Targeting in Multi-Domain Operations

Maj. Kyle David Borne, U.S. Army

The introduction of new doctrine is always met with skepticism and trepidation by entrenched bureaucracies. AirLand Battle had its critics, and the introduction of multi-domain operations (MDO) is no different. This article capitalizes on the experiences of a small cadre of planners from late 2017 to late 2018 garnered from four joint and coalition command-post exercises (CPXs) where MDO effects were planned. The primary focus of the CPXs was to incorporate space, cyber, and electronic warfare (EW) effects into the scheme of maneuver.

(Image courtesy of Lockheed Martin)

On the surface, MDO looks just like what a corps or an equivalent-level staff sees during normal daily operations. However, while some of the processes are indeed similar, it is important to recognize the differences. The primary difference is MDO focuses on multi-domain fires synchronized in time and space to achieve complimentary effects; whereas, cross-domain fires do not.

Cross-domain fires in their simplest form are just one domains affecting another. An example would be surface-to-air missiles or using a shore-based artillery piece to attack a ship. This is what most commanders grew up understanding. Developing an air defense plan for a critical asset on the ground or requesting a Navy EA-18G to provide jamming effects are actions Army staffs regularly execute and are other common examples of cross-domain fires.

Multi-domain fires take cross-domain assets and synchronize them in time and space to create synergistic effects in windows of convergence. A common example is the destruction of an integrated air defense system (IADS). Conventional cross-domain fires would involve an EA-18G providing standoff jamming while a strike package got close enough to deliver a lethal payload. As standoff has increased with recent IADS, this approach is no longer viable as IADS missiles can acquire and engage friendly aircraft at greater distances. A multi-domain effect combining synchronized cyberwarfare, space warfare, and EW effects can reduce standoff room to achieve lethal parity for the air package, thereby enabling destruction.

As warfare has evolved in the modern era, cross-domain fires have begun to leverage the domains of space and cyberspace. During the war on terrorism, the increased use of the information environment by violent extremist organizations hinged on the use of satellite internet providers to move information over cyberspace. Joint task forces (JTFs) and special organizations began to target space and cyber nodes in an attempt to disrupt violent extremist organizations' command and control as well as extremist ideological messaging. The efforts of the JTFs and others were conducted in isolation from each other. The Multi-Domain Task Force (MDTF) is different in that it is the first formation in the Army that brings all five domains under one command.

The novelty of the MDTF is its ability to provide effects in all five warfighting domains synchronized in time and space. As adversaries establish anti-access/area denial (A2/AD) bubbles that outrange conventional U.S. munitions, this formation provides a joint force commander (JFC) an organization that can effectively reduce those A2/AD bubbles by leveraging multiple warfighting domains at the same time to achieve lethal parity or overmatch, tipping the scale in the JFC's favor.

