Reinforce the Gates:

Expanded Roles for U.S. Homeland Missile Defense in the 21st Century

by

Santiago Spadiliero

Introduction

On January 27, 2025, the recently inaugurated President Donald J. Trump signed an Executive Order commanding the deployment and maintenance of a next-generation missile defense shield intended to deter America's adversaries while protecting American citizens and U.S. critical infrastructure from any "foreign aerial attack."[1] This decision laid the first foundations for a radical modification of the U.S. understanding of the role and purpose of homeland missile defenses, in ways without precedent since President Ronald Reagan's Strategic Defense Initiative (SDI) announcement of March 1983. Trump's decision took more specific form when, on May 20, Secretary of Defense Pete Hegseth stated that "the Department has developed a draft architecture and implementation plan for a Golden Dome system of systems that will protect our homeland from a wide range of global missile threats."[2] After decades of reticence about developing a robust homeland ballistic missile defense architecture, the U.S. government has finally decided that a great expansion of its homeland missile defense posture is needed to deter and protect against the wide range of new threats that have emerged.

The international security environment has worsened in the last decades, and the way armies conduct warfare has also shifted: the period of Blitzkrieg and of conventional, mechanized armies seems to be slowly being replaced by long-range strikes by ballistic missiles, cruise missiles, or drones. In this enterprise, newer and more dangerous technologies are also emerging, such as hypersonic cruise missiles and glide vehicles, which may threaten America's assets below the nuclear threshold.[3] The last tit-for-tat conflict between Israel and Iran in June 2025 is a clear example of this new era of warfare, in which infantry or armored vehicles are rarely seen, but long-range drone, aerial, and missile strikes are the primary means of combat, and much thus hinges on whether (and how well) one can defend against them. For these reasons, it is important to understand how these development have affected the current development of warfare, and how the U.S. should adapt its national security and defense policy accordingly.

This article seeks to help draw out such implications. It will first analyze key aspects of the new security environment that the U.S. and its allies face. These include the growing threats from North Korea and also, now more actively, Iran, as well as the continuing threats posed by Russia and China. It will then explore two current conflicts that have refloated the debate on the methods of modern warfare and the efficacy of missile defenses. Third, it will offer some insights on what the new U.S. "Golden Dome" architecture may look like based on the capabilities and intentions of the adversaries' attacks from whom it will be designed to deter. Fourth, it will briefly examine the complex situation of the production and procurement of missile interceptors vis-à-vis the Iran strikes over Israel, which has important implications for U.S. missile defense supply chains in the emerging "Golden Dome" era. Finally, a conclusion will summarize these findings.

A New (and More Dangerous) Security Environment

In the last two decades, the international security environment has become more competitive and hostile. North Korea and Iran are developing and fielding massive missile capabilities, including long-

range missiles possibly armed with nuclear warheads – already, in North Korea's case, and perhaps before long also in Iran's – while Russia and China have long deployed a wide range of missile systems capable of coercing America below and above the nuclear threshold in their pursuit of capabilities that undermine the "extended deterrence" policy that America prolongs to its military allies and in their campaign to weaken the role of the United States in the international system. This section examines developments and changes in the missile threat environment that affect America's policy and approach to missile defense, including an emerging debate over whether the United States should consider new roles for homeland missile defenses.

North Korean and Iranian Threats

In Asia, North Korea has been a threat to its neighbors and U.S. interests since the foundation of that country in 1948. Since its failed invasion of its southern neighbor in 1950, North Korea has sought to acquire better means to combat its enemies, both to deter attack upon itself and perhaps ultimately to "decouple" the United States from its South Korean ally and hence create opportunities for the peninsular unification Pyongyang has longed for since U.S. and United Nations armies stymied its 1950 invasion. These new tools have included systems capable of fighting asymmetrical wars and, more recently, weapons of mass destruction. From short and medium-range ballistic missiles to long-range ones and a growing arsenal of nuclear weapons, North Korea uses these capabilities to hold military forces and population centers at risk to deter external threats to the regime.[4]

A great leap for the North Korean missile program came in August of 1998 when North Korea tested its first three-stage missile, the Taepodong-1. This test has an important significance to this study since it proved how unprepared the United States was to deal with such emerging threats. In 1995, a U.S. National Intelligence Estimate (NIE) had declared that

> North Korea has the most advanced ballistic missile program but is unlikely to obtain the technological capability to develop a longer-range, operational ICBM. North Korea would have to overcome significant hurdles to complete such a program, particularly given the political and economic uncertainties and technological challenges it faces. North Korea would have to develop new propulsion and improved guidance and control systems.[5]

