

# 21<sup>st</sup> Century Deterrence in the Space War-Fighting Domain: Not Your Father's Century, Deterrence, or Domain

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## ***ABSTRACT***

*It's a new century; it's new deterrence; it's a new domain. Deterrence for the 21st century will not be the nuclear deterrence that keeps superpowers from engaging each other, nor the ad-hoc conventional deterrence that fails to keep perhaps thousands of smaller conflicts from erupting across the globe. Effective twenty-first-century deterrence needs to be national and multinational, multidiscipline, and multidomain, combining diplomatic, informational, military, and economic (DIME) means to prevent terrestrial conflicts from extending to space.*

## **1.0 INTRODUCTION**

At present, our potential adversaries understand the competitive advantage we derive from space and view our reliance on space as a critical vulnerability they can exploit. As I have testified before, in the not too distant future, near-peer competitors will have the ability to hold every space asset in every orbital regime at risk. To meet this challenge, we need to embrace the fact that space is a warfighting domain just like the Air, Land, Cyberspace and Maritime domains, which requires that we address our vulnerabilities and maintain our resolve to ensure the peace.

—Gen John W. Raymond, Commander, Air Force Space Command & Joint Space Forces Component Command

### **1.1 Executive Summary**

Deterrence for the twenty-first century will not be the nuclear deterrence that keeps superpowers from engaging each other, nor the ad-hoc conventional deterrence that fails to keep perhaps thousands of smaller conflicts from erupting across the globe. Effective twenty-first-century deterrence needs to be national and multinational, multidiscipline, and multidomain, combining diplomatic, informational, military, and economic (DIME) means to prevent terrestrial conflicts from extending to space. For the new space war-fighting domain, defining and understanding what space deterrence is and what it is not will be critical to developing space war-fighting capabilities that enable the “M” aspect of DIME. Space deterrence used in this article is not meant to claim that deterrence in space is separate and distinct from the over-arching deterrence of combined factors of DIME, including the M for Military, but rather to highlight the factors and considerations that will enable or disable space contributions to deterrence.

### **1.2 Introduction**

The century isn't new, but it is very young. The euphoria of the triumph of deterrence, demonstrated by the fall of the Berlin Wall on 9 November 1989 and signaling the end of the Cold War, had lasted just nine months when Saddam Hussein thumbed his nose at conventional wisdom and invaded Kuwait. Eighteen

months later, after a combination of many diplomatic, informational, and economic responses (DI\_E) failed to oust Iraq, the US-led coalition freed Kuwait in 12 days of military response, adding the missing “M.”

Post-Cold War deterrence isn't new, but it, too, is very young. Routinely defined as de-ter-rence (də'tərəns) “the act or process of deterring: such as (a): the inhibition of criminal behavior by fear, especially of punishment; (b): the maintenance of military power for the purpose of discouraging attack” (e.g., nuclear deterrence).<sup>1</sup> Our fathers' deterrence was often seen far too narrowly as described in meaning (b) above—“discouraging attack (e.g., nuclear deterrence):”

Nuclear deterrence was then and remains very binary; it either works 100 percent of the time, or it fails. The lack of any nuclear weapon attacks or exchanges (since the first two bombs) seems to support a 100-percent success rate of “the maintenance of military power” in nuclear deterrence, regardless of the myriad factors contributing to the lack of nuclear incidents. Unfortunately, the result is a very narrowly focused strategic deterrence—routinely associated only with nuclear weapons—including the misconception that successful deterrence is measured by a 100-percent lack of incidents.

Space certainly isn't new either, but as a war-fighting domain, it is very new. Just a few years ago the words space and war fighting weren't used in the same sentence. The character of outer space has changed since our fathers' time as well. If space was ever a peaceful sanctuary (interrupted only in science fiction movies' imaginary scenarios), that is certainly no longer the case. In April 2011, Ambassador Gregory L. Schulte, the United States Department of Defense (DOD) deputy assistant secretary of defense for space policy, spoke about the “three Cs” of space—congested, contested, and competitive—when he addressed the 27th National Space Symposium. It's not beyond imagining that a fourth “C”—combative—would be added if major space-faring nations found themselves in a terrestrial conflict.

This article is presented in three parts and summary:

2.0: New Century—Deterrence for the Twenty-First Century—extends Clausewitz's statement that “war is politics by other means” to “deterrence is politics by all means”—DIME.

3.0: New Deterrence—Multidomain Flexible Deterrence—highlights the “M” part of DIME, positioning for military flexible deterrent options (FDO), the development of flexible response options (FRO), and the process for planning and executing FDO → FRO transitions.

4.0: New War-fighting Domain—Deterrence in Space War-fighting Domain—connects war-gaming of space deterrence using the FDO → FRO process to discussions of potential operational deterrence futures.

5.0: Summary—Planning for multinational and multidomain deterrence across DIME, acquiring for capable space warfighting, and then rehearsing both in space war-fighting operations in war games and exercises, represents a paradigm shift in thinking for flexible deterrence in the newest war-fighting domain and may be the best recipe for successful 21<sup>st</sup> Century space deterrence.

## **2.0 NEW CENTURY – DETERRENCE IN THE 21ST CENTURY**

Deterrence for the twenty-first century and beyond is based on two fundamental concepts. First is the set of “three Cs” for deterrence: capability, communication, and credibility. Capability refers to the power, capacity, or ability to accomplish something. Communication is the imparting of the capability information to others. Credibility is believability. Any deterrence objective must meet all three criteria to succeed, to which one might once again add a fourth “C” for conditioning—based on the experience that senior leaders

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1. Merriam-Webster Dictionary, s. v. “deterrence,” accessed 16 June 2018, <https://www.merriam-webster.com/dictionary/deterrence>.

gain through war games that enables them to have confidence in the deterrent response system.<sup>2</sup> The second concept involves DIME, the acronym that stands for the diplomatic, informational, military, and economic instruments of national power, each considered across a spectrum of “carrot and stick” actions (or responses) shown (as triangles) in figure 2-1. Although figure 2-1 shows multiple notional movements from carrots to sticks, it is also possible that there are movements in the opposite direction as international actors may be induced instead of compelled to change undesirable behaviors. The responses executed across a spectrum of DIME categories combine to underpin all deterrence.

