The BWC effectively prohibits the development, production, acquisition, transfer, stockpiling and use of biological and toxin weapons. It also prohibits the acquisition or retention of microbial or other biological agents or toxins that have no justification for prophylactic, protective or other peaceful purposes; and weapons, equipment or the means of delivery designed to use such agents or toxins for hostile purposes. The BWC is critical to international efforts to address the threat posed by biological weapons – whether in the hands of governments or non-state actors. The UN Security Council can investigate complaints or violations of the terms of the treaty, but this power has never been invoked.
disarmament.un.org/treaties/t/bwc/text

Strategic Arms Reduction Treaty I (START I) (1992): Treaty between the United States and the Soviet Union which limited the number of Intercontinental Ballistic Missiles (ICBMs) and nuclear warheads either country could possess. The treaty restricted the United States to approximately 8,556 nuclear warheads and the Soviet Union to approximately 6,449 nuclear warheads. Weapons in excess of the agreed upon number would be disarmed and the ICBM launch facilities would be destroyed.
media.nti.org/documents/start_1_treaty.pdf

Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, (Chemical Weapons Convention (CWC)) (1993): The CWC prohibits the development, production, acquisition, stockpiling, retention, transfer of chemical weapons and limits transfer of dual-use technology used to make chemical weapons to states that are not parties to the CWC. The CWC prohibits: developing, producing, acquiring, stockpiling, or retaining chemical weapons; the direct or indirect transfer of chemical weapons;

On July 31, 1991, US President George Bush and General Secretary of the Communist Party of the Soviet Union, Mikhail Gorbachev, sign the START I Agreement. (Photo courtesy of George Bush Presidential Library and Museum)

chemical weapons use or military preparation for use; assisting, encouraging, or inducing other states to engage in CWC-prohibited activity; and the use of riot control agents "as a method of warfare." The CWC is implemented by the Organisation for the Prohibition of Chemical Weapons (OPCW). disarmament.un.org/treaties/t/cwc/text

Comprehensive Nuclear Test-Ban Treaty (CTBT) (1996): The CTBT is a multilateral treaty that bans all nuclear explosions, for both civilian and military purposes, in all environments. It was adopted by the United Nations General Assembly in 1996, but has **not** entered into force. At present, 168 states have ratified the CTBT and another 17 states have signed but not ratified it. Eight nations (China, Egypt, India, Iran, Israel, North Korea, Pakistan, and the United States) must take further action for the treaty to enter into force. The treaty will come into force only with the signature and ratification by the eight identified states.
disarmament.un.org/treaties/t/ctbt/text

Open Skies Treaty (2002): The Open Skies Treaty is designed to enhance mutual understanding and confidence, giving all parties, regardless of size, a direct role in gathering information about military forces and activities of concern to them. Open Skies is one of the most wide-ranging international efforts to date promoting openness and transparency of military forces and activities. The Open Skies Consultative Commission is the implementing body for the Treaty. It meets monthly at the Vienna headquarters of the Organisation for Security and Co-Operation in Europe,

and consists of representatives from each of the states that is a party to the treaty. www.osce.org/library/14127

Strategic Offensive Reductions Treaty (SORT) (2002): This treaty between the United States and Russia to reduce their strategic arsenals to 1,700-2,000 warheads each. The treaty was different from START in that it limited the number of operationally deployed warheads, whereas START limited the number of warheads through declared attribution to their delivery systems (ICBMs, SLBMs, Bombers). The treaty was entered into force in 2003 and was replaced by New START in 2001.
media.nti.org/documents/sort_moscow_treaty.pdf

Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START Treaty) (2011): Treaty between the United States of America and the Russian Federation on measures for the further reduction and limitation of strategic offensive arms. Entered into force in 2011, the treaty limits strategic arms, allowing the parties determine for themselves the structure of their strategic forces within the aggregate limits of the treaty. The treaty has a verification regime that combines appropriate elements of the 1991 START Treaty with new elements tailored to the limitations and structure of this treaty. Verification measures under the treaty include on-site inspections and exhibitions, data exchanges and notifications related to strategic offensive arms and facilities, and provisions to facilitate the use of national technical means for treaty monitoring. To increase confidence and transparency, the treaty also provides for an annual exchange of telemetry on an agreed number of ICBM and SLBM launches. The 2002 Moscow Treaty terminated when the New START Treaty entered into force. www.state.gov/new-start/

International Convention for the Suppression of Acts of Nuclear Terrorism (Nuclear Terrorism Convention) (2005): United Nations treaty designed to criminalize acts of planning, threatening, or carrying out acts of nuclear terrorism; it requires States to criminalize these offenses via national legislation and to establish penalties appropriate to the gravity of the criminal act; and deals with both crisis situations, assisting States to solve the situation, and post-crisis situations by rendering nuclear material safe through the IAEA. This convention does not cover the activities of armed forces during armed conflict or military exercises.
treaties.un.org/doc/db/Terrorism/english-18-15.pdf