Finally, this analysis concluded that "[n]o country, other than the major declared nuclear powers, will develop or otherwise acquire a ballistic missile in the next 15 years that could threaten the contiguous 48 states or Canada."[6]

Two years later, a congressional commission was formed to assess the ballistic missile threat to the continental United States. The commission, later known as the Rumsfeld Commission since it was chaired by former Gerald Ford Administration (and future George W. Bush Administration) Secretary of Defense Donald H. Rumsfeld, who concluded that

> … [t]he threat to the U.S. posed by these emerging capabilities (ballistic missiles) is broader, more mature and evolving more rapidly than has been reported in estimates and reports by the Intelligence Community.[7]

Notably, this report was signed and released on July 15, 1998, just a month and a half before the Taepodong-1 flight test.

In that Taepodong-1 test, North Korea flew its first multi-stage missile, reaching a third stage of flight but failing to deploy a satellite into Earth's low orbit. The test, nonetheless, provided evidence that despite official U.S. predictions to the contrary – but in many ways very much vindicating the warnings of the Rumsfeld Commission – the North Koreans in fact possessed (or would soon possess) the technological expertise to produce a missile that could reach the

continental United States with a survivable warhead, as such three-stage missiles can indeed achieve long distances, depending on their payload. The NIE embarrassingly made clear that the U.S. Intelligence Community had heavily underestimated the technological expertise of North Korea.[8] Moreover, "[t]he launch clearly changed the terms of the debate over a number of missile proliferation issues, including the long-running and contentious argument over the deployment of national missile defenses in the United States."[9] This, indeed, led to the development of the first nationwide missile defense systems in the early 2000s.

The overconfidence observed in the NIE's 1995 assessment showcased limitations in the U.S. threat assessment capabilities, also demonstrating how rapidly U.S. adversaries can develop systems capable of threatening either U.S. interests abroad or at home. The 1998 test, and the following reports on North Korea's military developments, would lead to a growing concern that perhaps U.S. nuclear weapons may not be fully reliable in deterring adversaries, especially what became known as "rogue regime" proliferators such as the Kim regime. This placed growing stress upon U.S. missile defense posture – especially vis-à-vis new "third-party" powers like North Korea – which remained sharply limited by the terms of the Anti-Ballistic Missile (ABM) Treaty agreed between the United States and the Soviet Union in 1972.

North Korean advancements in the military field did not stop there, and North Korea has conducted six nuclear explosive tests since 2006, making clear that it possessed nuclear weapons that could potentially be put atop such long-range missiles. According to a report prepared by Hans Kristensen for the Federation of American Scientists, North Korea had likely assembled around 50 nuclear warheads by 2024, but it possesses enough fissile material to produce at least 90 in total.[10] Moreover, as it has been assessed, North Korea now possesses a wide range of capabilities that can reach not only U.S. allies and partners and American bases in the region but also much of the continental U.S. and most of its most important population centers. In the last decade, North Korea has tested several ICBM-capable

missiles, including a solid-fuel system. At this point, three are considered to still be operational: the Hwasong-15, Hwasong-17, and Hwasong-18.[11] These systems have ranges of up to 15,000 or more kilometers (or about 9,300 miles). Additionally, North Korea has also revealed the construction of a "nuclear-powered strategic guided missile submarine," which could complicate U.S. anti-submarine warfare missions, especially were conflict to occur simultaneously on the Korean peninsula and over Taiwan.[12]

The strategic implications of a nuclear-armed North Korea are several. Significantly, North Korea has successfully embraced nuclear deterrence as a powerful tool, as the Kim regime has emphasized since 2003. On June 6 of that year, for instance, a North Korean foreign ministry spokesperson stated that "as far as the issue of nuclear deterrent force is concerned, the Democratic People's Republic of Korea (DPRK) has the same legal status as the United States and other states possessing nuclear deterrent forces."[13] According to Sung Chull Kim, this policy statement came at a time when the United States was deliberating a preemptive strike strategy against the regime. Deterrence, favoring Pyongyang, thus may have forced the U.S. to stand down.[14]

But such deterrence may not be entirely defensive. Under these circumstances, if North Korea felt that its nuclear force could deter U.S. counter-intervention against North Korean aggression, the Kim regime might be prompted to act more aggressively against South Korea and perhaps other U.S. allies. North Korea's nuclear program and capabilities thus raise important questions regarding how to deter the Kim regime from attacking its neighbors or even the United States itself. This has been much debated.