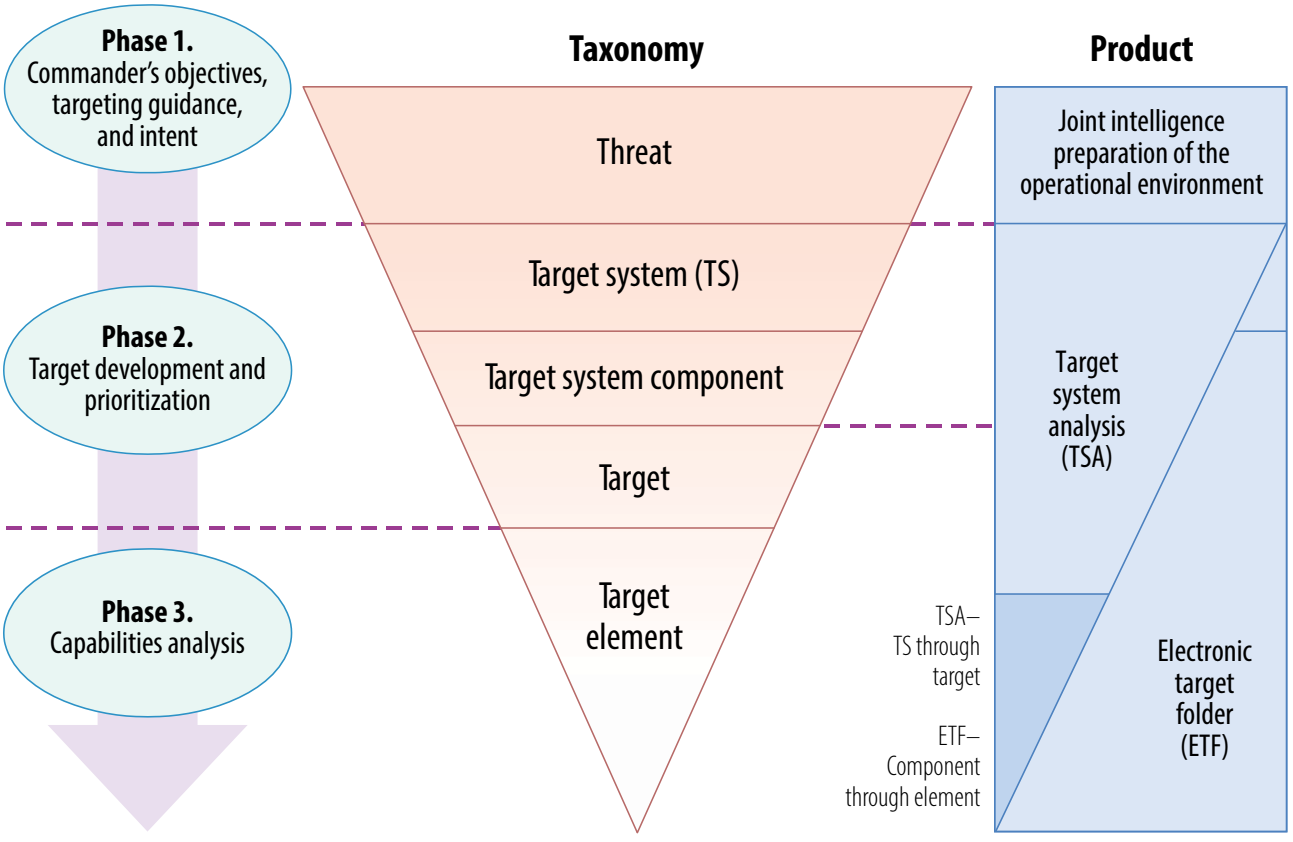
Joint Targeting in Multi-Domain Operations

In order to conduct MDO, the MDTF uses a targeting process very similar to the joint targeting cycle described in Joint Publication (JP) 3-60, *Joint Targeting*.[1] The targeting cycle for MDO is not much different than what joint doctrine currently calls for. Give an Army targeting officer a target and a desired effect, and nine times out of ten, he or she is going to figure out how to affect that target with artillery, close-combat attack, or close-air support. This is generally because Army targeting focuses on what is within the lethal targeting distance of its longest-range weapon systems and best targeting methodology.

Traditionally, targeting occurs in a service-centric mind frame. The Army prepares and targets the enemy's land order of battle, the Navy targets the maritime domain, and the Air Force targets the air and space domains. There has always been an element of cross-domain fires. The Army cares about air threats because they can strike ground targets. The Navy keeps an eye on the air domain as threats have evolved to include carrier-based aircraft and antiship cruise missiles. The Air Force has always had to be concerned with land-based antiair artillery.

Notwithstanding, a major change regarding peer adversaries is that they can now contest the space and cyberspace domains. The services must factor this into their targeting calculations.

Maj. Kyle Borne, U.S. Army, is the CEMA company commander for the Intelligence, Information, Cyberspace, Electronic Warfare, and Space (I2CEWS) Battalion. He has served as the Multi-Domain Task Force pilot program cyber electromagnetic activities officer since October 2017. He acts as the nonlethal effects integrator and chief nonlethal targeting officer as well as company commander.



(Figure from Joint Publication 3-60, *Joint Targeting*, 28 September 2018)

Figure 1. Target Development Relationships

Thinking Nonlethally during the Joint Targeting Cycle

The Army traditionally thinks of the physical characteristics of targets. A commander's attack guidance matrix might prescribe firing a certain number of battery- or battalion-level volleys of a munition to achieve an effect on a target. This approach works fine in a traditional peer-on-peer fight or against other well-defined threats. The temptation is to approach all targets through their physical characteristics (as Army doctrine does) and disregard their functional ones (as joint doctrine does).