Regimes, Organisations, and Agreements

Australia Group (AG): The AG seeks to ensure that exports of chemical weapons precursors, dual-use chemical and biological materials and related technologies, biological agents, and toxins do not contribute to the development of chemical or biological weapons. The AG maintains control lists of chemical and biological related dual-use goods which are periodically reviewed and updated. Coordination of national export control measures assists AG participants to fulfil their obligations under the CWC and the BWC to the fullest extent possible. All participants in the Australia Group are state parties to both the CWC and the BWC. Support for these regimes and their aims remains the overriding objective of Australia Group participants.
www.dfat.gov.au/publications/minisite/theaustraliagroupnet/site/en/index.html

Comprehensive Nuclear Test Ban Treaty Organization (CTBTO): Since the CTBT is not yet in force, the organization is called the Preparatory Commission for the Comprehensive Nuclear Test Ban Treaty Organization. It was founded to promote the Treaty and the build-up of the verification regime so that it is operational when the Treaty enters into force.
www.ctbto.org/

European Union (EU): The EU is an economic and political union between 27 European nations. It was initially formed as the European Economic Community in 1958 to foster economic cooperation, with the goal that economic interdependency would decrease the potential for conflict between member nations. What began as an economic union has evolved into an organisation spanning policy areas from climate change and the environment to external relations and security, justice, and migration. The EU maintains a *Strategy Against the Proliferation of Weapons of Mass Destruction* and works with the United States to counter WMD via the Joint Programme of Work on the Non-proliferation of Weapons of Mass Destruction. europa.eu

European External Action Service (EEAS): The EEAS is the European Union's diplomatic service. It helps the EU's foreign affairs chief carry out the Union's Common Foreign and Security Policy. The EEAS works closely with the foreign and defence ministries of the member states of the EU and has a strong working relationship with the United Nations and other International Organisations. The EEAS also has Common Security and Defence Policy planning and crisis response departments. The EU Military Staff is the source of collective military expertise within the EEAS

and advises the High Representative/Vice-President on military and security issues. eeas.europa.eu/headquarters/headquarters-homepage_en

Global Partnership Against the Spread of Weapons and Materials of Mass Destruction: The G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction is a security initiative announced at the 2002 Kananaskis summit. The Global Partnership members pledged to commit US $20 billion towards the elimination and security of WMD, some originating from the Second World War, in successor states to the former Soviet Union. Specific cooperative projects focus on securing fissile materials as well as their related facilities and scientific expertise. The agreement was initiated against the backdrop of the September 11 attacks and specifically aimed to deny terrorists access to WMDs. Some of the stated priorities include destroying stockpiles of chemical weapons, dismantling decommissioned nuclear submarines, safeguarding/disposing fissile material as well as employing former weapons scientists.[25] www.gpwmd.com

International Atomic Energy Agency (IAEA): The IAEA is the world's preeminent intergovernmental agency for scientific and technical cooperation in the nuclear field. It works for the safe, secure, and peaceful use of nuclear science and technology; contributes to international peace and security; and supports the UN's Sustainable Development Goals. The IAEA runs laboratories specialized in nuclear technology and performs monitoring and inspections in support of treaties such as the Treaty on the NPT. www.iaea.org/

Missile Technology Control Regime (MTCR): The MCTR seeks to limit the risk of proliferation of WMD by controlling exports of goods and technologies that could contribute to delivery systems (other than manned aircraft) for such weapons. The aim of the MTCR is to restrict the proliferation of missiles, complete rocket systems, unmanned air vehicles, and related technology for those systems capable of carrying a 500 kilogram payload at least 300 kilometres, as well as systems intended for the delivery of WMD. The regime's controls are applicable to certain complete rocket systems (to include ballistic missiles, space launch vehicles, and sounding rockets) and unmanned air vehicle systems (to include cruise missiles, drones, and remotely piloted vehicles). mtcr.info

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[25] "Global Partnership Against the Spread of Weapons and Materials of Mass Destruction ('10 Plus 10 Over 10 Program')." *Nuclear Threat Initiative - Ten Years of Building a Safer World*, www.nti.org/learn/treaties-and-regimes/global-partnership-against-spread-weapons-and-materials-mass-destruction-10-plus-10-over-10-program/.