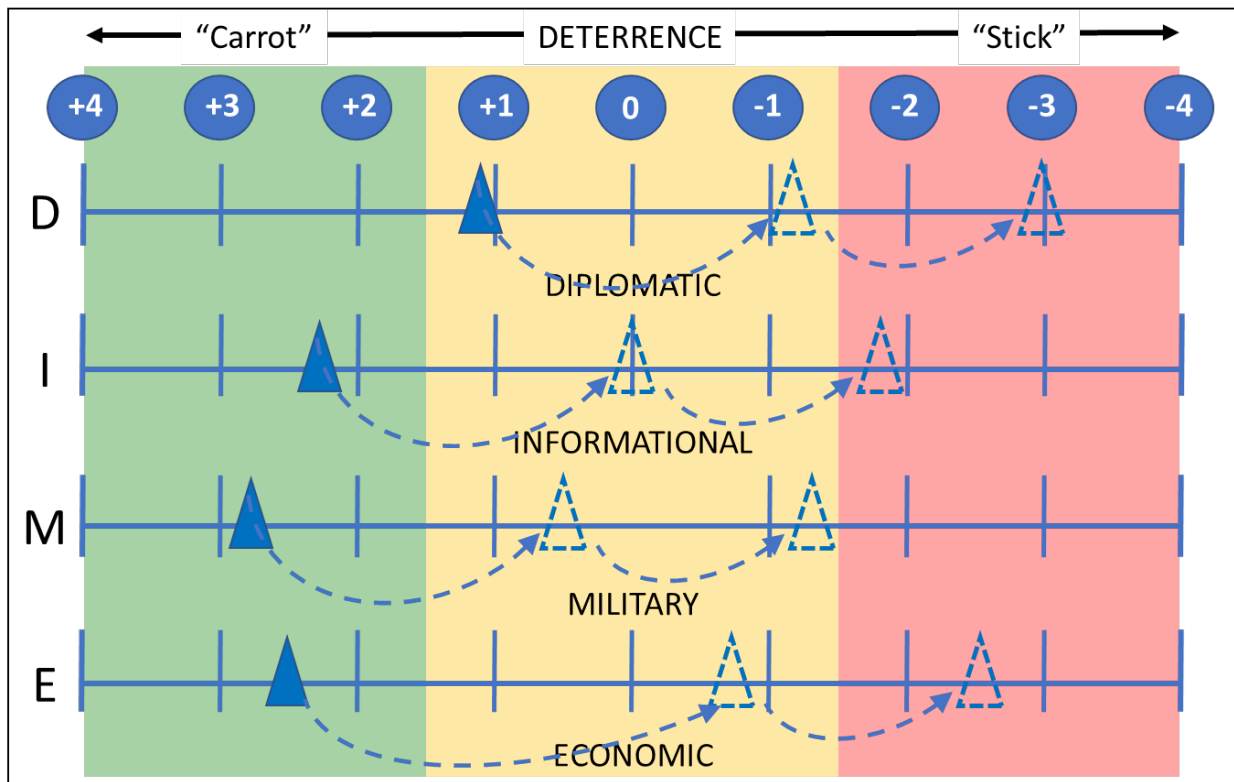


Figure 2-1: “Deterrence is politics by all means” visualized across diplomatic, informational, military, and economic means.

Each DIME category has its own row with nine columns of possible responses ranging from most positive on the left to most negative on the right. Figure 2-1 is an example of ongoing peacetime deterrence where the status triangles on each DIME category are on the positive side of 0. This article touches on deterrence across DIME but highlights the choice to develop and war game the military options for space deterrence that move from 0 toward the stick side of the model to fulfill the four Cs of deterrence, accepting that a choice to move military options toward the carrot side may prove just as effective. Carrots and sticks enable four basic options when multiplied by two execution verbs: withhold and give. Give Carrots or Give Sticks. Withhold Carrots or Withhold Sticks. These options cover what some refer to as deterrence by denial and deterrence by punishment. Across DIME, bad actors can receive sticks or carrots, and have carrots or sticks withheld, and any desired combination.

Based on the global record since the end of the Cold War and the twentieth century, deterrence in the twenty-first century will not look like nuclear deterrence with no attacks or incidents. Rather, it must be a multidomain strategic deterrence against behavior at the international level, with examples ranging from

2. What-when-how In-depth Tutorials and Information, s. v. “Deterrence (Social Science),” accessed 23 June 2018, <http://what-when-how.com/social-sciences/deterrence-social-science/>. Based on the author’s war-gaming experience, perhaps a fourth “C” (conditioning), both on the Blue side and the Red side, is the cherry on top.

Russian military intervention in Ukraine and annexation of Crimea (2014–present)<sup>3</sup> to China (spring 2018) forcing Vietnam to suspend yet another oil drilling project occurring too close to the U-shaped “nine–dash line” that marks the vast area that China claims in the South China Sea.<sup>4</sup> Transformational deterrence thinking is captured in the new Joint Concept on Integrated Campaigning (JCIC) from March 2018 that acknowledges a very complex twenty-first-century world and the challenges of “integrating military activities within the DOD and aligning those activities with interorganizational partners.”<sup>5</sup> The JCIC goes on to define integrated campaigning as “Joint Force and interorganizational partner efforts to enable the achievement and maintenance of policy aims by integrating military activities and aligning non-military activities of sufficient scope, scale, simultaneity, and duration across multiple domains.”<sup>6</sup> Future international deterrence in an integrated, interorganizational, multidomain (including space deterrence) world will have to include some of the first definition (a) of deterrence above: “the inhibition of [state/non-state] behavior by fear, especially of punishment.”

### **3.0 NEW DETERRENCE – MULTIDOMAIN (WITH SPACE) FLEXIBLE DETERRENCE**

Deterrence consists of essentially two basic components: first, the expressed intention to defend a certain interest; secondly, the demonstrated capability to actually achieve the defense of the interest in question, or to inflict such a cost on the attacker that, even if he should be able to gain his end, it would not seem worth the effort to him.