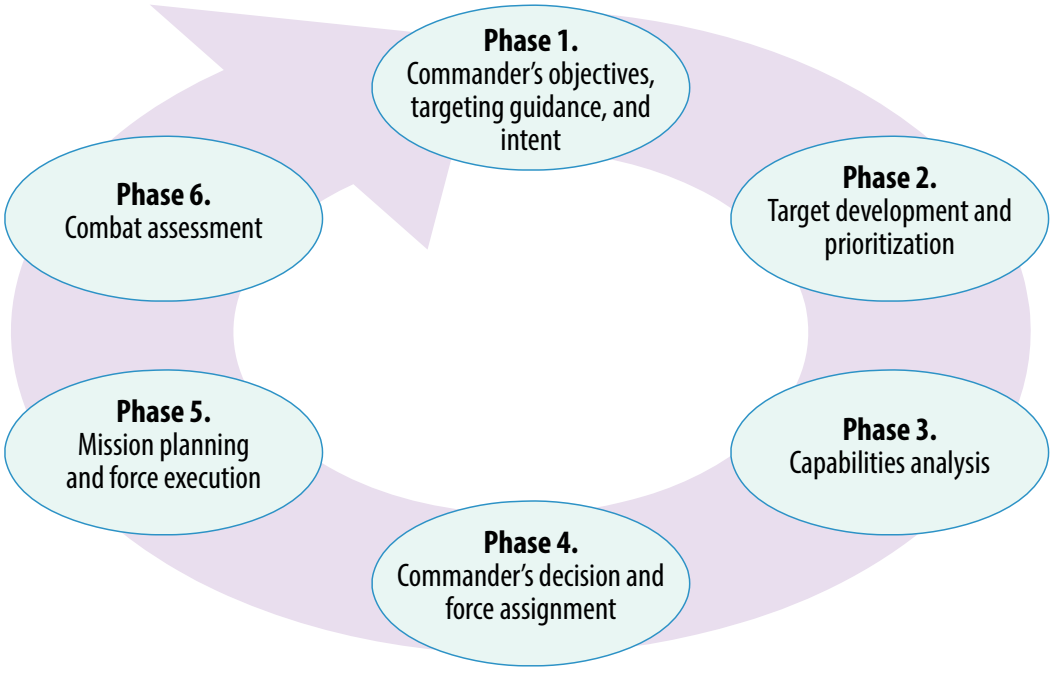
The recently revised JP 3-60 does an excellent job of highlighting the difference between Army targeting and joint targeting. Army artillery formations typically receive targets instead of nominating targets and focus on the Detect, Decide, Deliver, Assess (D3A) model.[2] This is where joint targeting differs; joint targeting focuses on the physical and the functional characteristics of a threat system. This level is associated with the "threat" of the joint targeting taxonomy. The MDTF needs to focus more on the lower portions of the taxonomy in order to mitigate the lethal engagement range overmatch of adversary systems. Targeting the key elements of the functional characteristics enables joint forces to close with threat systems and destroy them. Therefore, a fundamentally more in-depth targeting analysis must occur, making joint targeting doctrine more applicable to MDTF missions (see figure 1).[3]

JP 3-60 states, "Achievement of clear, measurable, and achievable objectives is essential to the successful attainment of the desired end state. The ability to generate the type and extent of effects necessary to achieve the commander's objectives distinguishes effective targeting."[4] Therefore, instead of saying "Deny integrated air defense systems (IADS)" or "Destroy short-range ballistic missiles," we need to shift to the *system* we wish to effect.

For example, a multi-domain commander's intent might look like this: "Deny IADS the ability to engage air targets" or "Delay IADS ability to target aircraft for two hours." This guidance provides the ability to tailor deny, delay, disrupt, destroy, or manipulate (D4M) effects to meet the commander's intent. Through the joint targeting cycle, a targeteer can then decide what ends are feasible, which ways are available, and which means can deliver the desired effects. For IADS, the targeteer may decide they can degrade the IADS air picture by leveraging cyber, space, and EW means in the MDTF to achieve the commander's intent.