North Atlantic Treaty Organisation (NATO): NATO is an intergovernmental military alliance between 30 North American and European countries. The organisation implements the North Atlantic Treaty that was signed on 4 April 1949. NATO constitutes a system of collective defence whereby its independent member states agree to mutual defence in response to an attack by any external party. NATO's military structure is headed by two strategic level commands, Allied Command Operations (ACO) and Allied Command Transformation (ACT). ACO's overall purpose is to contribute to Allied defence and security by maintaining the integrity of Alliance territory, safeguarding freedom of the seas and economic lifelines, and preserving or restoring the security of its members. ACO is responsible for planning and executing all military operations. ACT is responsible for the training, transformation, and development of the Alliance to ensure it is capable of meeting current and future challenges. There are multiple specialized organisations within NATO which support nuclear arms control and CWMD, including the Nuclear Planning Group; the Arms Control, Disarmament, and WMD Non-proliferation Centre; the Joint Chemical, Biological, Radiological and Nuclear Defence Centre of Excellence; and the Combined Joint CBRN Defence Task Force. www.nato.int/

Nuclear Suppliers Group (NSG): The aim of the NSG is to ensure that nuclear materials, equipment and technology used for peaceful purposes does not contribute to the proliferation of nuclear weapons or other nuclear explosive devices, and that international trade and cooperation in the nuclear field is not hindered unjustly in the process. The NSG guidelines facilitate the development of trade in this area by providing the means whereby obligations to facilitate peaceful nuclear cooperation can be implemented in a manner consistent with international nuclear non-proliferation norms. www.nuclearsuppliersgroup.org

Organisation for the Prohibition of Chemical Weapons (OPCW): The OPCW was created as part of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction. The OPCW strives to fulfil the Convention's mandate to end the development, production, stockpiling, transfer, and use of chemical weapons; to prevent their re-emergence; to ensure the elimination of existing stocks of such weapons; and, in so doing, to make the world safe from the threat of chemical warfare. The OPCW conducts on-site inspections and verifies compliance with the CWC.
www.opcw.org/

Organisation for Security and Co-Operation in Europe (OSCE): The OSCE is the world's largest security-oriented intergovernmental organisation. Its mandate includes issues such as arms control, promotion of human rights, freedom of the press, and fair elections. The OSCE is concerned with early warning, conflict prevention, crisis management, and post-conflict rehabilitation. Its 57 participating countries are located in Europe, northern and central Asia, and North America. www.osce.org/

Proliferation Security Initiative (PSI): The PSI aims to improve cooperation on the interdiction of suspect transfers by land, sea or air of items that could be used to manufacture nuclear, chemical or biological weapons and delivery systems. Endorsed by 107 nations, the PSI seeks to unite, regardless of size or location, all nations concerned about the spread of WMD and willing to undertake the commitments in the *Statement of Interdiction Principles*. Endorsers of the PSI also seek to cooperate with any state whose ships, flags, ports, territorial waters, airspace, or land might be used for proliferation purposes by state and non-state actors of concern. The PSI provides a platform for networking and coordination of activities to counter proliferation. States become PSI participants by endorsing the PSI Statement of Interdiction Principles. By doing so, participants commit themselves to establishing a coordinated and effective basis through which to impede and stop the trafficking in WMD, their delivery systems, and related material. The PSI is open to every nation that wishes to contribute to a safer world. www.psi-online.info

United Nations (UN): The UN is an international organisation founded in 1945. It is currently made up of 193 Member States. The mission and work of the United Nations are guided by the purposes and principles contained in its founding Charter. The main bodies of the UN are the General Assembly, the Security Council, the Economic and Social Council, the Trusteeship Council, the International Court of Justice, and the UN Secretariat. There are numerous bodies and offices organised within the UN that deal with chemical, biological, radiological, and nuclear weapons; disarmament; non-proliferation; and countering weapons of mass destruction. www.un.org/

United Nations Office for Disarmament Affairs (UNODA): UNODA supports multilateral efforts aimed at achieving the ultimate goal of general and complete disarmament under strict and effective international control. The mandate for the programme is derived from the priorities established in relevant General Assembly resolutions and decisions in the field of disarmament. Weapons of mass destruction, particularly nuclear weapons, continue to be of primary concern due to their destructive

power and the threat that they pose to humanity. The UNODA also works to address the humanitarian impact of major conventional weapons and emerging weapon technologies, such as autonomous weapons, as these weapons have become a greater concern across the international community. www.un.org/disarmament/