–William Kaufmann, “The Evolution of Deterrence 1945–1958” in Martin C. Libicki, *Cyberdeterrence and Cyberwar*

#### **3.1 Background**

Deterrence and flexible response have been a part of US national security thinking and policy at least since the end of World War II, and more specifically since President John F. Kennedy and Secretary of Defense Robert S. McNamara sought strategic alternatives to nuclear weapons, “massive retaliation,” and mutual assured destruction. According to Joint Publication (JP) 5-0, Joint Planning, FDOs are “preplanned, deterrence-oriented actions carefully tailored to send the right signal and influence an adversary’s actions. . . established to dissuade actions before a crisis arises or to deter further aggression during a crisis. . . developed for each instrument of national power—diplomatic, informational, military, and economic [DIME]. . . most effective when used to combine the influence across instruments of national power.”<sup>7</sup> FROs are defined as “the capability of military forces for an effective reaction to any enemy threat or attack with actions appropriate and adaptable to the circumstances existing.”<sup>8</sup> FROs are “operational to strategic-

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3. Nick Thompson, CNN, “Ukraine’s War: Everything You Need to Know about How We Got Here,” 3 February 2017, <https://www.cnn.com/2015/02/10/europe/ukraine-war-how-we-got-here/index.html>.

4. South China Morning Post, “Vietnam ‘Scraps South China Sea Oil Drilling Project under Pressure from Beijing,’ : Spanish Firm Repsol Ordered to Halt Scheme off Country’s Southeast Coast, BBC Reports,” 23 March 2018, <http://www.scmp.com/news/china/diplomacy-defence/article/2138619/vietnam-scraps-south-china-sea-oil-drilling-project>.

5. Joint Chiefs of Staff, Joint Concept for Integrated Campaigning, 16 March 2018, [http://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/joint\\_concept\\_integrated\\_campaign.pdf?ver=2018-03-28-102833-257](http://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/joint_concept_integrated_campaign.pdf?ver=2018-03-28-102833-257).

6. Ibid.

7. Joint Publication (JP) 5-0, Joint Planning, 16 June 2017, Appendix F, F-1, [http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp5\\_0\\_20171606.pdf](http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp5_0_20171606.pdf).

8. Ibid.

level concepts of operation that are easily scalable, provides military options, and facilitates rapid decision making by national leaders. . .”<sup>9</sup>

Domains first came into the DOD lexicon in Joint Vision (JV) 2020 (June 2000). Full-spectrum dominance required that “US forces are able to conduct prompt, sustained, and synchronized operations with combinations of forces tailored to specific situations and with access to and freedom to operate in all domains; space, sea, land, air, and information.”<sup>10</sup> In his article, “Multidomain Confusion: All Domains Are Not Created Equal” for The Strategy Bridge on 26 May 2017, Erik Heftye referenced JP 3-0 Joint Operations (17 January 2017) that describes the operational environment as “encompassing the physical areas of the air, land, maritime, and space domains; the information environment (including cyberspace); the electromagnetic spectrum; and other factors.”<sup>11</sup> This is perhaps the latest (and best) capture of multidomain terminology.

Included but not discussed at length in this article are other critical “multi-‘s” that flesh out the rest of the picture, including critical multinational and multi-source (civil, commercial, etc.) capabilities. Allied and commercial augmentation to deterrence, particularly in mission assurance is addressed below.

### 3.2 Developing Space Deterrence Strategy

“Deterrence has failed!” Nearly ubiquitous across war games is the failure of deterrence leading to war—it is a war game after all. Dozens of ongoing wars across the globe in 2018 demonstrate that only nuclear deterrence can be counted on to work. Other forms of strategic and conventional deterrence offer mixed results as state and nonstate actors pursue their objectives. As mentioned earlier, space deterrence presents a new challenge—that of defining what deterrence in the space domain looks like and how it might prevent conventional conflicts from starting in, or extending to, space. Future war games offer partial answers as moves are planned, and space war fighters develop their portion of the plan to respond to conflict in space based on their capabilities in the notional space order of battle (SOB). War-game space war fighters may not know at the time how or why space capabilities failed to deter the conflict in space, but it deserves a discussion here.

War games can only offer partial answers to deterrence in the space domain because war games often result in more questions than answers, including questions about the notional SOB, the rules of engagement, responding to a conflict extending to space, the risks of escalation, and national policy and strategy. Furthermore, anticipating DOD acquisition challenges, future notional SOB capabilities must be a primary investment area today if they are to be available in the decades to come.

War-game space deterrence and war fighting face four key challenges presented in chronological order (despite wargames generally assuming challenges 1-3 and starting with 4):

1. Develop and publish space deterrence and war-fighting policy and strategy
2. Define and codify space deterrence and war-fighting requirements
3. Develop, acquire and deliver space deterrence and war-fighting systems
4. Execute space deterrence to deter and dissuade conflict in space with known (communicated) credible space war-fighting capabilities (three Cs of deterrence).

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9. Ibid.

10. Peter J. Steng, National War College, 2020 Vision, 19 April 2001, <http://www.dtic.mil/docs/citations/ADA441649>.

11. Erik Heftye, The Strategy Bridge, “Multidomain Confusion: All Domains Are Not Created Equal,” 26 May 2017, [https://thestrategybridge.org/the-bridge/2017/5/26/multidomain-confusion-all-domains-are-not-created-equal#\\_edn7](https://thestrategybridge.org/the-bridge/2017/5/26/multidomain-confusion-all-domains-are-not-created-equal#_edn7).

Foundational to any military capability is the policy and strategy that requires it. Figure 3-1 depicts an activity flow for developing a deterrence policy, strategy, alternatives, and so forth. The key boxes are numbered and in bold borders.