The target working group in the MDTF must follow the joint targeting cycle instead of Army targeting while looking at all warfighting domains (see figure 2).[5] Typically, Army targeting is synchronized with an air tasking order cycle that prioritizes and allocates air and space domain capabilities against a commander's joint, integrated, prioritized target list. This is how national-level assets such as the Rivet Joint reconnaissance aircraft, the Joint Surveillance Target Attack Radar System, or the cyber national mission force are allocated. A key difference in the MDTF is similar capabilities now reside at a brigade-sized Army organization that have organic assets capable of delivering effects normally found at the operational and strategic levels.

Despite these capabilities residing at a brigade level in the Army, the joint targeting cycle still provides a common framework with which the Army can target and provide complimentary effects with other services in the joint environment. Attempting to create a new targeting process has proven to just create confusion and resistance from joint partners. For example, while participating in the Rim of the Pacific 2018 international maritime exercise, MDTF planners met resistance from the air operations center (AOC) because the AOC was under the impression that the Army was trying to make a new targeting system that bypassed the AOC's responsibility to synchronize fires for the combatant commander.



(Figure from Joint Publication 3-60, *Joint Targeting*, 28 September 2018)

Figure 2. Phases of the Joint Targeting Cycle

Multi-Domain Targeting through the Joint Targeting Cycle

The six phases of the joint targeting cycle provide a sufficient framework to analyze multi-domain targets. Phase 1, "Commander's Objectives, Targeting Guidance, and Intent," is crucial in providing clear and realistic expectations.[6] Having a clear and concise intent using D4M effects gives the targeting team the maximum amount of latitude to meet the commander's intent. This is essential to enable the centers of gravity (COG) analysis and identifying

the decisive points; or, as described in JP 3-60, target system analysis (TSA).[7]

Unique MDO Targeting Planning Considerations in Phase 2 of the Joint Targeting Cycle

A planning factor for nonlethal effects is the amount of time and effort required to validate a target. Developing targets in the electromagnetic spectrum (EMS) and cyberspace requires more complicated techniques and specialized tools than lethal targeting. In order for an MDTF commander to conduct the necessary intelligence gathering in this phase, "Target Development and Prioritization," the MDTF must have the required authorities to conduct intelligence, surveillance, and reconnaissance (ISR); or cyberspace, surveillance, and reconnaissance (C-S&R); and ultimately to produce effects in gray (e.g., noncombatant and combatant use) or red (combatant space) zones. For example, a Rivet Joint may derive signals intelligence (SIGINT) that provides an exploitable access point (e.g., a wireless hotspot or supervisory, control, and data acquisition data link) for cyberspace to begin conducting C-S&R, requiring the formation to be legally authorized by the national command authority to conduct the activity.

Once this process is complete, a different set of authorities may be required to refine the TSA of that system through cyber ISR (C-ISR). Once established, a cyber-support team will have to develop a tool that meets the commander's intent for that specific system. All of this can take months to years and cost millions of dollars in asset time and man-hours. This places an additional calculation on the targeting team to provide the commander with a cost-benefit analysis estimation of whether using a specific tool for the mission is worth the expense. The assumption is once the tool is delivered it will not be able to be used again.

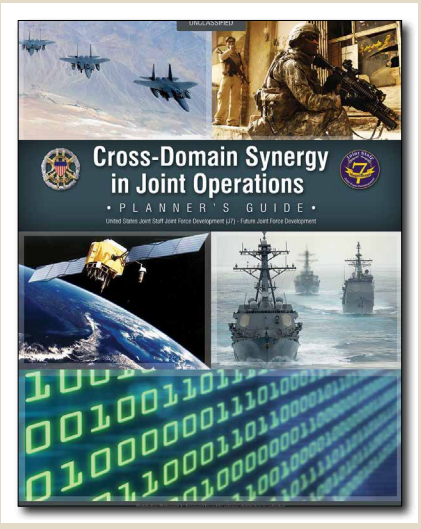
For example, the Stuxnet virus, which was delivered to Iranian nuclear research facilities, would have required extensive intelligence.[8] The actor would have to determine who manufactured the centrifuge equipment, the model of equipment, the software running it, the hardware specifications, and how the system receives instructions from the outside world. From there, the actor would have had to analyze the entire code content of the software to find a vulnerability. Once the vulnerability is discovered, the actor would have to develop a virus that could spin the centrifuges out of control while providing a false picture (manipulation of data) to the operators so they would not see something was wrong until it was too late and the equipment was destroyed.

