

# US Nuclear Deterrence

## Global Threats and Emerging Entities

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### Introduction

The current Nuclear Posture Review prioritizes low-yield nuclear weapons of eight kilotons (kts) or less.<sup>1</sup> While this review serves to maintain the current nuclear posture, it does not advance a cohesive deterrence strategy. Nuclear weapons and their capabilities are often misconstrued due to a lack of information and education relating to their role in US strategies. While pursuit of new weapons and modernization programs supporting the US Nuclear Triad (consisting of Air, Land, and Sea weapon systems) benefits the US, these programs are often met with resistance by US citizenry due to a misunderstanding of our adversaries' capabilities and strategies. Russia and China are both pursuing large-scale strategic weapons and advanced technologies; which within the Global Power Competition (GPC) environment, creates doubt in the US deterrence posture and its ability to provide a valid response to aggression.<sup>2</sup>

However, the need for such powerful weapons for successful future deterrence is a controversial subject. Rear Admiral Ronald Fritzemeier of US Strategic Command admits, "if strategic deterrence fails and in particular if nuclear deterrence fails, then we just ripped the underpinnings out of every Operations Plan (OPLAN) and Concept of Operations (CONOPS) for every other capability inside the department."<sup>3</sup> Unfortunately, US nuclear deterrence cannot be sustained by its current nuclear weapon inventories, strategies, and capabilities. Since a failure to deter a nuclear enemy would lead to annihilation: How does the US increase deterrence without adding weapons to its nuclear stockpile? The US can accomplish this by developing more mobile and agile options while increasing interoperability and communications. Future deterrence development is necessary to maintain a global nuclear balance.

### Strategic Messaging

Nuclear weapons conjure images of world-ending destruction with a single nuclear blast, but this is an incomplete understanding of the weapons' power. To provide scope, consider a theoretical nuclear weapon dropped on Washington, DC. An eight kiloton detonation would inflict 0.7 miles of moderate damage, with structures experiencing major damage, and 47,000 estimated casualties.<sup>4</sup> A 350 kiloton W-78 weapon would inflict approximately three miles of moderate

damage and 297,000 estimated casualties.<sup>5</sup> A nine megaton (9,000 kilotons) weapon, like the US W-53 thermonuclear bomb, would inflict approximately nine miles of moderate damage and 1,200,000 estimated casualties.<sup>6</sup> Each nuclear weapon results in destruction within its intended purpose and desired deterrence strategy. Nonetheless, while smaller nuclear weapons provide tactical options for escalatory warfare, they have historically not been part of deterrence strategy. Instead, deterrence strategy includes the Nuclear Triad in its current state, in which advanced weapons and evolving strategies provide deterrence due to the large-scale destructive capabilities associated with a response. Thus, finding the proper strategic progress for future deterrence will be a challenge to overcome.

Exploring the deterrence capability of a flexible and agile nuclear force is significant because the US should not lose its ability to deter Russia, China, North Korea, and Iran. The future of US deterrence theories will develop, not because of the enemy the US will need to deter, but rather the way the US will be willing to combat its adversaries. Our capability to break or delay an enemy's attack provides physical and psychological deterrence; yet the current architecture of the Nuclear Triad, influenced by tactical level warfare for the past 35 years, is aging, and a mere refurbishment of technology without strategic evolution will only provide a stop-gap measure in the GPC.

Instead, the US will need to build weapons to provide inherent defense through mobility and flexibility versus development of weapons built for specific targets. US strategy must grow and evolve to achieve effective deterrence, as new weapons technology development alone cannot create adequate deterrence. Increasing nuclear deterrence without increasing the actual overall number of nuclear weapons means future capabilities will need to include nuclear agility, next-generation weapons, and interoperability among emergent domains.

The aging US Nuclear Triad force structure proved successful during the Cold War against the USSR over 35 years ago. However, the US is now only beginning to modernize and invest in its current legacy systems, and the battlefield has changed. Enemies are building new and more complex systems despite the current Nuclear Triad's deterrence capabilities. However, the US continues modernization and employment strategies based on a Cold War mindset instead of exploring the adversary's new nuclear threats—which would help to identify the deterrence requirements for future systems.