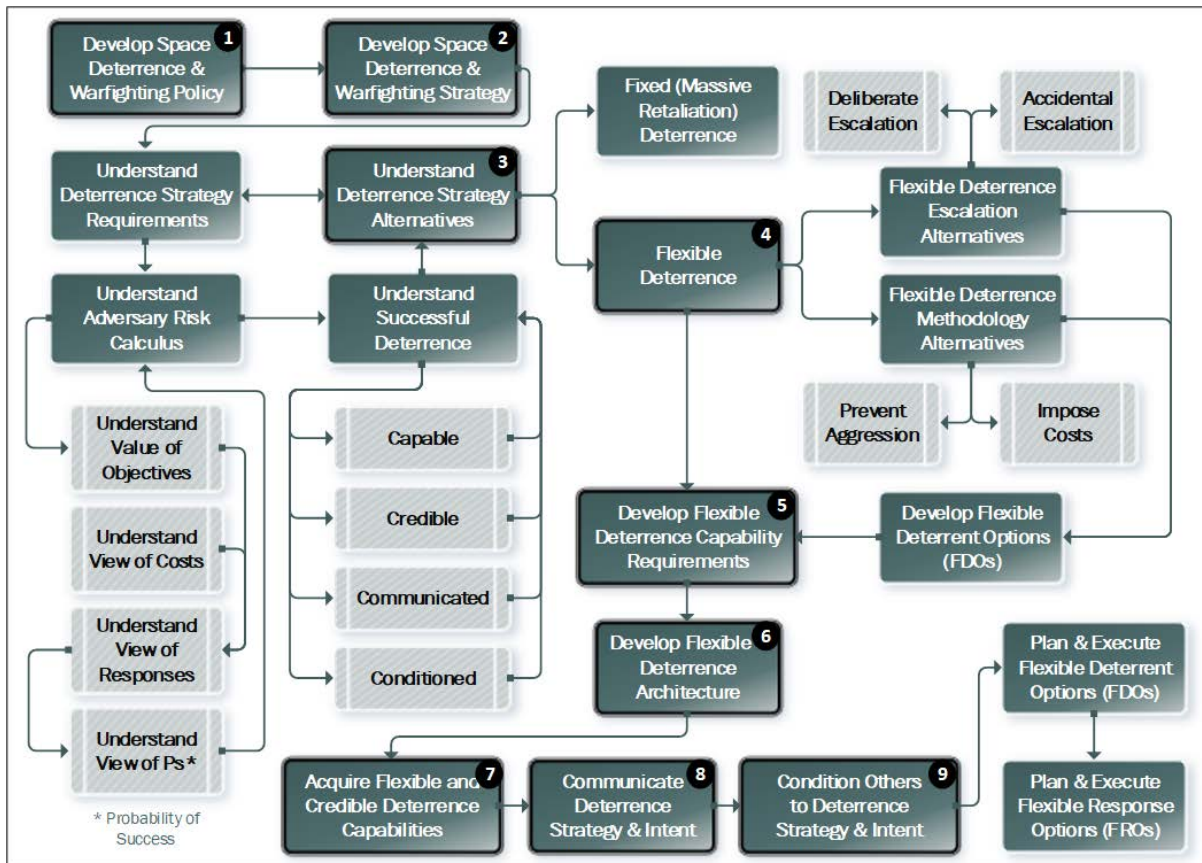


Figure 3-1: Activity diagram for developing and executing space deterrence and war-fighting strategy

### 3.3 Deterrence Doctrine

Deterrence policy and strategy are codified for DOD in doctrine. Space deterrence and space war-fighting doctrine are implied but need further definition and codification. In a general sense, the Deterrence Operations Joint Operating Concept 2.0, December 2006, lays out an ends-ways-means strategy for achieving deterrence.<sup>12</sup>

#### 3.3.1 Ends

- The deterrence of aggression and coercion against US and Allied vital interests

#### 3.3.2 Ways

- Credibly threaten to impose costs and deny benefits
- Encourage adversary restraint

12. DOD, "Deterrence Operations Joint Operating Concept 2.0," December 2006, 20, [http://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/joc\\_deterrence.pdf?ver=2017-12-28-162015-337](http://www.jcs.mil/Portals/36/Documents/Doctrine/concepts/joc_deterrence.pdf?ver=2017-12-28-162015-337).

### 3.3.3 Means

- Global situational awareness
- Command and control (C2)
- Forward presence
- Security cooperation and military integration and interoperability
- Force projection
- Active and passive defenses
- Global strike
- Strategic communication
- Deterrence assessment, metrics, and experimentation<sup>13</sup>

### 3.4 Flexible Deterrent Options (FDOs)

JP 5-0 Joint Planning states that “contingency plans should provide a range of military options, to include flexible deterrent options (FDOs) and/or flexible response options (FROs) and should be coordinated with the total US government response.”<sup>14</sup> JP 5-0 also suggests combining the instruments of national power (DIME) as the most effective deterrent. Specific military deterrence options include:

- Increase the readiness posture of in-place forces
- Upgrade alert status
- Increase intelligence, surveillance, and reconnaissance (ISR)
- Initiate or increase show-of-force actions
- Increase training and exercise activities
- Increase defense support to public diplomacy
- Increase information operations
- Deploy forces into or near the potential operational area
- Increase active and passive protection measures<sup>15</sup>

The Air War College (AWC) use DIME to categorize FDOs in the “Tailored Responses” section of “Contingency Planning (as represented in the author’s figure 3-2 below).”<sup>16</sup> For deterrence to be successful, the DIME instruments of national power combine to ensure an adversary’s perception and decision making is understood and influenced, based upon their perception of the costs-benefits (or consequences) of a course of action (COA), and the consequences of restraint or inaction (or the costs-benefits of not taking the COA in question).<sup>17</sup>

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13. The suggested addition was made by the author.

14. JP 5-0, Joint Planning, II-21.

15. Ibid.

16. Air War College, “Flexible Deterrent Options in the Tailored Response section of Contingency Planning,” fig. 4-18, accessed 16 June 2018, <http://www.au.af.mil/au/awc/awcgate/pub1/fdo.pdf>.