After the effect was achieved, the Stuxnet virus was discovered both in the Iranian system and on the internet. Several entities then decompiled its code in an effort to understand it and determine who delivered it. The Iranians then patched the vulnerabilities found in their software, rendering further uses of Stuxnet futile.

The MDTF is a hybrid organization that blends the tactical, operational, and strategic levels of war, especially through nonlethal targeting with the Intelligence, Information, Cyberspace, Electronic Warfare, and Space (I2CEWS) Battalion. Nonlethal targeting at the operational and strategic levels elevates the amount of deconfliction that must take place. Intelligence gain/loss has always been a calculation between SIGINT and EW. However, the addition of cyber extends this to the cyberspace domain and involves other government agencies that have a stake in the domain. This phase also raises the specter of the law of armed conflict and rules of engagement. Cyberspace and electrons in the EMS are not confined by geographical boundaries. Adversary systems often leverage this ambiguity by using dual-use systems that engage both civil and military systems. Sometimes the COG is a dual-use system that requires even more tailored effects to minimize the impact on the civilian population.

Phase 3 of the targeting cycle, "Capabilities Analysis," is where a clear definition of the commander's intent allows for maximum flexibility in the I2CEWS's ability to deliver effects.[9] During TSA, targeteers determine which capabilities in which domains are required to achieve the commander's intent. The state in which the conflict lies defines which methods of effect delivery are suitable, feasible, and acceptable. For example, during the competition phase, a lethal strike is less likely to be used for the risk of triggering a shift to conflict phase, whereas C-S&R provides anonymity and reversibility to achieve an effect and may be used as a deterrent to conflict.

With the analysis and capabilities assessment completed, the MDTF commander would then



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For those interested in more closely examining joint multi-domain planning concepts, your attention is invited to the Future Joint Force Development's *Cross-Domain Synergy in Joint Operations Planner's Guide*. This guide organizes cross-domain planning information and activities for use by the joint staff, combatant commands, subunified commands, joint task forces, subordinate components of these commands, the services, and the Department of Defense agencies supporting joint operations. You may view or download the guide by visiting https://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/cross_domain_planning_guide.pdf?ver=2017-12-28-161956-230.