Many of the current US systems have reached the end of their life-cycle and date back to the 1960s. These systems have remained static, without an increase in their numbers, to maintain agreements reached in decades old treaties betwixt the USSR and the US. Yet, this bipolar mindset should no longer be the primary driving deterrence factor for US strategies. The US must now contest a multi-

polar world including China, North Korea, and Iran. What nuclear capabilities does a potential enemy have, and what systems are they developing despite US nuclear deterrence?

### ***Enemy States' Perceived Capabilities***

Russia possesses a wide variety of nuclear-capable forces, with a similar Nuclear Triad as the US land-based, sea-based, and bomber-based legs. They are more varied than US forces and less varied than Chinese forces. Of concern, Russia possesses forces beyond the originally prescribed limitations of the 2011 New Start Treaty which it has recently renounced. Those forces include multiple Intercontinental Ballistic Missiles (ICBM) such as the SS-18, SS-19, SS-27 Mod 1, SS-27 Mod 2, and land-mobile ICBMs such as the SS-25, SS-27 Mod 1, and SS-27 Mod 2.<sup>7</sup> In total, Russia has claimed to have deployed 510 strategic launchers as of September 2020; a force of 400 ICBM and 110 Submarine-Launched Ballistic Missiles (SLBM) and bombers.<sup>8</sup> Russia continues its build-up of ICBM forces, and according to Defense Minister Sergei Shoigu, over 950 structures and facilities have been built for its strategic missile forces as of December 2020.

The Russian navy totals 11 nuclear-powered, nuclear missile capable Ballistic Missile Submarines (SSBN). Each submarine can carry 16 SLBMs, and each SLBM is capable of carrying several Multiple Independently Targetable Reentry Vehicles (MIRV).<sup>9</sup> This brings the total of Russian SLBMs to approximately 816 warheads, whereas the New Start Treaty limited the total to 650 warheads in service.<sup>10</sup> What's more, the Russian navy has not stopped developing nuclear weapons and has developed the "Status-6" Poseidon torpedo. This torpedo is propelled by an onboard nuclear reactor traveling in excess of 115 miles per hour at depths of 3,300 feet and carries a 100-megaton warhead.<sup>11</sup>

Meanwhile, the Russian bomber force contains two bombers: the Tu-160 Blackjack and the Tu-95MS Bear. It is estimated that a total of 50 bombers have been deployed under the New START Treaty.<sup>12</sup> These bombers are similar to US bombers, with the capability to carry cruise missiles and gravity weapons. Additionally, Russia is working on an exotic cruise missile called the 9M730 Burevestnik, which is propelled by an onboard nuclear-powered engine.<sup>13</sup> The entirety of the Russian nuclear force is being overhauled and incorporates new weapons to provide the Russian government with options for nuclear attacks. Their current systems have been expanded and are incorporating varying assets in comparison to US strategic forces.

Similarly, China has rapidly developed arsenals of advanced weapons intended to break apart US battle networks, destroy the US military's traditional platforms, and shatter its ability to close the kill chain.<sup>14</sup> By breaking apart the kill chain, the

deterrence credibility of the US is degraded. What's more, in contrast to the START treaties between the US and Russia, Chinese forces have never been limited to the restrictions these treaties place on weapons capability and developments. Currently, the Chinese People's Liberation Army (PLA) has mobile ICBMs, new nuclear-powered SSBNs, and MIRV-capable silo-based ICBMs, in addition to hypersonic-glide vehicles and MIRV-capable mobile ICBMs.<sup>15</sup>