17. Ibid.

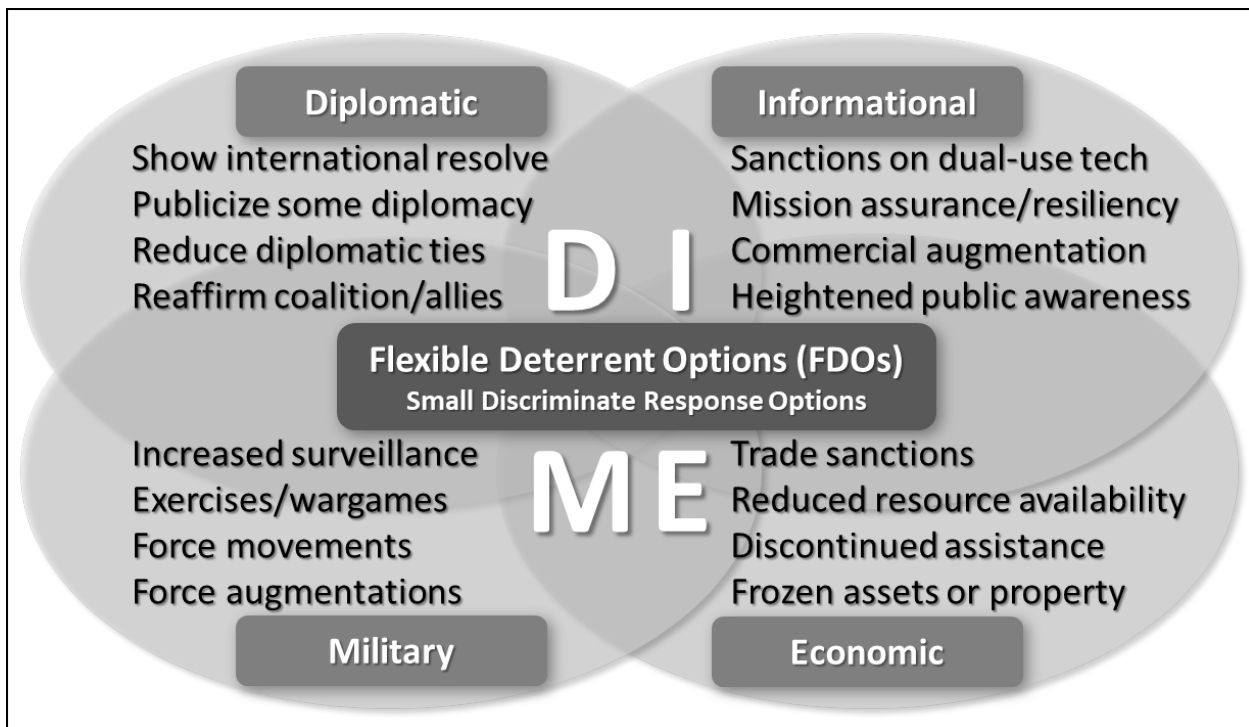


Figure 3-2: Space Deterrence-tailored model for FDOs → FROs in DIME categories

Critical to US and Allied security objectives, and supporting space deterrence, is maintaining space superiority. Adapting to, and overcoming, the challenges to maintaining space superiority requires mission assurance (MA) across all space mission areas including:

- Satellite Communications (SATCOM) – redundancy, resiliency, back-up, surge, etc.
- Spacelift/Launch – Launch-on-Demand, replenishment, surge, constellation growth, etc.
- Space Situational Awareness (SSA) – persistent/real-time tracking and reporting, fingerprinting, status change, Indications & Warning (I&W), action/behavior attribution, space traffic management – Space Traffic Management (STM), etc.
- Intelligence, Surveillance and Reconnaissance (ISR) – I&W, status change, tip & cue, action attribution, etc.
- Radio Frequency Interference (RFI) – Identification, mitigation, geolocation, etc.
- Positioning, Navigation and Timing (PNT) – redundancy, resiliency, back-up, surge, etc.
- On-Orbit Servicing (OOS) – future capability supporting resiliency, resupply, repair, etc.

There are multiple measures in three categories of MA measures<sup>18</sup> across DIME for national and allies, including commercial:

- Defense
- Reconstitution
- Resilience
- Disaggregation

<sup>18</sup> JP 3-14, Space Operations, 10 April 2018, pp I-7 to I-9



- Distribution
- Diversification
- Protection
- Proliferation
- Deception

Combining the above in MA enables deterrence in two major ways: (1) It makes adversary counterspace capabilities infeasible due to the ubiquitous nature of space capabilities across missions, and (2) It makes actions in space visible and known and known to be visible.

In wargames, FROs from commerce and allies show international resolve to reveal information in public and social media that exposes formerly ambiguous actions in space and enables strategic messaging about undesirable behaviors and requests to cease. These actions combine to support space deterrence.

FDOs and FROs have proven a successful planning construct for other war-fighting domains and are now doing so for the space war-fighting domain, as demonstrated in war games and exercises. Planning for space deterrence and war fighting based on identified trigger events, which enables the transition from FDOs → FROs, has proven ground-breaking in war games and likely holds as much potential for real-world operational planning going forward. The FDOs → FROs construct in war-game space war fighting is well-served by the find, fix, track, target, engage, and assess (F2T2EA) paradigm. F2T2EA came into common usage in Air Force terminology when Gen John P. Jumper was commander of Air Combat Command for 18 months early in 2000–01, and then chief of staff of the Air Force 2001–05. Although there have been several efforts to update it, including the “U.S. Special Operations’ Find, Fix, Finish, Exploit, Analyze, and Disseminate and Find, Fix, Fire, Finish, and Feedback,”<sup>19</sup> finding, fixing, and tracking is particularly well-suited for the space domain, and target, engage, and assess enable war-game war fighting.

Meeting the challenges of war-game war fighting in the new space domain often requires making dubious assumptions, as future solutions have yet to be developed and tested. Space war games need equal effort by war-game “white-cell” planners (for foundational and starting status), and “blue-cell” players (for operational planning and execution) to develop the intelligence assessments and event triggers, preplanned monitoring and reporting, assured timely detection, unambiguous assessment, positive identification, precise orbit determination, and so forth, whether the event is supported by “white-card” injects or modeling and simulation. Whether the event is a new space launch, the unexpected maneuver of a resident space object, or numerous other anomalous events, war-game scenarios and events enable an assessment of how and why space deterrence fails (if the conflict extends to space).

### 3.5 Flexible Response Options (FROs)

As stated above, an FRO is an operational-to-strategic-level concept of operation that is easily scalable, provides military options, and facilitates rapid decision making by national leaders. The implementation of FROs is based on the contingency planning process to prevent or respond to threats. Prevention relies heavily on warning intelligence and threat warning, formerly known as indications and warning (I&W), and response on attribution. Timely orders and execution of FROs require a commander’s thorough situational awareness. Space situational awareness (SSA) within the space domain combines ISR to characterize “space objects and the operational environment upon which space operations depends.”<sup>20</sup> Using the inset from

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19. Mike Benitez, War on the Rocks, “It’s About Time: The Pressing Need to Evolve the Kill Chain,” 17 May 2017, <https://warontherocks.com/2017/05/its-about-time-the-pressing-need-to-evolve-the-kill-chain/>.