For instance, in 1995, Jan Lodal, then-Principal Deputy Undersecretary of Defense for Policy declared that:

> Nuclear deterrence worked throughout the Cold War, it continues to work now, it will work into the future . . . The

> exact same kinds of nuclear deterrence calculations that have always worked will continue to work.[15]

This conclusion, nonetheless, was later harshly questioned by officials from the George W. Bush administration, partly based on the possibility that regimes such as the one in North Korea may not be as "deterrable" as the Soviets were during the Cold War. Despite U.S. confidence in deterrence, the leaders of such regimes

> have nevertheless demonstrated a great variance in the priority they attach to such values (such as survival). Other values such as liberty, religious or ideological devotion, revenge, national honor, and personal glory have, on frequent occasions, been accorded higher priority by leaders than the survival of their regimes or themselves, and they have consciously, willingly risked, and sometimes sacrificed, themselves and their own countries in service of these higher values.[16]

There is thus great concern that the regular tools the U.S. uses for nuclear deterrence may not work for a "rogue state" such as North Korea, given the personal traits of its leaders.[17]

As noted earlier, moreover, acquiring better offensive capabilities could also assist Pyongyang's objective of "decoupling" South Korea from its most important ally, the United States and hence creating opportunities for North Korean aggression free of the threat of American counter-intervention. A 2024 RAND report written by Bruce W. Bennett, for example, states that

> … [t]o dominate South Korea, North Korea would need to clearly appear militarily superior to the South. To do that, North Korea needs to induce a decoupling of the South Korea–U.S. alliance, then build upon already existing perceptions in the South of North Korean military superiority when considering the North's nuclear weapons.[18]

In short, keeping the United States away from a possible Korean conflict via the use of nuclear threats could pave the way towards a North Korean annexation of the peninsula.

North Korean military developments in both fields – in its nuclear and its missile enterprises – have certainly expanded in recent years, and now the United States faces multiple DPRK systems capable of reaching the U.S. homeland as well as its allies' territories and U.S. bases there. As the United States' *2022 Missile Defense Review* stated,

> North Korea continues to improve, expand, and diversify its conventional and nuclear missile capabilities, posing an increasing risk to the U.S. homeland and U.S. forces in theater, as well as regional allies and partners.[19]

There are also growing concerns that North Korean advancements, coupled with delays in the development of the Next Generation Interceptor (NGI) for existing U.S. anti-ballistic missile systems, could create a dangerous window of vulnerability by 2030, as Pyongyang's missile and nuclear threat is expanding faster than anticipated.[20] Nonetheless, North Korea is not the only growing long-range missile threat that the United States and its allies face today.

In the Middle East, Iran has followed North Korea in the development of its own domestically produced longer-range missiles. Tehran has heavily invested in improving and enhancing its military capabilities, including its short-, medium-, and intermediate-range ballistic missiles. Moreover, Tehran has also heavily invested in drone technology, with its designs being tested and deployed extensively not only in Ukraine but also in Iran's recent conflict with Israel.

Although Iran is believed not yet to possess any nuclear warheads, its nuclear program is (or was) still alive, centered on uranium centrifuge plants dispersed across the country. These capabilities can be manufactured quickly and placed almost anywhere,[21] and allow Iran to enrich uranium by spinning uranium

hexafluoride gas at high speeds to increase the concentration of the uranium-235 isotope. These can produce both low-enriched uranium, used in nuclear reactors that provide energy, as well as high-enriched uranium, one of the two types of fissile material typically used in nuclear warheads (the other being plutonium-239).[22] These plants were a focal point of attack for Israeli and U.S. strikes during the short-lived war between these and Tehran in June of 2025, during which these strikes inflicted significant damage on Iran's nuclear program by destroying key infrastructure and human capital.[23]

Even though Iran is assessed to have halted most aspects of its nuclear weaponization program in 2003 – except, of course, for the uranium enrichment program it originally began in order to provide fissile material for nuclear weapons – the aforementioned capabilities can be rapidly used to create Iran's first nuclear weapon. According to U.S. intelligence assessments as of February and March of 2024, Iran has not yet decided to develop nuclear weapons.[24] Nonetheless, the bipartisan December 2023 Strategic Posture Commission (SPC) Report states that

> the United States must consider the possibility that Iran will become a nuclear state during the 2027-2035 timeframe. Iran is likely not currently undertaking the key nuclear weapons design and development activities that would be necessary to produce a testable nuclear device; however, the time estimated for Iran to achieve sufficient fissile material continues to shorten, as Iran is accelerating the expansion of its nuclear program.[25]