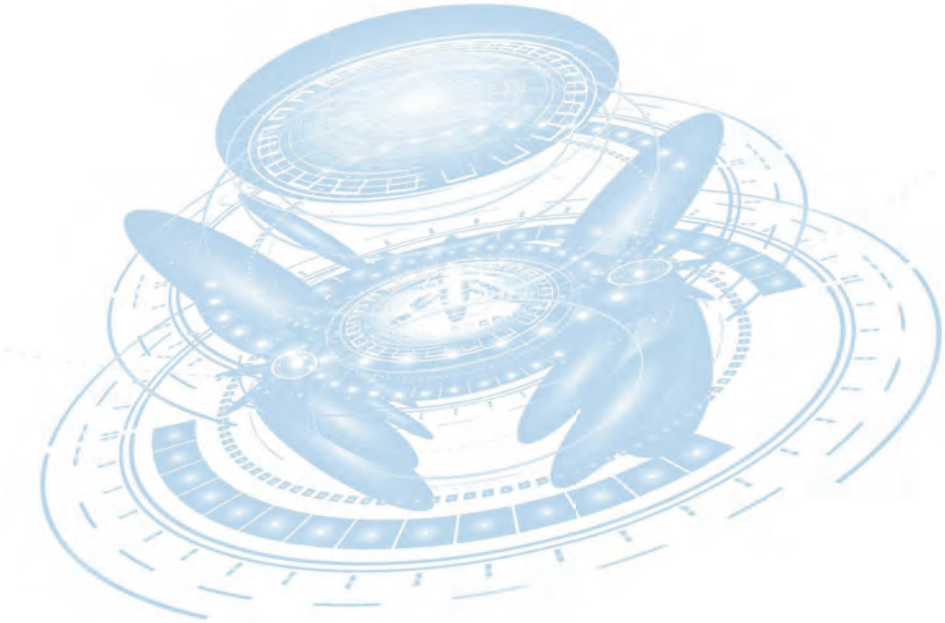
United Nations Security Council (UNSC): The UNSC has primary responsibility for the maintenance of international peace and security. It has 15 Members, and each Member has one vote. Under the Charter of the United Nations, all Member States are obligated to comply with Council decisions. The Security Council takes the lead in determining the existence of a threat to the peace or act of aggression. It calls upon the parties to a dispute to settle it by peaceful means and recommends methods of adjustment or terms of settlement. In some cases, the Security Council can resort to imposing sanctions or even authorize the use of force to maintain or restore international peace and security.
www.un.org/securitycouncil/

Wassenaar Arrangement: The Wassenaar Arrangement was established in order to contribute to regional and international security and stability by promoting transparency and greater responsibility in transfers of conventional arms and dual-use goods and technologies. The aim is also to prevent the acquisition of these items by terrorists. Participating states apply export controls to all items set forth in the List of Dual-Use Goods and Technologies and the Munitions List, with the objective of preventing unauthorized transfers or re-transfers of those items.
www.wassenaar.org

Zangger Committee: The Committee, named after its first Chairman Prof. Claude Zangger, was formed following the coming into force of the NPT, to serve as the "faithful interpreter" of its Article III, paragraph 2, to harmonize the interpretation of nuclear export control policies for NPT Parties. The Committee has been focussing on what is meant in Article III.2 of the Treaty by "especially designed or prepared equipment or material for the processing, use or production of special fissionable material." The Zangger Committee maintains a Trigger List (triggering safeguards as a condition of supply) of nuclear-related strategic goods to assist NPT Parties in identifying equipment and materials subject to export controls. The Trigger List and the Zangger Committee's understandings are published by the IAEA in the INFCIRC/209 (Information Circular/209) series. www.zanggercommittee.org

Nuclear Weapon Free Zones: There are several regions across the globe where states in those regions have agreed to ban development, possession or use of nuclear weapons. Known as nuclear weapon free zones, these include:

- Antarctica (The Antarctic Treaty), 1959
  www.ats.aq/e/antarctictreaty.html
- Latin America (Treaty of Tlatelolco), 1967
  www.opanal.org/en/treaty-of-tlatelolco/
- South Pacific (Treaty of Rarotonga), 1985
  www.iaea.org/publications/documents/infcircs/south-pacific-nuclear-free-zone-treaty-rarotonga-treaty
- Southeast Asia (Treaty of Bangkok), 1995
  disarmament.un.org/treaties/t/bangkok
- Africa (Treaty of Pelindaba), 1996
  disarmament.un.org/treaties/t/pelindaba
- Central Asia (Treaty of Semipalatinsk), 2006
  disarmament.un.org/treaties/t/canwfz/



Appendix C: CWMD Lexicon

The most relevant and frequently used terms pertaining to WMD and CWMD are defined in Chapter 1. This Appendix provides an additional list of definitions for words and phrases commonly used by military and civil organisations involved in CWMD activities. As with the key terms in Chapter 1, nations and organisations often define these terms differently, therefore, sources have been included for the definitions that follow. Where appropriate, similar terms are grouped together to allow the reader to better understand the similarities, differences, and relationships between key terms.