Thus, China is fielding a robust nuclear force and is demonstrating a commitment to being a global nuclear power. The targeting capabilities of these agile forces complicate the US' ability to utilize counter-target deterrence. For example, the road-transportable system creates targeting difficulties for the US, as their mobile nature allows them to move during the time it takes for a strike to reach them. Furthermore, production of China's H-6 nuclear-capable bomber, used as the visible deterrence leg of their triad, is not limited by any existing treaty. These bombers can launch Air-Launched Ballistic Missiles (ALBM), and in early 2020 it was assessed that a yet to be named ALBM would be "in research & development within 10 years."<sup>16</sup> Currently, the H-20 stealth bomber is in development, with production beginning in 10 years.<sup>17</sup> The Chinese submarine force contains six Jin-Class nuclear-powered SSBNs. Each submarine can carry a minimum of 12 JL-2 missiles capable of reaching 3,900 nm each.<sup>18</sup> What's more, the next generation of Chinese submarines, capable of carrying 24 instead of the 12 SLBMs Chinese submarines currently carry, will deploy with the JL-3 SLBM, capable of reaching over 5,400nm.<sup>19</sup> Furthermore, China's vast territory allows for assets to be hidden in numerous locations. Having such a robust force designed to mirror and defeat the current US deterrence strategy proves the need for an evolution in US' current thinking. China has never been a signatory of treaties limiting weapons; instead, in 1950, it inked a secret arrangement with Moscow in which it delivered uranium ores in exchange for Soviet nuclear technical assistance; which allowed China to begin building nuclear weapons in the late 1950s. The relationship and development efforts between China and Russia created a new nuclear deterrent landscape in which China does not operate under the same limitations as the US and Russia.

Other nations such as North Korea are changing the deterrence landscape as well, as they too continue to build their nuclear weapons program. North Korea's stockpile has grown in tandem with China's nuclear weapons program. Once a small nation with little power, this country has now become a threat to the US. Its largest nuclear test, conducted in September 2017, which North Korea stated was of a thermonuclear device, had an estimated yield around 250 kilotons (just shy of the US' own Minuteman III yield). Coupled with its *Hwasong-12* mobile intermediate-range ballistic missile, it has a projected range of 2,500 nautical

miles. What's more, as of a 2020 military parade, US analysts assessed that North Korea's *Hwasong-15*, declared to be the "largest road mobile ICBM,"<sup>20</sup> could strike anywhere in the US;<sup>21</sup> as it would theoretically have a 7,000 nautical mile range.<sup>22</sup> In addition to ICBMs, North Korea has been developing SLBMs as part of its nuclear arsenal. The *Pukguksong-3* SLBM has been estimated to be capable of striking within a 1,000 nautical mile range, and the older generation *Pukguksong-1* had an estimated range of 650 nautical miles.<sup>23</sup> During the same 2020 parade and another one in early 2021, North Korea showed its latest production of the *Pukguksong-4*, an SLBM speculated to introduce the capability of MIRV warheads.<sup>24</sup> North Korea continues to develop missile systems, and as of recently, Pyongyang confirmed a launch on 20 October 2021 of a "new type" of SLBM.<sup>25</sup> These systems, with their inherent destructive capability, have provided North Korea with leverage on the world stage. These developments and advancements are quickly closing the capability gap with US nuclear forces, despite current deterrence models.