Such concerns – along with Iran's refusal to cooperate fully with International Atomic Energy Agency (IAEA) inspectors – helped lead to the preemptive strike launched by Israel against Tehran in June of this year. The operation, codenamed Rising Lion, was meant to disrupt Iran's nuclear enterprise by targeting its nuclear facilities across the country.[26] The intervention by the U.S. Air Force with huge conventionally-armed "bunker buster" munitions, days later, served to inflict further damage on Iran's capabilities. Nevertheless, the

specific extent of the resulting damage to Iran's enrichment capabilities is not publicly known, nor the location of its stockpile of enriched uranium, nor the extent (if any) of Iran's subsequent success in rebuilding and perhaps further dispersing fissile material capabilities.

In terms of missile capabilities, Iran has heavily invested in a large and modern missile arsenal, hoping to deter any attempt at intervention by the West against the theocracy. As national security analyst Anthony H. Cordesman, once noted,

> … [s]een from an Iranian perspective, Iran is responding to proven threats from its neighbors and the U.S. and its inability to properly modernize its military forces since 1980.[27]

From a broader perspective, moreover, Iran could perhaps also utilize these systems to coerce or blackmail its neighbors, including not only Israel but also Saudi Arabia. In ways loosely analogous to North Korea's arguable hopes to "decouple" South Korea from its U.S. alliance, Iran may also hope to use its missile capabilities to deter American intervention in support of those threatened by Iran's policies of regional destabilization.

These Iranian modernization efforts involve several different types of missile and other types of aerial threats. In the realm of ballistic missiles, these have replaced Iran's decrepit air force as the regime's primary means of long-range attack and have grown in both sophistication and numbers. These missiles can target U.S. forces and population centers of U.S. allies in the region, as well as parts of Southern Europe. Although the Iranian regime still lacks a reliable ICBM, its shorter-range missiles have improved their accuracy, lethality, and reliability.[28] These have been seen in action more recently in the 12-Day War against Israel in June of 2025. The following section will address these implications.

Furthermore, the partnerships that Iran has formed with North Korea and Russia could greatly advance Iran's long-range missile capabilities, giving it the ability to hold American cities at risk.[29] In this field, Iran is already building its own space program and is seeking to develop solid-propellant rockets similar to North Korea's. Reports have indicated, for instance, that solid-propellant systems "have greater military utility and likely are being used to develop an alternative ICBM pathway by the Iranian security establishment."[30] The Strategic Posture Commission report, in fact, notes that Iran "could field advanced longer-range missile systems in the 2027-2035 timeframe."[31]

In early December of 2024, Iran conducted its latest space launch by launching a Simorgh rocket with the heaviest payload in its history: about 300 kilograms. Allegedly, that rocket also carried an orbital propulsion system, as well as two research systems and the Fakhr-1 military satellite, to a 400-kilometer (250-mile) orbit above the Earth.[32] Such payload capacity clearly suggests ICBM-class capabilities. Iran's recent regional setbacks at Israeli and U.S. hands and the collapse of its ally in Syria may prompt it to deepen its investments in its nuclear program, while the future development of its long-range weapons might soon pose a grave security risk to the U.S. homeland.

Russian and Chinese Strategies

In Europe, Russia continues to field new tactical and strategic weapons, while also relying heavily on aggressive nuclear rhetoric in support of its imperialistic foreign policy and war of territorial aggression against Ukraine, violating its neighbors' sovereignty and every arms control agreement it has ratified.[33] The Kremlin's objective, according to the Strategic Posture Commission, is to establish a sphere of influence over the post-Soviet space that would provide it with a perceived defense against the West's attempts to undermine Russia's sovereignty. In connection with its war in Ukraine, Russia has relied on the threat of using tactical nuclear weapons to deter NATO counter-intervention in support of Moscow's Ukrainian victims.