Definitions of Terms

Additive Manufacturing: The process of joining materials to make parts from [three-dimensional] model data, usually layer upon layer, as opposed to subtractive manufacturing and formative manufacturing methodologies. (UN, UNTERM)

Biological Agent: A microorganism (or a toxin derived from it) that causes disease in personnel, plants, or animals or causes the deterioration of materiel. (USA, JP 3-11)

Biological Warfare Agent: Living organisms or infective material derived from them that may be used to cause disease or death in humans, animals or plants. (UN, UNTERM)

Biological Hazard: One or more processes of organic origin or those conveyed by biological vectors, including exposure to pathogenic microorganisms, toxins and bioactive substances, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. (UN, UNTERM)

Biological Hazard: An organism, or substance derived from an organism, that poses a threat to human or animal health. (USA, JP 3-11)

Chemical Agent: A chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate mainly through its physiological effects. (USA, JP 3-11)

Chemical Warfare Agent: Chemical substances, whether gaseous, liquid or solid, that might be employed in warfare because of their direct toxic effects - their abilities to kill, injure or incapacitate - humans, other animals or plants. (UN, UNTERM)

Chemical, Biological, Radiological and Nuclear Defence (CBRN Defence): The plans, procedures and activities intended to contribute to the prevention of chemical, biological, radiological and nuclear incidents, to protect forces, territories and populations against, and to assist in recovering from, such incidents and their effects. (NATO, NATOTerm)

Chemical, Biological, Radiological, And Nuclear Defense (CBRN Defense): Measures taken to minimize or negate the vulnerabilities to, and/or effects of, a chemical, biological, radiological, or nuclear hazard or incident. (USA, JP 3-11)

Chemical, Biological, Radiological or Nuclear Device: An improvised assembly or system intended to cause the release of chemical, biological, radiological or nuclear substances. (NATO, NATOTerm)

Chemical, Biological, Radiological, and Nuclear Environment (CBRN Environment): An operational environment that includes chemical, biological, radiological, and nuclear threats and hazards and their potential resulting effects. (USA, JP 3-11)

Chemical, Biological, Radiological, and Nuclear Hazard (CBRN Hazard): Chemical, biological, radiological, and nuclear elements that could create adverse effects due to an accidental or deliberate release and dissemination. (USA, JP 3-11)

Chemical, Biological, Radiological or Nuclear Incident (CBRN Incident): An occurrence due to the suspected or confirmed presence of chemical, biological, radiological or nuclear substances, either arising from the intention to use them by an aggressor, or following their intentional or accidental release. (NATO, NATOTerm)

Chemical, Biological, Radiological, or Nuclear Incident (CBRN Incident): Any occurrence, resulting from the use of chemical, biological, radiological, and nuclear weapons and devices; the emergence of secondary hazards arising from friendly actions; or the release of toxic industrial materials or biological organisms and substances into the environment, involving the emergence of chemical, biological, radiological, and nuclear hazards. (USA, JP 3-11)

Chemical, Biological, Radiological, and Nuclear Response (CBRN Response): In countering weapons of mass destruction, the activities to attribute responsibility for an event, minimize effects, sustain operations, and support follow on actions. (USA, JP 3-40)

Chemical, Biological, Radiological, and Nuclear Substance (CBRN Substance): A chemical or biological agent, a toxic industrial material or a radioactive material, in any physical state or form. (NATO, NATOTERM)

Chemical, biological, radiological, or nuclear weapon: A weapon designed and manufactured to cause the release of a chemical or biological agent, or to generate a nuclear burst. (NATO, NATOTerm)

Chemical Hazard: A risk that involves chemical compounds, chemical reactions and processes that may cause fire, bodily injuries, explosions, poisoning, toxic effects on living organisms or corrosion of metals: 2) A hazard caused by or involving a chemical compound or processes which endangers life, property or the environment through toxic effects, corrosion, fire or explosion. (UN, UNTERM)

Chemical Hazard: Any chemical manufactured, used, transported, or stored that can cause death or other harm through toxic properties of those materials, including chemical agents and chemical weapons prohibited under the Chemical Weapons Convention as well as toxic industrial chemicals. (USA, JP 3-11)

Chemical Warfare: Involves using the toxic properties of chemical substances as weapons. (UN, UNTERM)

Chemical Warfare (CW): All aspects of military operations involving the employment of lethal and incapacitating chemical munitions/agents and the warning and protective measures associated with such offensive operations. (USA, JP 3-11)

Chemical Weapon: A weapon that contains and delivers, projects, dispenses or disseminates a chemical warfare agent. (UN, UNTERM)

Chemical Weapon: Together or separately, (a) a toxic chemical and its precursors, except when intended for a purpose not prohibited under the Chemical Weapons Convention; (b) a munition or device, specifically designed to cause death or other harm through toxic properties of those chemicals specified in (a), above, which would be released as a result of the employment of such munition or device; (c) any equipment specifically designed for use directly in connection with the employment of munitions or devices specified in (b), above. (USA, JP 3-11)

Competition Continuum: A description of a world of enduring competition conducted through a mixture of cooperation, competition below armed conflict, and armed conflict. (Derived from USA, JDN 1-19)

Counter-Proliferation (CP): Refers to diplomatic, intelligence and military efforts to combat the proliferation of weapons, including weapons of mass destruction (WMD), long-range missiles and certain conventional weapons, while a related term -- 'non-proliferation' -- focuses on diplomatic, legal and administrative measures to dissuade and impede the acquisition of such weapons. (UN, UNTERM)