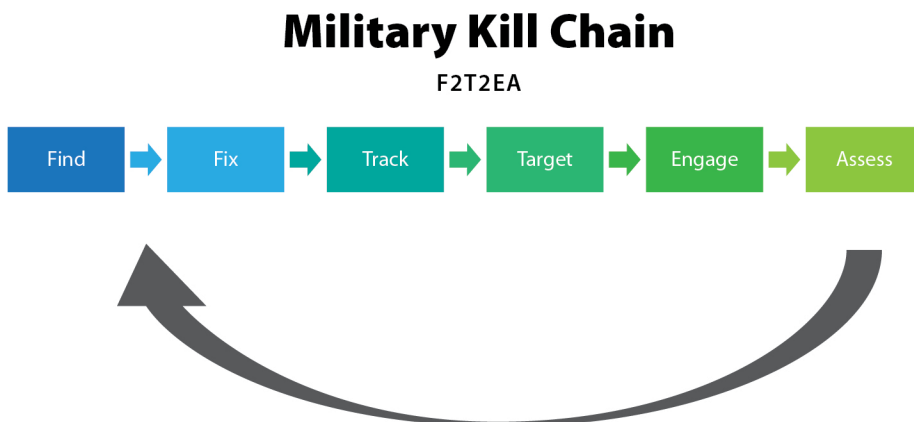
Iran has also demonstrated the capability to be a nuclear threat and continues to pursue nuclear weapons. Their advancement of ballistic missiles and increased uranium enrichment demonstrates their desire to be considered a nuclear capable nation. Recently, Iran signed a deal regarding their nuclear programs called the Joint Comprehensive Plan of Action (JCPOA). The JCPOA is a detailed, 159-page agreement with five annexes reached by Iran and the P5+1 (China, France, Germany, Russia, the United Kingdom, and the United States) on July 14, 2015.<sup>26</sup> Tehran continues to reduce its compliance with some clauses of the JCPOA; for example, it's increasing uranium enrichment and testing ballistic missiles with controversial warhead designs, which could be capable of carrying nuclear weapons with minor modifications.<sup>27</sup> According to analysts, three of Iran's ballistic missiles, the Shahab-3, Khorramshahr, and Emad, with a 1,000 nautical mile range, have designs that indicate they could be mated with nuclear warheads.<sup>28</sup> The JCPOA has attempted to denuclearize Iran without success, as Tehran has boosted its uranium enrichment to twenty percent, above the 3.67 percent maximum mandated by JCPOA.<sup>29</sup> US nuclear deterrence strategies have also failed to dissuade Iran from continuing to develop new systems. To counter the ever-growing Iranian threat, the US must continue to increase the effectiveness of its nuclear triad.

## **The Threat Environment**

Understanding the enemies' weapons and advancements allows the US to assess their ability to compete and challenge the nuclear status quo. Current enemy systems are beyond Cold War-era technology and are advancing quicker than US weapons development. Potential adversaries have become agile through road-mobile

ICBMs, advancements in cruise missiles, and SLBMs. These new systems make the current US deterrence model less effective because of their inherent ability to compete with, and in some areas surpass, US capabilities. China, North Korea, and Iran do not have treaties similar to the New START program betwixt the US and Russia, and they continue to develop their nuclear stockpiles. To counter adversaries and become an increasingly credible threat in the future, the US must evolve beyond the stagnant Cold War triad. Deterrence strategies and strategic force standards in today's contemporary, fluid environment demand humility in prediction, flexibility in application, and preparation for deterrence failure or irrelevance.<sup>30</sup> The future must include a flexible force capable of responding to enemy threats. The key to flexibility and a retaliatory strike is an adequate kill chain, capable of defending and then defeating enemy systems. To do this, the kill chain must first be examined and then exploited to provide resilience to current US forces.

Part of deterring an enemy requires the complication of the enemy's ability to strike targets. Targeting has often been referred to as the Find-Fix-Track-Target-Engage-Assess (F2T2EA), or "kill chain," and has been used for specifically engaging Time Sensitive Targets (TST). A visual depiction of the kill chain is seen in Figure. The military kill chain can be complicated by challenging an adversary's ability to find, fix and track targets. Improving deterrence capabilities can be achieved through increasing the complexity of targets. Agility and flexibility provide a means to complicate the process.<sup>31</sup>



**Figure. Depiction of the kill chain, which flows as follows: Find, Fix, Track, Target, Engage, and Assess. The figure ends with an arrow bringing the entire process back to the beginning after completion**

Source: Author

The current deterrence model provides a mostly non-agile force. Each leg of the triad's locations has been broadcast to comply with existing treaties. Thus, the enemy knows and can mark and destroy these locations as their positions have not changed over time and the targetable asset pool has become smaller. The US' current posture and directive have led to a Counter-Target approach to deterrence which, in theory, causes the enemy to target US military installations in-lieu of the general populace. This approach increases the enemy's need to increase their nuclear weapons arsenal sufficiently to enable a crippling first strike to prevent any retaliatory US strikes. However, this posture sets the stage for a weapons race that can lead to another costly and unsustainable Cold War environment.

The requirement for deterrence is to dissuade an enemy from striking the US. Unfortunately, after the fall of the USSR, the US began a drawdown and consolidation of nuclear forces. This resulted in the US' current static kill chain being based on Cold War era architecture, an aging force structure tailored to then state of the art 1980s technology; all the while its enemies have and continue to study them. Thus, US deterrence force requirements should never be considered accomplished, as they are subject to a constantly changing threat environment.<sup>32</sup> To achieve credible future deterrence, the US must adopt a flexible force capable of delaying and denying the Find, Fix and Track phases of the enemy's military kill chain.