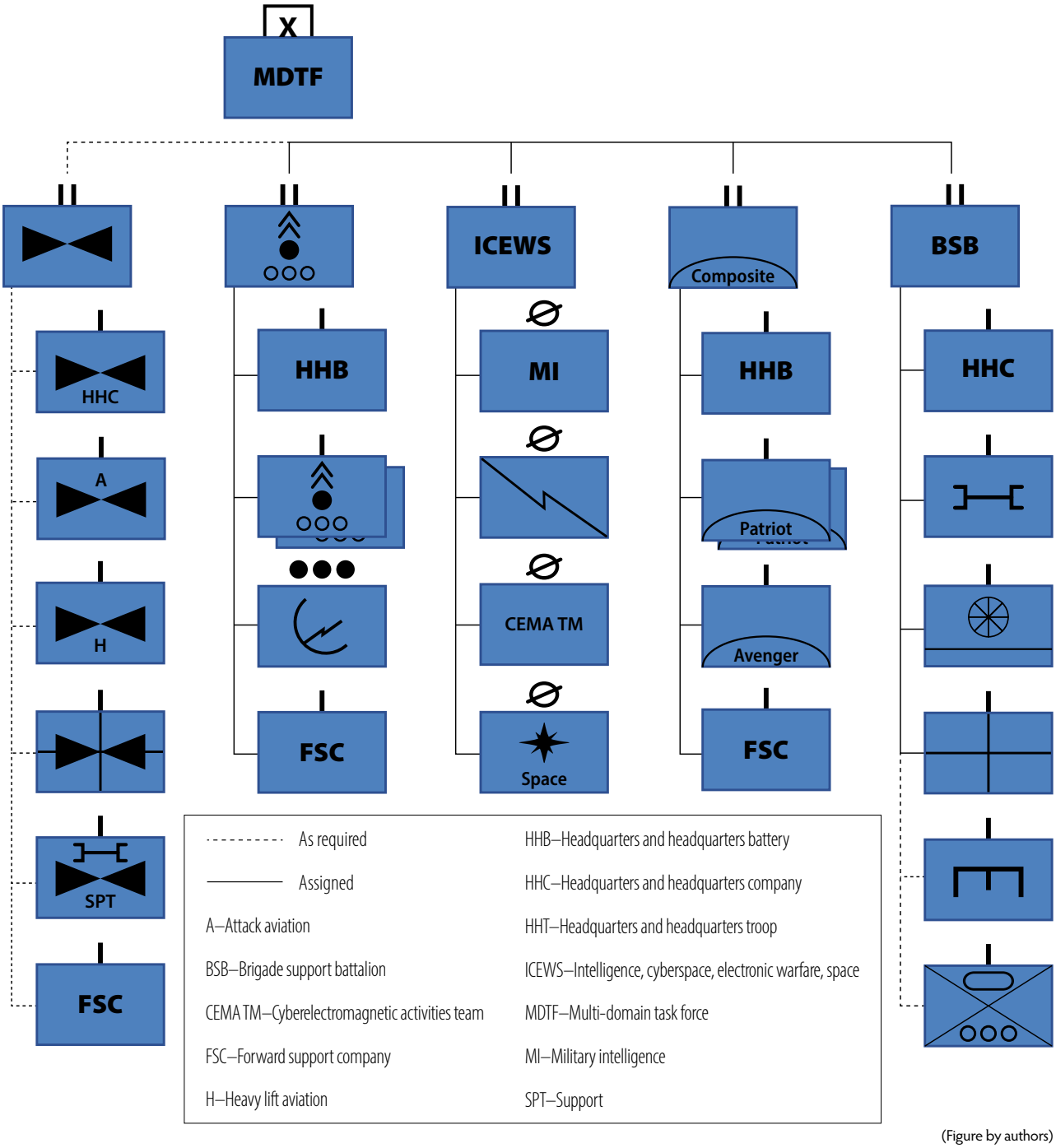
provide his guidance in the fourth phase of the joint targeting cycle, "Commander's Decision and Force Assignment."[10] A novelty of the MDTF is that it is a brigade-size unit directly supporting a geographic combatant command or a JFC (if one is present), and it acts on the same level as a joint force air component commander, which is typically commanded by a two-star general officer. Through both competition and conflict phases, the MDTF commander will nominate targets to the JFC for inclusion on the joint integrated prioritized target list.

More than one unit may be required to engage a target. The MDTF may not even be the best unit for striking a target it nominates. For example, if the MDTF discovers a COG that lays outside the lethal effects range of its long-range artillery, an Aegis cruiser may be able to engage it with a Tomahawk Land Attack Missile. The MDTF may still engage a portion of the target packet by providing a cyber or space effect at the same time in order to enhance the lethality of the strike.

Just like lethal fires, nonlethal effects need an observer to watch effects on a target. For an EW mission, using a SIGINT asset provides the ability to determine if effects are achieving the desired results by monitoring the rest of the EMS in order to determine if the target is transitioning to its primary, alternate, contingency, or emergency plan. A cyber operator can use network monitoring tools to determine if a system administrator on the target system is taking corrective actions or if the desired change in network behavior is occurring. Key outputs of this phase may include a warning order to identified units and an initial strike plan. Once the executing units are designated, phase 5, "Mission Planning and Force Execution," begins.[11]

Phase 5 may find the MDTF executing other-unit-nominated targets and vice versa. Once the MDTF receives the warning order tasking to engage a target, the individual units of the MDTF must begin their troop leading procedures. Each has their own considerations; however, the I2CEWS battalion units are nascent in developing their troop leading procedures. A space detachment will have different mission planning requirements than the cyberspace electromagnetic activities teams. As with all targets, each unit has to validate the assumptions and facts used to plan the mission are still valid. For example, a cyber unit will need to verify the target is still being held at risk or that they can still gain end-point access in order to hold it at risk. Key outputs for this phase are a completed military decision-making process cycle and company-level operations orders.