20. JP 1-02, Department of Defense (DOD) Dictionary of Military and Associated Terms (Washington, DC: DOD, September 2018), 213, <https://fas.org/irp/doddir/dod/dictionary.pdf>.

figure 2-1 above, figure 3-3 shows two options of either moving gradually into FRO responses in the “M” of DIME or jumping directly to a punishing military response.

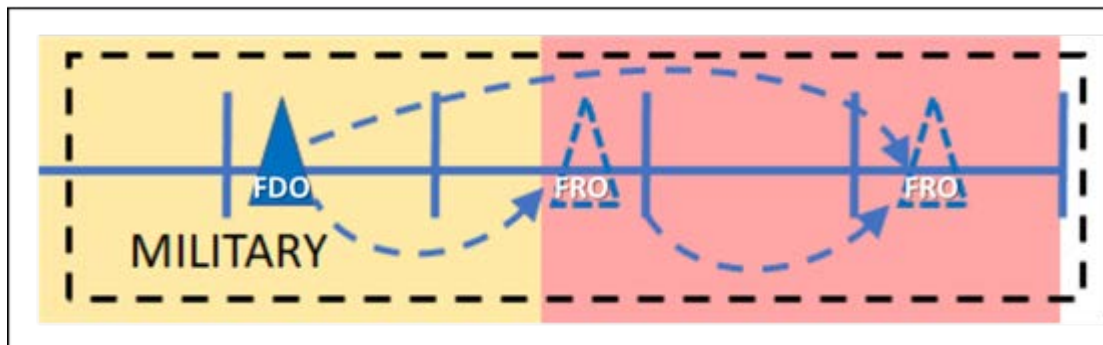


Figure 3-3: Detail from figure 2-1 showing “M” deterrence options move into response options

### 3.6 Redlines and Triggers

Redlines and triggers or triggering events are defined as “the final straw that sets things in motion.”<sup>21</sup> Formerly associated with I&W, redlines and trigger events are now captured in JP 2-01, Joint and National Intelligence Support to Military Operations, 5 July 2017:

“Threat warning is closely associated with, but functionally distinct from, warning intelligence. Threat warning is the urgent communication and acknowledgment of time-critical information essential to the preservation of life and/or resources. The nature of threat warning is urgency.”<sup>22</sup>

Warning intelligence is primarily an intelligence function, while threat warning can come from any informed source. Both can provide the tip-off of imminent or hostile activity, in best practice combining to form the triggering event that kicks off an FRO. Redlines and triggers were in the news recently associated with the Iran nuclear accord. In his article “Triggers, Redlines, and the Fate of the Nuclear Accord,” in a usage very similar to what is implied in the FDO → FRO construct introduced herein, Richard Nephew explains that “first and foremost, if drawn tightly, . . . redlines and triggers could create unwarranted and unnecessary crises with Iran, . . . Triggers and redlines are intended to serve as a forcing function in which A automatically results in B.”<sup>23</sup> The ambiguities of detecting and assessing events in space deterrence and war fighting produce latencies that require some responses to be preapproved for execution upon detection of redlines and triggers to have any chance of being effective. This does not suggest automated (no-human-in-the-loop) responses, but rather thorough planning, seamless monitoring, and pre-briefed and approved COAs.

### 3.7 FDOs → Redlines and Triggers → FROs

Developing and planning FDOs, identifying redlines and triggering events, conducting the contingency planning for the FROs, and requesting preapproval for FROs orders upon detection of the triggers, has been transformational in war games and exercises. As illustrated in figure 3-4 below, transitioning from FDOs to FROs (FDO → FRO) is basically developing “if-then” contingencies for the commander. The FDO is

21. Answers, “What is a Triggering Event?” accessed 16 June 2018, [http://www.answers.com/Q/What\\_is\\_a\\_triggering\\_event?#slide=1](http://www.answers.com/Q/What_is_a_triggering_event?#slide=1).

22. JP 2-01, Joint and National Intelligence Support to Military Operations, 5 July 2017, III-50, [http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp2\\_01\\_20170705v2.pdf](http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp2_01_20170705v2.pdf).

23. Richard Nephew, Arms Control Association, “Triggers, Redlines, and the Fate of the Iran Nuclear Accord,” December 2017, <https://www.armscontrol.org/act/2017-12/features/triggers-redlines-fate-iran-nuclear-accord>.

“commander, recommend approve this now,” while the FRO is “commander, recommend if trigger is detected, then approve this response.” The key boxes are numbered 1-5 and have bold borders.