### **Developing a Lethal, Agile, and Resilient Force**

The 2018 National Defense Strategy called to "Develop a lethal, agile, and resilient force posture and employment." Coupling the concept with the call to "modernize the nuclear triad," a need for an agile nuclear force becomes clear.<sup>33</sup> This force must be resilient and adaptable, and to achieve this resiliency, assets must no longer be static but be able to adapt to the shifting battlespace. Posturing is a key element to nuclear deterrence and forces must be able to posture over large geographical areas. With only two legs (Air and Sea) of the US Nuclear Triad currently able to posture over large areas, more needs to be done to increase the resiliency of US forces.

Each leg of the triad can increase its survivability by capitalizing on modern capabilities. ICBMs can become more agile through road and rail mobility technology development. Bombers can exponentially complicate the enemies' targeting solutions through increased basing options. Submarine forces gain advantage with the ability to rearm and refit with autonomous systems at sea. Each of these proposals do not increase the number of weapons but instead increases the effectiveness of each leg.

## *Land*

In the past, the US employed rail garrisoned mobile launchers and further explored the potential for road-mobile launchers at the end of the Cold War, which allowed the ICBM force to increase survivability through agility. As the DoD calls for agile forces, these operational theories must be reexplored, as further research and real-world employment of rail and road mobile ICBMs would provide a springboard for agility. The mobility of such systems increases deterrence by complicating the enemy's ability to find and target US Air Force nuclear weapons.<sup>34 35</sup> In addition to a road-mobile force, the US has also explored ways to move the ICBM forces off-road and into predesignated launch regions. Mobile ICBMs provide the ability to defend against a first strike, diplomatic leverage when negotiating with China and Russia on weapon systems drawdown, and a complex targeting environment for would be adversaries. What's more, developing these or similar systems provide an increase in deterrence without increasing the nuclear stockpile.

## *Air*

For the Air leg of the Triad to become more agile, additional locations for bomber carried nuclear weapons should be explored and established, as was performed during the Air Force's Strategic Air Command's tenure, in which bombers would forward deploy to various airports to aid in diplomatic posturing.<sup>36</sup> For example, at the peak of the Cuban Missile Crisis, 183 combat-ready B-47 bombers were ordered to disperse to 30 airfields to reduce vulnerabilities from a Russian nuclear strike.<sup>37</sup> This posturing provided President Kennedy increased diplomatic leverage as Russia was now faced with dynamically changing targeting locations; as these forces were ready to take off and strike at a moment's notice, which increased their survivability. The Air Force still maintains a proof-of-concept video documenting aircraft movements during this time period when they were stationed at Memphis International Airport.<sup>38</sup>

Currently, seven US nuclear bomber squadrons are stationed in three USAF bases; with only two of these B-52 bases operationally active. This is in contrast with the total force of 742 B-52 bombers which were stationed across 21 bases during the Cold War era. Therefore, to increase deterrence, the B-52 force should be distributed into four operational bases versus the current two. There are several existing operational USAF bases that can assume this mission, such as Ellsworth, Dyes, Fairchild, Beale, Homestead, Eglin, Seymour Johnson, Grand Forks, and Shepard. By expanding the force to already established and operating USAF bases, enemy forces would need to engage twice the existing targeting locations.



Another future bomber capability option would be the development of road moveable cruise missiles and gravity weapons. Having the ability for a force to arrive at a location and upload a missile pylon would allow a B-52 or B-2 to generate from any airfield capable of hosting the aircraft. With at least 54 airfields capable of housing B-52s and B-2s, having a force exercising random airfield operations complicates the enemy's kill chain due to the unpredictability of road-mobile launcher locations at any given time. Thus, an improved agile bomber force would provide, as it has done in the past, the ability to increase its survivability and deter enemy first strikes; as by providing a large target pool, the US can counter the number of weapons an enemy would need to create a successful crippling first strike.