The sixth and final phase, "Combat Assessment," is crucial.[12] For the I2CEWS units whose effects exist in domains that are not immediately visible, it is imperative during phase 2 that the planners include combat assessment criteria for what success



(Figure by authors)

Figure 3. Objective Multi-Domain Task Force Task Organization

looks like. Unlike lethal effects where the damage is physically apparent by looking at an ISR feed, effects delivered in the EMS and cyberspace do not always lead to visible indicators. Often the nonlethal team is asked to achieve effects the JFC cannot reach physically with lethal munitions. Thus, the mission of the nonlethal team is to create a window of convergence with nonlethal effects that sufficiently provides D4M effects to minimize risk to a kinetic strike package. Timely, well-thought-out combat assessment criteria allows the MDTF to quickly determine if the intended effects were delivered, which may serve as a trigger

for a ship or aircraft to maneuver into contested space and deliver lethal effects.

Bringing It Together

The MDTF is a novel organization that cobbles together elements of the traditional Army with new units found in the I2CEWS battalion. With this addition, the MDTF is able to create windows of convergence across all five warfighting domains simultaneously in order to enable joint maneuver in contested A2/AD environments (see figure 3, page 66).

The inclusion of all five domains requires commanders and staffs to change their frames of thinking from exclusive lethal targeting as the primary method of engagement to include nonlethal means. It also requires them to think across the continuum of operations and realize targeting now must take place all of the time, not just during a conflict, and targeting is conducted in the joint environment through the joint targeting cycle.

This article looked at each phase of the joint targeting cycle and highlighted key similarities and differences for MDO. After exercising the MDTF at Yama Sakura 73 in Japan, Pacific Sentry 18 in Hawaii, Rim of the Pacific 2018 exercise in Hawaii, Valiant Shield 18 in Guam, and Yama Sakura 75 in Japan, the joint targeting cycle has proven to be an effective method.[13] The skill sets exercised by the I2CEWS battalion and MDTF targeting staffs require broadening to actively include nonlethal target systems analysis. When combined, the joint targeting cycle enables the MDTF to seamlessly integrate into joint operations. This is essential, as the A2/AD fight is inherently joint in nature.

The next step in developing MDO doctrine is to look at how the MDTF translates joint targeting into tactical action. The staffing processes have been tested, and with an experienced cadre of soldiers, many of the higher level processes provide a strong foothold for doctrinal development. Translating these processes down to a tactical maneuver unit to begin discerning the "how" to deliver multi-domain effects needs to be tested and bottom-up refinement given to the staff to polish processes. ■

Notes

1. Joint Publication (JP) 3-60, *Joint Targeting* (Washington, DC: U.S. Government Publishing Office [GPO], 28 September 2018), chap. 2.
2. Army Techniques Publication 3-60, *Targeting* (Washington, DC: U.S. GPO, May 2015), 2-1.
3. JP 3-60, *Joint Targeting*, II-6.
4. Ibid., II-4.
5. Ibid.
6. Ibid., II-3.
7. Ibid., II-7.
8. Kim Zetter, "An Unprecedented Look at Stuxnet, the World's First Digital Weapon," Wired, 3 June 2017, accessed 1 March 2019, https://www.wired.com/2014/11/countdown-to-zero-day-stuxnet/.
9. JP 3-60, *Joint Targeting*, II-14.
10. Ibid., II-18.
11. Ibid., II-21.
12. Ibid., II-31.
13. Yama Sakura is an annual bilateral command-post exercise involving the U.S. military and the Japan Ground Self-Defense Force; Pacific Sentry is a field training exercise that focuses on joint training integration among U.S. forces and is designed to exercise U.S. Pacific Command headquarters staff and command components in a real-world, operational level of war scenario; Rim of the Pacific is a biennial international training exercise designed to foster and sustain cooperative relationships that are critical to ensuring the safety of sea lanes and security on the world's interconnected oceans; Valiant Shield is a U.S.-only, biennial field training exercise with a focus on integration of joint training in a blue-water environment among U.S. forces.