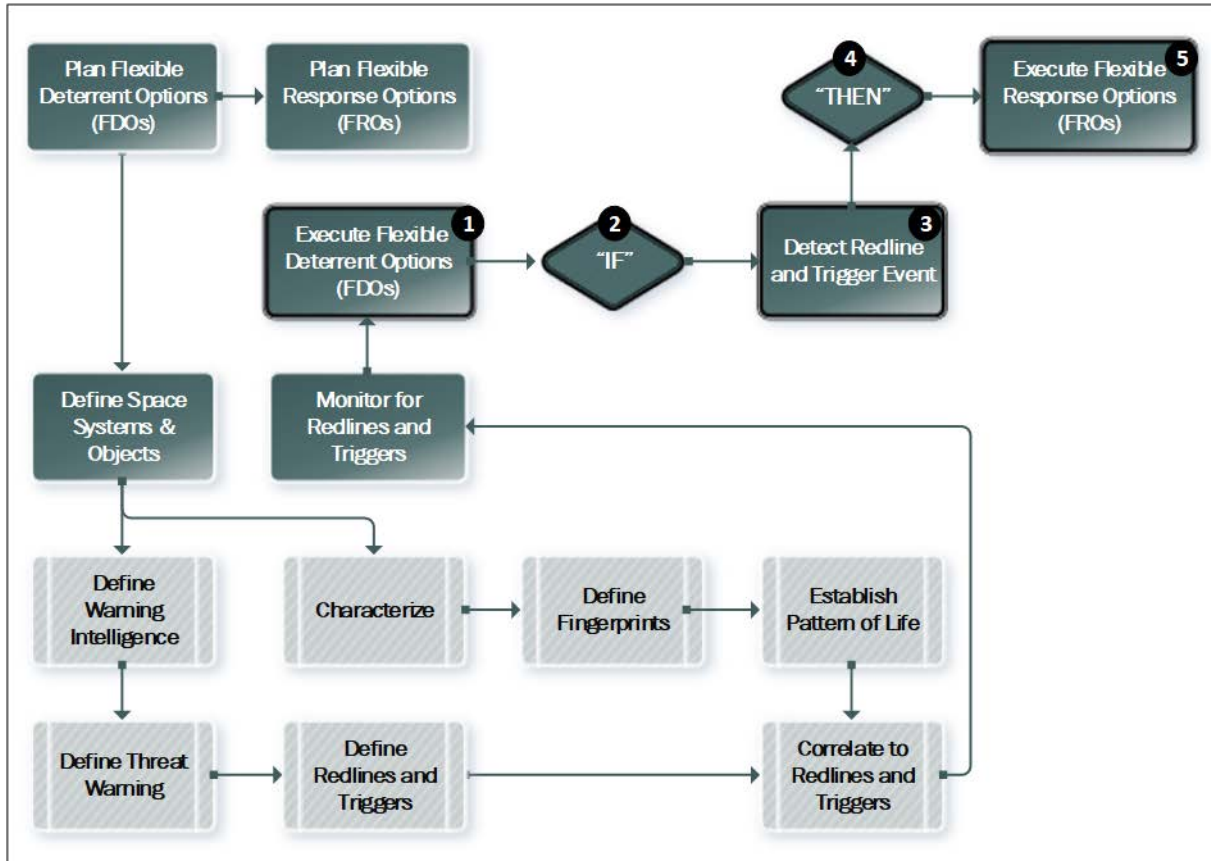


Figure 3-4: Moving from FDO → FRO in the space domain supported by redline and trigger detection

Planning for FROs is similar in steps to crisis planning. For space operations planners, developing redlines and triggers is the least familiar of the steps shown above. Redlines and triggers are based on knowing what to monitor, tasking for the collections, and detecting and comparing newly collected data and assessing it against known starting conditions.

#### 4.0 NEW DOMAIN – DETERRENCE IN THE SPACE WAR-FIGHTING DOMAIN

Space deterrence will never be similar to the binary nature of nuclear deterrence discussed above, nor can the space domain be expected to be free from incidents. Space deterrence will be flexible deterrence, as it is in all other war-fighting domains, which by definition allows for varied situationally-dependent responses to the inevitable incidents in the space domain. China proved this on 11 January 2007, when in its fourth anti-satellite (ASAT) test, it destroyed one of its own aging weather satellites and caused a 10-percent increase in debris (thousands of pieces) at an altitude of about 530 miles.<sup>24</sup> It was in the early 2000s before the last of

24. Carin Zissis, Council on Foreign Relations, “China’s Anti-Satellite Test,” 22 February 2007, <https://www.cfr.org/backgrounder/chinas-anti-satellite-test>.

hundreds of pieces of debris from the last ASAT test by the US at a lower altitude in 1985 burned in.<sup>25</sup> Another public-space event occurred on 10 February 2009, when Iridium 33 and Cosmos 2251 collided at a speed of 42,120 km/h (26,170 mph) at an altitude of 789 kilometers (490 mi) above the Taymyr Peninsula in Siberia. Although accidental, it was easy to imagine similar effects if an intentional collision were to occur. Whether the space domain sees a terrestrial conflict “extend to space,” or space incidents precede and foreshadow terrestrial conflict, deterrence in space should consider and utilize flexible deterrence paradigms.

As a new war-fighting domain, space is catching up to methodologies and processes that are routine practices in other domains. War games and exercises require breaking old paradigms and mind-sets as space planners and operators look at “4-C” space environments with space forces and missions at risk from peer or near-peer space adversaries. Among the many observations and lessons learned from war-gaming notional space operations in the coming decades, coming to grips with space deterrence in policy and strategy and applying it to planning flexible deterrent options is among the most important. In terrestrial domains, strategic deterrence is very clear. When the US sent B-1 Lancer bombers and F-15 Eagle jets off the coast of Korea in the fall of 2017, it left little doubt in anyone’s mind what the real objective was, which according to the Pentagon was a “demonstration of U.S. resolve and a clear message that the President has many military options to defeat any threat.”<sup>26</sup> But what does space deterrence look like? Only in war games can players work through various combinations of “sticks and carrots” to discover what does and doesn’t work in the space domain. The FDO → FRO process provides a critical piece to successful space operations—issuing orders while the probability of mission success is as high as possible. Issuing timely orders requires an FDO → FRO model with preapproved orders upon detection of the triggering event (when possible).

Figure 4-1 shows the space C2 performance model with the adversary kill-chain in the red arrow across the top and protection countermeasures beneath with representative effectiveness bars decreasing over time from 100–10 percent. SSA quality/quantity is down the left side and C2 (commander) confidence on the right. Space C2 performance is notionally expressed on the red, orange, and green curves that result in no orders (red), late orders (orange star), or timely orders (green star). In war games, a fully developed space war-fighting FDO → FRO process with preapproved FROs has been shown to help move the path from red to orange to green.

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25. Ibid.

26. Doug Stanglin, USA Today, “U.S. Bombers, Fighter Jets Counter ‘Reckless Behavior’ in Show of Force off North Korea Coast,” 23 September 2017, <https://www.usatoday.com/story/news/2017/09/23/u-s-b-1-bombers-f-15-jets-carry-out-rare-show-force-off-north-korean-coast/696480001/>.