### *Sea*

The current US SLBM force can stay at sea for 77 days without resupply. To increase its agility and resiliency, it is imperative to be able to resupply at sea, thereby increasing US Sea posture over a longer period. Being able to resupply at sea means ballistic submarines would not have to return to a predesignated port as often. This ability provides enhanced flexibility as the enemy would have to track submarines while at sea, instead of following them to and from port. The US Navy is actively working on exactly this concept, experimenting with drones, cargo planes, and helicopters as resupply avenues.<sup>39</sup>

A unique way to resupply submarines at sea is by using Wing-in-Ground-Effect (WIG) vessels. These WIG vessels are a hybrid of a ship and an airplane which travel over water while not truly touching it. The USSR employed these vessels, dubbed Ekranoplans, during the Cold War for various roles such as anti-ship, cruise missile launch, rescue, and resupply, and Russia is planning to deploy these vessels within the decade.<sup>40</sup> The US Navy's "Strategic Studies Group XVI" in 1997 discussed using WIG craft as cargo craft capable of traversing the oceans. WIG craft can be produced and developed to travel faster than traditional maritime resupply ships, which would reduce at sea resupply times by at least 60 percent compared to traditional methods.<sup>41</sup> WIG aircraft are able to move across the ocean relatively undetected and can prevent tracking by enemy forces. Coupling this concept with a drone interface would allow for submarines to be rapidly supplied without having naval ships revealing the submarine's location. These drone WIGs could further be pre-deployed and be remotely called in by the submarine. Giving a submarine the capability to link up with a prepositioned drone allows the submarine to survive in the event of loss of communications. Creating a submarine force capable of staying at sea longer counters Russia and China's ability to Find, Fix and Track the submarine leg of the triad.

To have the nuclear triad work together to complicate the kill chain, the Air Force Global Strike Command must adopt a strategic evolution that allows for the agile movement of the legs of the US Nuclear Triad from their current locations, to provide a complex and difficult targeting problem for enemies.<sup>42</sup> The force structure should maintain centralized control while allowing communications across all mobile assets. The ability of a force to posture themselves agilely allows for commanders to bring deterrence to a new level of strategic gamesmanship.

The current ideology of mosaic warfare being explored for conventional warfare provides a framework for systems to work together to improve their capabilities; this should be developed for nuclear forces as well. The idea is best explained by the paper, *Restoring America's Military Competitiveness: Mosaic Warfare*:

“Mosaic” is a force design concept for a systems warfare strategy. The concept is designed to address the demands of the future strategic environment and the shortcomings of the current force. Mosaic warfare exploits both the ability of advanced networks to seamlessly share information across an area of operations and recent developments in processing, computing, and networking... In the mosaic concept, platforms are “decomposed” into their smallest practical functions, creating collaborative “nodes” in a networked kill web that is highly resilient and can remain operationally effective, even as an adversary attrits some of the web’s elements.<sup>43</sup>

The incorporation of mosaic warfare into the nuclear deterrence realm should be explored to cover all aspects of nuclear-capable forces; as it would provide the redundancy necessary to prevent the enemy from successfully striking a single Nuclear Communication, Command and Control (NC3) point. Without a mosaic architecture, such a strike would be capable of disrupting US nuclear response options. Each platform becomes a flexible asset which can work within the network to cue information regardless of the separation of resources. An example of assets working together would be utilizing ship-born communications to influence bombers’ flight paths, targets, or recovery to enhance asset survivability. Having survivability translates to a credible deterrence as the enemy must now consider if they can defeat the robust and flexible network of systems being posed against them.