Counterproliferation (CP): Those actions taken to reduce the risks posed by extant weapons of mass destruction to the United States, allies, and partners. (USA, JP 3-40)

Countering Weapons of Mass Destruction (CWMD): Efforts against actors of concern to curtail the conceptualization, development, possession, proliferation, use, and effects of weapons of mass destruction, related expertise, materials, technologies, and means of delivery. (USA, Department of Defense Strategy for Countering Weapons of Mass Destruction, June 2014)

Cyberspace Operations (CO): The employment of cyberspace capabilities where the primary purpose is to achieve objectives in or through cyberspace. (USA, JP 3-0)

Decontamination: The process of making any person, object, or area safe by destroying, neutralizing, making harmless, or absorbing and removing chemical or biological agents or by removing radioactive material clinging to or around it. (USA, JP 3-11)

Deterrence: The convincing of a potential aggressor that the consequences of coercion or armed conflict would outweigh the potential gains. This requires the maintenance of a credible military capability and strategy with the clear political will to act. (NATO, NATOTerm)

Deterrence: The prevention of action by the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits. (USA, JP 3-0)

Dual-Use Item: Equipment, technology, machinery or products (such as chemicals) which can be used for civilian as well as military purposes. (UN, UNTERM)

Existing WMD Threat Management *(known as WMD Defeat in US doctrine)***:** Activities designed to control, defeat, disable, and dispose of extant weapons of mass destruction and the ability to stockpile, transfer, or employ weapons of mass destruction. (NATO, Draft AJP 3-23)

Horizontal Proliferation: In the context of nuclear weapons, the acquisition of nuclear weapons capabilities by undeclared nuclear weapon states. (UN, UNTERM)

Hybrid Threat: A type of threat that combines conventional, irregular and asymmetric activities in time and space. (NATO, NATOTerm)

Hybrid Warfare: The synchronized use of multiple instruments of power tailored to specific vulnerabilities across the full spectrum of societal functions to achieve synergistic effects. (MCDC, Understanding Hybrid Warfare, 2017)

Improvised Explosive Device (IED): Locally made weapon rigged up on an ad hoc basis. Used to destroy, incapacitate, distract or harass enemy forces or civilian supporters. It can refer to a booby trap, to an improvised anti-lift device made from plastic explosives and placed on mines to prevent mine clearance or to a roadside bomb. (UN, UNTERM)

Improvised Explosive Device (IED): A device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic or incendiary chemicals and designed to destroy, incapacitate, harass or distract. (NATO, NATOTerm)

Improvised Explosive Device (IED): A weapon that is fabricated or emplaced in an unconventional manner incorporating destructive, lethal, noxious, pyrotechnic, or incendiary chemicals. (USA, JP 3-15.1)

Improvised Nuclear Device (IND): A device incorporating fissile materials designed or constructed outside of an official government agency that has, appears to have, or is claimed to be a nuclear weapon that is no longer in the control of a competent authority or custodian or has been modified from its designated firing sequence. (USA, JP 3-42)

Indications: In intelligence usage, information in various degrees of evaluation, all of which bear on the intention of a potential enemy to adopt or reject a course of action. (USA, JP 2-0)

Indicator: A value calculated from a set of parameters which supplies information on a phenomenon or on the state of that phenomenon; they are designed for a certain purpose and a specific group of users; they can be either quantitative benchmarks or qualitative descriptions. (UN, UNTERM)

Indicator: In intelligence usage, an item of information which reflects the intention or capability of a potential enemy to adopt or reject a course of action. (NATO, NATOTerm)

Warning and Reporting: In chemical, biological, radiological and nuclear defence, the process by which information on chemical, biological, radiological and nuclear incidents is collected, processed and distributed through the command structure in a timely and accurate manner in order to inform of resulting hazards and predicted hazard areas. (NATO, NATOTerm)

Warning Intelligence: Those intelligence activities intended to detect and report time-sensitive intelligence information on foreign developments that forewarn of hostile actions or intention against United States entities, partners, or interests. (USA, JP 2-0)

International Chemical, Biological, Radiological, and Nuclear Response (ICBRN-R): United States Government activity that assists foreign governments in responding to the effects from an intentional or accidental chemical, biological, radiological, and nuclear incident on foreign territory. (USA, JP 3-41)

Irregular Activity: The use or threat of force by irregular forces, groups or individuals, frequently ideologically or criminally motivated, to effect or prevent change as a challenge to governance and authority. (NATO, NATOTerm)

Irregular Warfare (IW): A violent struggle among state and non-state actors for legitimacy and influence over the relevant population(s). (USA, JP 3-40)

Mass Casualty: Any number of human casualties produced across a period of time that exceeds available medical support capabilities. (USA, JP 3-40)

Mass Casualty Situation: A situation in which an initial disparity exists between the casualty load and the local medical capacities and capabilities. (NATO, NATOTerm)