Russia, in fact, has made clear since at least the early 2000s that it "reserves the right to use nuclear weapons to respond to large-scale aggression utilizing conventional weapons in situations critical to the national security of the Russian Federation."[34] According to security analysts such as Robert Joseph and Peppino DeBiaso, Russia envisions the prospective escalation to nuclear strikes deter or to force Washington to halt involvement in an ongoing conflict with Russia.[35] Use of a nuclear escalatory strategy directly against Ukraine could also perhaps force the Kyiv government to capitulate.[36]

Manipulating the risk of nuclear escalation has thus been a key part of Russia's regional strategy for years. In 2015, for instance, Ilya Kramnik, a military correspondent for the state-controlled Russian news agency *RIA Novosti*, wrote that the 2010 revision of Russia's military doctrine had "further lowered" the threshold for combat use of nuclear weapons.[37] In September of 2024, Russian President Vladimir Putin announced:

> It is proposed that aggression against Russia by any non-nuclear state, but with the participation or support of a nuclear state, be considered as their joint attack on the Russian Federation …. The conditions for Russia's transition to the use of nuclear weapons are also clearly fixed.[38]

In a context in which Russia has declared portions of its neighbors' territory to be parts of "Russia" – as is the case with Ukraine – the implications of such threats are obvious: the Kremlin's nuclear weapons policy is devoted not merely to defense but also to creating *offensive* opportunities for regional aggression by deterring involvement by those who would support Moscow's victims.[39]

Moreover, such a strategy of nuclear coercion could perhaps also be used against the American homeland to achieve further strategic goals. An unprotected U.S. homeland, for example, could be threatened with a limited conventional or small-yield nuclear strike by Russia's newer weapons to force the U.S. to refrain from assisting

Europe in the event of Russian aggression. This would be quite consistent with Russia's now well-established military doctrine of "strategic operations to destroy critical infrastructure targets" (SODCIT), and in light of improving Russian conventional and nuclear strike capabilities represents a significant new threat to the U.S. homeland.[40]

In terms of Russia's newer weapons, the Kremlin has heavily invested in a new generation of sea and air-launched cruise missiles, among other types of aerial weapons. These weapons, called "Super Weapons" by President Putin,[41] can travel at hypersonic speeds and include the *Kinzhal* and the *Tsirkon*, which (in conventionally-armed forms) have both been used in the war against Ukraine. These systems have had mixed results against Kyiv. (In May of 2023, for instance, seven Kinzhal missiles were reported to have been shot down by U.S.-provided Patriot systems.[42]) Nevertheless, they demonstrate the growing breadth and sophistication of Russia's strike arsenal.

Furthermore, Russia still possesses the largest and most diverse nuclear stockpile in existence today,[43] which Putin continues to modernize and expand.[44] The Kremlin is also seeking to expand its fleet of non-strategic nuclear systems, including the aforementioned hypersonic systems. In sum, Russia's nuclear doctrine views its nuclear capabilities as necessary to maintain deterrence, enable coercion, and achieve its goals in a potential conflict against NATO, and the Kremlin's doctrine emphasizes leveraging nuclear threats in support of a range of objectives. This threat can imply the possible use of tactical nukes in the Ukrainian theater, which raises new questions on whether deterrence by punishment is enough to deter Russia's actions in Ukraine and Europe as a whole.

Russia's actions and attitudes towards its neighbors and the U.S. should raise the alarm level and reinforce the possibility that deterring Moscow is now more complex than it used to be. An attack composed of long-range strikes, possibly nuclear-armed, could be difficult not only to prevent but also to deter, particularly because the United States lacks comparable nuclear capabilities. In other words, the war

dynamic vis-à-vis Russia has changed, and therefore, the deterrence requirements have also shifted – and the need to *defend* against missile attack has grown.

Nonetheless, Putin is not the only growing challenge the United States faces. In Asia, China has rapidly become a hegemon in the region with not only a growing economy and a powerful position astride global supply chains, but also considerable geopolitical ambitions. Both the SPC Report and the U.S. Department of Defense's Report on the Military and Security Developments Involving the PRC (MSDPRC) emphasize this ambition in their first lines: "[t]he Chinese Communist Party (CCP) seeks to make China the world's preeminent power by 2049, the 100th anniversary of the PRC,"[45] and "[t]he PRC's national strategy is to achieve 'the great rejuvenation of the Chinese nation' by 2049."[46] In other words, Beijing's leaders seek to " zero-sum positional advantage: to 'restore' – for that is how Chinese nationalists see it – China's relative position vis-à-vis all others at the top of the global status hierarchy."[47] For Chinese strategists, therefore, United States power and military alliances are necessarily obstacles to be broken and overcome.

China's regional ambitions are of particular concern, and are at present mostly focused on two sectors. One is Beijing's claims in the South China Sea, most of which it claims as its own and where it has occupied and built on several islands and archipelagos claimed by other countries in that area – among them the Spratly Islands, which are claimed not only by China but also by Taiwan, Vietnam, the Philippines, and Malaysia.