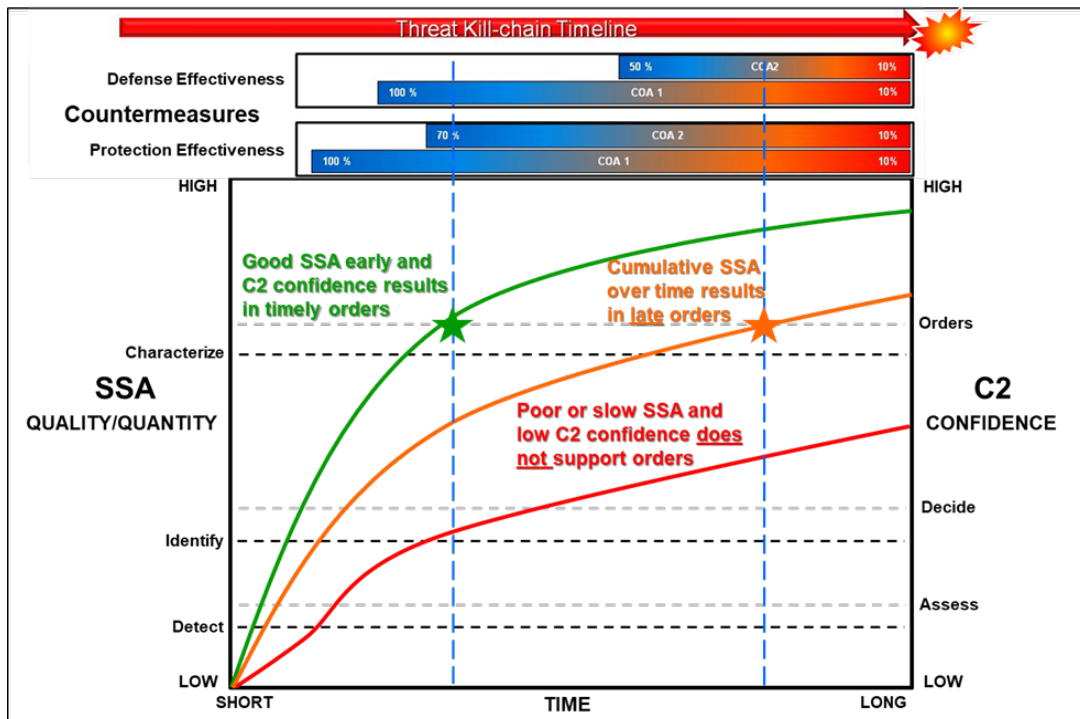


Figure 4-1: Space command and control operations performance model

#### 4.1 Learning from War-Gaming Flexible Space Deterrence

What does flexible space deterrence look like in a war-game scenario? It usually starts with an international actor doing something that upsets the status quo in the region, regardless of DIME deterrence activity by the US or other international actors. As in the real world, that first act is an initial failure of deterrence as defined above: “the inhibition of behavior by fear, especially of punishment.” But flexible space deterrence is not done yet, the conflict has not extended into space, and FROs are planned and ready. The only question that remains is how dramatic the FRO—measured or massive? Carrot or stick? Further carrots may be forthcoming. On the stick side, the punishment for undesired international behavior should not be considered escalatory or warmongering. Nations that upset the status quo have done so with a calculated risk about the response of the international community and the US and have accepted that risk. Perhaps ambiguous or nonpunitive responses in the past have lulled potential adversaries into miscalculating risks. Calculations in the space domain are even more complex. China accepted that risk with the January 2007 ASAT test but seemingly learned a lesson from the international reaction, as there have been no further debris-causing tests.

War games and exercises are the perfect means to condition and acclimatize leaders (at least senior military leaders) that some FROs may need to be swift, harsh, and violent to return a region to the status quo without a major conflagration.<sup>27</sup> Fears of escalation, tripping misunderstood or invisible redlines, or the possibility of issuing order that contribute to wars instead of preventing them cannot be allowed to hobble decision makers and senior leaders. The cliché of responding to international crises with a “tersely worded State Department demarche” cannot rule the day in war games and exercises. If space is a war-fighting domain, then actually fighting a war that extends into space may be required to maintain space superiority, should space deterrence fail.

27. Hopefully, similar “war games” occur at the highest levels of civilian leadership, as well, conditioning the ultimate decision makers to make the hard decisions.

## **4.2 FDO → FRO Success for Operational Space Deterrence**

In war games and exercises, success for deterrence and the FDO → FRO process in planning and execution can be measured during adjudication or assessment. Questions are asked and answered such as:

1. Was there appropriate multinational and multidomain FDO planning across DIME?
2. Were redline and trigger conditions identified and monitored?
3. Were FROs planned with possible branches and sequels in mind, depending on whether the crisis evolves along “most likely” or “most dangerous” possibilities?
4. Was threat warning adequate and timely?
5. Did the commander have the authorities to order the FROs?

All well and good for future war games adjudicated in distinct moves, but what is the impact of deterrence and the FDO → FRO process on real-world operations in 2019 and beyond? The impact could be negligible unless the following challenges are addressed. Starting with the given that deterrence is multinational and multidomain, as all future conflicts will require a coalition response:

Challenge 1: Develop and publish appropriate space deterrence and war-fighting policy and strategy

Challenge 2: Define and codify space deterrence and war-fighting requirements.

Challenge 3: Develop, acquire and deliver space deterrence and war-fighting systems.

Challenge 4: Execute space deterrence to deter and dissuade conflict in space with known (communicated to adversaries) credible space war-fighting capabilities (three Cs of deterrence). Recall the classic quote from Dr. Strangelove, “The whole point of a Doomsday Machine is lost, if you keep it a secret!”

## **5.0 SUMMARY**

Space is a war-fighting domain. Air, land, and maritime domains understand flexible deterrence. Examples are routinely in the news as mentioned above. Space and cyberspace operations deterrence activities may not be in the headlines—yet. But merging FDO planning with FRO preplanning for space war-fighting operations in war games and exercises, based on identified trigger events, represents a paradigm shift in thinking for flexible deterrence in the newest war-fighting domain.

What does the road ahead look like for deterrence in the twenty-first century space war-fighting domain? Some of the steps going forward include:

1. Developing a comprehensive national and multinational, multidiscipline, and multidomain DIME deterrence policy and strategy
2. Applying and tailoring DIME deterrence strategy for key defense planning scenarios
3. Exercising and war-gaming coalition deterrence defense planning scenarios across all levels of DIME instruments of national power to identify deterrence capability, communication, and credibility gaps
4. Proposing and developing near-, mid-, and long-term solutions for deterrence gaps across

multinational agencies, organizations, and armed services

5. Repeating and improving steps 3–4, integrating and synchronizing vertically and horizontally