Non-Proliferation (NP): The measures taken to prevent the proliferation of weapons of mass destruction or should prevention fail, to reverse such proliferation by any means other than the use of military force. (NATO, NATOTerm)

Nonproliferation (NP): Actions to prevent the acquisition of weapons of mass destruction by dissuading or impeding access to, or distribution of, sensitive technologies, material, and expertise. (USA, JP 3-40)

Nuclear Proliferation: The diversion or undeclared production of nuclear material or misuse of technology by States in order to acquire nuclear weapons or nuclear explosive devices. (UN, UNTERM)

Operational Environment (OE): A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (USA, JP 3-40)

Precursor: Any chemical reactant which takes part at any stage in the production by whatever method of a toxic chemical; this includes any key component of a binary or multicomponent chemical system. (UN, UNTERM)

Radiological Dispersal Device: A bomb in which conventional high explosives are surrounded with a highly radioactive material which, when dispersed in an explosion, would create fallout and could contaminate large urban areas. The radiological isotopes used to produce radiological dispersal devices are found in waste from medical facilities, industrial plants, and nuclear power plants. The threat is not so much immediate loss of life as it is contamination (dirty-ing). It has been feared that terrorists or "rogue States" would get access to weapons-grade plutonium and uranium produced by nuclear power reactors and use this material to make such dirty bombs, exploiting the poisonous effects of radiation, spreading panic and disrupting economies. (UN, UNTERM)

Radiological Dispersal Device: An improvised device designed to spread radiological substances. (NATO, NATOTerm)

Radiological Dispersal Device (RDD): An improvised assembly or process, other than a nuclear explosive device, designed to disseminate radioactive material to cause destruction, damage, or injury. (USA, JP 3-11)

Radiological Exposure Device (RED): A radioactive source placed to cause injury or death. (USA, JP 3-11)

Radiological Hazard: Ionizing radiation that can cause damage, injury, or destruction from either external irradiation or due to radiation from radioactive materials within the body. (USA, JP 3-11)

Related Materials: Materials, equipment and technology covered by relevant multilateral treaties and arrangements, or included on national control lists, which could be used for the design, development, production or use of nuclear, chemical and biological weapons and their means of delivery. (UN, UNSCR 1540)

Resilience: The ability to "resile from" or "spring back from" a shock. May refer specifically to 1) the capacity of a system to tolerate impacts without irreversible change in its outputs or structure. In species or populations often understood as the capacity to withstand exploitation, or 2) In the context of disasters, the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. (UN, UNTERM)

Riot Control Agent (RCA): Any chemical, not listed in a schedule of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction that can produce rapidly in humans sensory irritation or disabling physical effects that disappear within a short time following termination of exposure. (USA, JP 3-11)

Toxic Industrial Material (TIM): A generic term for toxic, chemical, biological, 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. (USA, JP 3-11)

Toxic Industrial Chemical (TIC): A chemical developed or manufactured for use in industrial operations or research by industry, government, or academia that poses a hazard. (USA, JP 3-11)

Toxic Industrial Biological (TIB): Any biological material manufactured, used, transported, or stored by industrial, medical, or commercial processes which could pose an infectious or toxic threat. (USA, JP 3-11)

Toxic Industrial Radiological (TIR): Any radiological material manufactured, used, transported, or stored by industrial, medical, or commercial processes. (USA, JP 3-11)

Vertical Proliferation: In the context of nuclear weapons, it refers to the development and deployment of new nuclear devices and systems by nuclear-weapon states. (UN, Article VI of NPT)

Weapons of Mass Destruction (WMD): Atomic explosive weapons, radio-active material weapons, lethal chemical and biological weapons, and any weapons developed in the future which have characteristics comparable in destructive effect to those of the atomic bomb or other weapons mentioned above. (UN, Commission for Conventional Armaments, 1948)

Weapon of Mass Destruction (WMD): A weapon that is able to cause widespread devastation and loss of life. (NATO, NATOTerm)

Weapons of Mass Destruction (WMD): Chemical, biological, radiological, or nuclear weapons capable of a high order of destruction or causing mass casualties, excluding the means of transporting or propelling the weapon where such means is a separable and divisible part from the weapon. (USA, JP 3-40)

Weapons of Mass Destruction Activity Continuum: A complex but identifiable process of WMD activities that together constitute the progression from intent to use. In general, the WMD continuum includes intent; infrastructure and expertise development; production; weaponization; delivery systems; and use. These activities are not necessarily sequential, and actors may, at any point along the continuum, bypass one or more of the steps by acquiring (by theft, barter or purchase) the capability thereby accelerating the WMD development process. (Derived from USA, JP 3 -40)

Weapons of Mass Destruction Pathways: Networks (links among individuals, groups, organizations, governmental entities, etc.) encompassing ideas, materials, technologies, facilities, processes, products, and events that enable actors to conceptualize, develop, possess, and proliferate WMD and related capabilities. (Derived from USA, JP 3-40)