Additionally, China has long had the desire to capture and "reunify" with Taiwan. Since taking control of the country in 1949 and the retreat from the Kuomintang government to the island, the CCP has claimed Taiwan as its own, prompting several crises through the decades.[48] According to the MSDPRC report, China's military, the People's Liberation Army (PLA), has established the objective of modernizing its conventional forces by 2027 to accelerate the integrated development of mechanization, informatization, and

"intelligentization" of those forces. Doing this will give its military the capacity to be a more credible tool for the CCP's ambitions in Taiwan, enabling it to take that democratically-ruled island by force if necessary.[49]

China's military strategy has evolved and become increasingly more advanced and capable. Its most recent evolution comes in the shape of what it calls "intelligentized warfare." First mentioned in 2019, this concept focuses on

> integrated warfare waged in land, sea, air, space, electromagnetic, cyber, and cognitive arenas using intelligent weaponry and equipment and their associated operation methods, underpinned by the IoT (Internet of Things) information system.[50]

This could include the expanded use of Artificial Intelligence (AI) and other advanced technologies at every level of warfare, including missile targeting and maneuverability. In short, "[m]ulti-domain precision warfare aims to integrate AI and big data analysis with precision strikes to identify and target enemy weaknesses." China is also "exploring how to use AI for missile guidance and target detection and identification, as well as for electronic warfare and decision making."[51] The evolution of Chinese military thinking has been quick and in-depth and has now become a focus of major concern for U.S. national security experts.

Alongside these concerns, China's nuclear arsenal has also evolved and expanded, increasing the stress on the U.S. nuclear deterrent. According to the SPC,

> current estimates are that the PRC's operational nuclear warhead stockpile surpassed 400 warheads in 2021 and that the PLA will field over 700 nuclear warheads by 2027, over 1,000 warheads by 2030, and, if it continues its current pace, at least 1,500 deployed warheads by 2035.[52]

Moreover, the PLA's Rocket Force (PLARF) continues to deploy new and more sophisticated missiles capable of not only reaching the continental United States but also playing anti-access/area denial (A2/AD) roles within the second island chain in hopes of precluding U.S. Navy and other allied operations in that area.

On top of this, China might also be seeking to achieve the capability to directly strike the U.S. homeland with non-nuclear strategic warheads. In 2021, it was reported that China had tested a missile with the capability of deploying a Fractional Orbital Bombardment System (FOBS) warhead capable of flying through a low orbit of the planet before de-orbiting onto its target.[53] This test apparently caught the U.S. intelligence and national security communities by surprise, showing once more that America's adversaries have not stopped developing and testing new systems, and that Washington cannot always see them coming. This FOBS system provides its possessor with the capability of striking a target from any direction, rendering most radar and missile defense systems useless because they tend to focus upon defending upon attacks along a particular threat axis.[54] The U.S. Department of Defense also reports that China has begun development of a conventionally-armed ICBM,[55] which could also facilitate Russian-style nuclear coercion.

China's ongoing technological progress in nuclear and conventional arms raises the possibility that one day it might reach nuclear parity (or worse) vis-à-vis the United States. Since the testing of its first nuclear weapon in 1964, Beijing has continuously declared a "no-first-use" (NFU) nuclear policy, stating that it will not be the first party to use of nuclear weapons in case of conflict unless attacked via the same means first.[56] Still, China's nuclear modernization and expansion have further fueled longstanding questions about the actual existence and credibility of this NFU policy.[57]

As I have written elsewhere,

> China's approach to achieving its strategic goals in the region may transition toward the inclusion of nuclear

> weapons into its framework of political threats, intimidation, and even the use of force to achieve its international goals.[58]

This could mean that China's growing nuclear arsenal will prompt and permit the Politburo to modify its current nuclear policy, heading towards an approach more like those of other nuclear powers, and holding out the possibility of a first strike or policies of nuclear coercion. This could lead to Beijing issuing nuclear threats against its foes to pursue its short and long-term goals.[59] China's neighbors might be the first victims, but Beijing could perhaps use the same type of threats against the U.S. homeland: coercive threats to convince Washington to avoid intervention against Chinese aggression in Asia, for instance.