The next generation of technological advancements goes beyond communications architecture. Leveraging advancements in current technology allows the US to provide additional deterrence without increasing the overall nuclear threshold. For example, hypersonic or above Mach 5 weapons employment is not a new concept, as both ICBMs and SLBMs provide high-speed warheads.<sup>44</sup> However, having systems capable of performing flight maneuvers at speeds above Mach 5 would be a new concept. Hypersonic weapons beyond SLBMs and ICBMs fall

into two developmental categories: Hypersonic Glide Vehicles (HGVs) and their cousin Hypersonic Cruise Missiles (HCMs). HGVs are employed by a solid rocket booster before gliding to a target, they fly at lower altitudes than both ICBMs and SLBMs and are capable of substantial maneuverability. HCMs are propelled by high-speed scram jet engines during flight and are designed to fly both faster and higher than current cruise missiles.<sup>45</sup> Both of these systems are capable of carrying a conventional or nuclear warhead as a payload. These types of weapons become crucial for deterrence operations as they “offer the potential to enhance the probability of destroying high-value, heavily defended, and time-sensitive targets, such as road-mobile missiles and surface-to-air missiles.”<sup>46</sup> These missile systems are being explored and developed by both China and Russia.

The primary reason for Russia’s hypersonic missile development rests in a nuclear surprise attack strategy, and currently the US has no defense against hypersonic missiles.<sup>47</sup> To counter these hypersonic missiles and advance US deterrence, hypersonic weapons must be developed to work alongside the current Nuclear Triad. The unique ability of hypersonic cruise missiles to be launched from sea, air, or land provides a rapid response capability without increasing the number of nuclear warheads. Technological advancements and future weapons provide a unique ability for current nuclear deterrence to evolve. These weapons provide the ability to strike targets from different platforms and provide an avenue for future weapons integration. Future deterrence will include weapons such as HGVs and HCMs, but they will not be a complete deterrence strategy. Although they seem extremely capable, these weapons alone cannot provide a completely credible deterrence for the US, just another layer of deterrence.

The deterrence of the future no longer rests in nuclear-on-nuclear warfare to dissuade nations from regional conflicts. Russia, China, and North Korea are fundamentally opposed to regional security arrangements which are underpinned by US defense commitments.<sup>48</sup> These security arrangements have kept US allies under the protection of a nuclear umbrella since the end of World War II. Since the combined forces of the US and allies can overwhelm conventional enemy forces, Russia and China have been working towards conventional-nuclear integration to counter this capability. Conventional-Nuclear Integration (CNI) refers to the seamless planning and operations of nuclear and conventional forces, in sequence and parallel, across a spectrum of conflict, up to and through a nuclear employment environment.<sup>49</sup> Former Deputy Assistant of Defense for nuclear and missile defense policy, Brad Roberts, concludes nuclear weapons will play a role in regional wars with Russia or China. Furthermore, Moscow and Beijing incorporated nuclear coercion, and conventional employment, into “theories of victory” for multiple conflict scenarios.<sup>50</sup> The development of CNI for Russia and China

signals a divergence from a US strategy of separating nuclear and conventional weapons employment. Deterring and countering CNI threats from potential adversaries requires an integrated, robust, and unique US response but not mirror-imaged capabilities.<sup>51</sup> By enacting the concepts of agility, next-generation weapons, and interoperability among forces, the US can become resilient to CNI ideology and be prepared for deterrence operations on a regional and global scale.

## Recommendations

After analysis of past, present, and developing capabilities, the concept of improving deterrence without the addition of more nuclear warheads becomes plausible. Future capabilities will defeat enemy kill chains through agility, next-generation weapons, and resilient communications through interoperability. Each leg of the triad must evolve to achieve deterrence against rapidly progressing Russia, China, North Korea, and Iran. The recommendation for agility comes from developing a mobile force capable of complicating enemy kill chain completion. ICBMs should become road or rail mobile. The current bomber force must separate from two primary B-52 bases and develop the capability to generate from random airfields across the US. The submarine force ought to develop an ability to replenish resources at sea to prevent predictable resurfacing locations. Developing strategic evolution through interoperability similar to a “Mosaic Warfare” concept provides resiliency for the communications network needed for future deterrence environments. The US should begin leveraging new weapon systems such as HGVs and HCMs to provide an ability to hold targets at risk despite great ranges and heavy defenses. These weapons are emerging as viable additions to deterrence theory but not as a complete solution, they should be developed to work alongside the current nuclear triad and amplify current system capabilities. Developing these capabilities provides the US with additional deterrence without increasing nuclear warheads, and a new agile, resilient, and flexible force. □

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