WMD Acquisition and Development Defeat (*known as Pathway Defeat in US Doctrine*)**:** Activities to dissuade, deter, delay, disrupt, destroy, deny, and assure to complicate conceptualization, development, production, and proliferation of weapons of mass destruction. (NATO, Draft AJP 3-23)

Acronyms and Abbreviations

AAP	Allied Administrative Publication (NATO)
ACO	Allied Command Operations (NATO)
ACT	Allied Command Transformation (NATO)
AG	Australia Group
BWC	Biological Weapons Convention, informal term for the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons
CBRN	Chemical, Biological, Radiological, and Nuclear
CBRND	Chemical, Biological, Radiological, and Nuclear Defence
CP	Counter-Proliferation
CTBT	Comprehensive Nuclear Test-Ban Treaty
CTBTO	Comprehensive Nuclear Test Ban Treaty Organisation
CTR	Cooperative Threat Reduction
CW	Chemical Warfare
CWC	Chemical Weapons Convention, informal term for the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction
CWMD	Countering Weapons of Mass Destruction
DIMEFIL	Diplomatic, Informational, Military Economic, Financial, Intelligence, and Law Enforcement
DOD	Department of Defense (US)
EEAS	European External Action Service (EU)
EU	European Union (EU)
IAEA	International Atomic Energy Agency
ICBM	Intercontinental Ballistic Missile

ICBRN-R	International Chemical, Biological, Radiological, and Nuclear Response
IED	Improvised Explosive Device
IGO	Intergovernmental Organisation
JP	Joint Publication (US)
LTBT	Limited Test Ban Treaty, informal term for the Treaty Banning Nuclear Weapon Tests In The Atmosphere, In Outer Space and Under Water
MTCR	Missile Technology Control Regime
NATO	North Atlantic Treaty Organisation
NATOTerm	NATO Terminology Database
NP	Non-Proliferation
NPT	Non-Proliferation Treaty, informal term for the Treaty on the Non-Proliferation of Nuclear Weapons
NSG	Nuclear Suppliers Group
NTBT	Nuclear Test Ban Treaty
OPCW	Organisation for the Prohibition of Chemical Weapons
OSCE	Organisation for Security and Co-Operation in Europe
PBA	Pharmaceutical-Based Agent
PSI	Proliferation Security Initiative
PTBT	Partial Test Ban Treaty, informal term for the Treaty Banning Nuclear Weapon Tests In The Atmosphere, In Outer Space and Under Water
RCA	Riot Control Agent
RDD	Radiological Dispersal Device
RED	Radiological Exposure Device
SC	Security Cooperation
SLBM	Submarine-Launched Ballistic Missile

SOF	Special Operations Forces
START	Strategic Arms Reduction Treaty
TIB	Toxic Industrial Biological
TIC	Toxic Industrial Chemical
TIM	Toxic Industrial Material
TIR	Toxic Industrial Radiological
USA	United States of America
UN	United Nations
UNODA	United Nations Office for Disarmament Affairs
UNSC	United Nations Security Council
UNSCR	United Nations Security Council Resolution
UNTERM	United Nations Terminology Database
WMD	Weapons of Mass Destruction

Appendix D: References

This Appendix provides a list of useful references related to WMD and CWMD. It identifies additional sources and does not duplicate the documents identified in previous chapters and appendices.

- Understanding Hybrid Warfare, MCDC Countering Hybrid Warfare Project, January 2017
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  www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_11pa.pdf

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- Chemical, Biological, Radiological, and Nuclear Response (Joint Publication 3-41), 9 September 2016
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- The US Department of Defense (DOD) Dictionary of Military and Associated Terms
  www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf

- Defense Threat Reduction Information Analysis Center (DTRIAC) document collection
  https://www.dtra.mil/Mission/Defense-Threat-Reduction-Information-Analysis-Center/

- US Army Nuclear and Countering Weapons of Mass Destruction Agency, CWMD Journal
  https://www.nec.belvoir.army.mil/usanca/currentIssue.asp

- NATOTerm (the official NATO Terminology Database)
  https://nso.nato.int/natoterm/content/nato/pages/home.html?lg=en

- UN Office for Disarmament Affairs, Nuclear Weapons
  https://www.un.org/disarmament/wmd/nuclear/

- UN Terminology Database (UNTERM)
  https://unterm.un.org/unterm/portal/welcome

- UN Glossary of terms relating to Treaty actions
  https://treaties.un.org/Pages/Overview.aspx?path=overview/glossary/page1_en.xml

- UN Office for Disarmament Affairs
  http://disarmament.un.org/treaties/

- UN Depositary of Treaties
  https://treaties.un.org/Pages/Home.aspx?clang=_en

- UN Security Council Resolution repository
  https://www.un.org/securitycouncil/

CWMD GUIDEBOOK

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