In fact, China has already provided some evidence of this course of action. Recent Chinese military writings already discuss the utility of a "controlled use" of small-yield nuclear weapons for the purposes of "warning and deterrence."[60] Even as early as 2004, moreover, a People's Liberation Army publication indicating that China's NFU policy may be far less absolute than officials in Beijing would have one believe, suggesting multiple *conventional* military scenarios (*i.e.*, ones *not* involving China being attacked by nuclear weapons) in which "lowering the nuclear threshold" might be appropriate.[61]

Since Taiwan is the oldest and most important regional territorial objective for the People's Liberation Army, it would not be surprising to see Beijing employ such nuclear coercion in the case of an amphibious invasion of the island. The use or threatened use of nuclear weapons could be directed not only against the Taiwanese island *per se* but against any American fleet coming to its aid as well. Chinese efforts to deter American intervention in such a conflict would thus

> … [i]nvolve … convincing Washington that the conflict might escalate to levels of violence that exceed the importance of the U.S. stake in Taiwan, therefore deterring

> Washington from intervening in the first place. And it requires intra-war deterrence of U.S. nuclear escalation to defeat the invasion.[62]

These dynamics have clear implications for American homeland missile defense, for Beijing's nuclear strategy might not be limited only to targeting the American forces deployed overseas with its nuclear element. China's rocket forces could also target the American homeland with its broad range of hypersonic, and small-yield nuclear capabilities, or with a new conventionally-armed ICBM. The SPC report has already noted, for instance, that

> unlike previous conflicts in the 20th century, a future potential conflict with China or Russia would likely involve new kinetic and non-kinetic attacks on the U.S. homeland and assets in space and cyber domains – further underscoring the importance of deterring and defeating such attacks.[63]

This possibility has concerned U.S. planners for years. In 1996, for example, an Assistant Secretary of Defense quoted a Chinese military officer as asserting that China could act against Taiwan without fear of intervention, since the United States might not dare to defend it if credibly forced to choose between defending Taipei and preserving America's own cities.[64] If China considered the stakes to be high enough, this possibility could become real, and the United States currently has no capability to stop such a strike.

The threat posed by Beijing continues to grow. China already possesses the world's largest arsenal of ballistic, cruise, and hypersonic missiles of various ranges.[65] Some of these systems can be armed with either conventional or nuclear warheads, complicating the decision-making for those commanders on the field lacking clear information on what they are facing. This problem, known as "entanglement," complicates how U.S. forces in theater would react against an attack by such missiles, and which systems the U.S. should target in case of conflict.

The risks and complications associated with such dual-use capabilities were deliberately created by China years ago, when it was felt that that U.S. conventional superiority could still overwhelm China's forces, and that such "entanglement" might help make U.S. forces more cautious about targeting seemingly conventional Chinese assets. As noted by Jacob Stokes, a researcher at the Indo-Pacific Security Program at the Center for a New American Security, it is also possible that China worried that U.S. conventional missiles "might be powerful enough to destroy a large portion of Beijing's previously bare-bones nuclear arsenal, leaving U.S. missile defenses to intercept the remainder and thereby prevent China from retaliating."[66]

Yet China has continued to acquire dual-capable systems, even as its relative power has grown, and such a broad suite of both conventional and nuclear delivery options may soon give China opportunities for more offensively-focused coercive opportunities. Without improved American defenses, the nature, number, and sophistication of China's growing missile arsenal will undoubtedly not only compromise U.S. operations in the Indo-Pacific region overall but also complicate any U.S. decision to intervene against China on behalf of allies and partners in the region, like Taiwan.

All in all, America's adversaries are not only becoming increasingly willing to assert themselves against U.S. interests and present growing threats to the American homeland, but they are also expanding the means at their disposal to undermine those interests. In addition to the threats posed by even more novel emerging technologies such as AI and cyber weapons, which will not be discussed here but that it is nonetheless important to mention, America's foes are heavily investing in their air and long-range capabilities to undermine U.S. conventional superiority – and increase their coercive leverage – at several different levels of conflict.

Two Case Studies: Ukraine & Israel

Analysis of the effectiveness of missile defenses in the Ukrainian-Russian war requires exploring two main axes: the adversaries' reliance on long-range weapons, and the effectiveness of missile defenses in this conflict. In Ukraine, Russia has heavily used some of its old stockpile of missiles and other long-range weapons while also innovating by using some of its new "super weapons." Moreover, Moscow has also sought to replenish and diversify its offensive arsenal by acquiring Iranian-made armed drones, which have seen wide use throughout the war and have caused a certain level of destruction.

Russia's reliance on missiles was first observed during the first year of the conflict. Ian Williams, Deputy Director of the Missile Defense Project at CSIS, has noted that

> … [s]ince February 2022, Russia has fired thousands of missiles and loitering munitions at Ukraine's cities, infrastructure, and military forces. These attacks have killed and maimed thousands of Ukrainian civilians and military personnel and have heavily damaged Ukraine's infrastructure and economy …. Long-range missile strikes against Ukrainian cities and infrastructure have been a prominent and persistent aspect of the Kremlin's war against Ukraine.[67]

Nevertheless, these systems have not always proven as successful as the Kremlin wished. Williams, for instance, has also observed that "Russia has struggled to use this advantage to produce the kind of decisive strategic effects that Moscow likely expected to deliver a quick Ukrainian capitulation."[68] Moreover, according to analyst William Alberque "Russia's use of missiles in its war on Ukraine has been less effective and decisive in helping achieve its war aims than leaders in Moscow likely expected. "[69] This may be in part thanks to the use of advanced missile defense systems by the Ukrainian forces.

Russia's goals in the use of its missiles seem to have shifted throughout the war, from targeting military bases and achieving other similar objectives to targeting civilian populations and transportation networks. These shifts did not represent pre-planned moves, but rather "*ad hoc* adaptations driven by Russia's frustration over its broader war effort, its struggle to target mobile Ukrainian military assets, and the irregular availability of cruise missiles and other stand-off weapons."[70] Furthermore, Russian missiles have not only supported the operational goals of Moscow's military campaign but have also been used to shape public opinion and act as psychological warfare instruments to subdue Ukrainian leaders.[71]

In terms of numbers, from September 28, 2022, to September 1, 2024, Russia launched a total of 11,466 missiles. On average, 23.2 missiles were launched daily, with the median being recorded at 17 missiles.[72] These numbers illustrate the huge reliance that Russians have put on their missile capabilities. For comparison purposes, during the Iraq-Iran War of 1982-1988, Iraq fired 516 Scud B missiles, while Iran fired 117.[73] Years later, during the First Gulf War, Iraq fired 93 Al-Hussein and Al-Hijarah missiles, while 23 were fired during the Second Gulf War. In 2006, the terrorist organization Hezbollah fired 4,000 short-range rockets at Israel. Finally, and more importantly, the Soviet Union launched between 1,700 and 2,000 Scud missiles against Afghan guerrillas between 1988 and 1991 during their invasion of the country.[74] These numbers provide some insight into the vast size of Moscow's missile effort against Ukrainian targets today and the centrality of such missiles in the Kremlin's approach to war and coercion.

Such high fire volume has naturally raised questions about whether or when Russia would run out of missiles and other such weapon systems.[75] One analysis in the spring of 2023, for instance, suggested that Russia would not run out of missiles, but that export controls and sanctions can limit the quantity and quality of these weapons. More importantly, it analyzed the Russian attempt to destroy one of Ukraine's most expensive weapon systems: the U.S.-made, Germany-provided Patriot battery defending the Ukrainian

capital city. To achieve the destruction of this system, Moscow used some of its best weapons in the attack, including 34 *Iskander* ballistic missiles and *Kinzhal* hypersonic missiles.

According to reports, however, the Patriot battery, alongside other systems, was able to intercept all 34 missiles.[76] On November 13, 2024, Russia attacked Ukraine's capital city once more with a barrage of missiles and other aerial weapons. Kyiv's missile defenses were able to intercept two cruise missiles, two ballistic missiles, and 37 drones.[77] Moscow's barrage of missiles does not seem to have been able to undermine Ukraine's will to fight, however, either at the tactical or strategic levels. Nonetheless, Russia has not been dissuaded and continues to strike Ukraine with these weapons; large attacks on Ukrainian civilian infrastructure have become routine.

As these accounts illustrate, missile defenses have been a critical factor in the Ukrainian war effort. As mentioned previously, the 34 Iskander and Kinzhal missiles intercepted by the Patriot battery and other systems serve as an example of the effectiveness of these systems being used by the Ukrainian army. (Similar reports were filed and verified by American officials on *Kinzhal* missiles being intercepted by the Patriot battery deployed in Kyiv.[78]) "Overall," it has been observed, "the performance of Ukraine's air defenses has steadily improved since the start of the war, particularly against Russian cruise missiles."[79] Ukraine's air force has also reported that during the 2022-2023 Winter campaign against Ukraine's electrical grid, Russia lost around 70-80 percent of the missiles it launched against Ukraine.

Moreover, in May of 2023, Ukraine also reported intercepting 90 percent of launched Russian missiles:

> Ukraine has reported downing nearly 80 percent of air and ground-launched ballistic missile attacks nationwide and 100 percent of ballistic missiles attacking areas where ballistic missile defenses (Patriot) are present. Ukraine only has two Patriot batteries.[80]

In this regard, Ukraine's President Zelenskyy recently stated that "[a]ir defense is the answer. We need at least seven additional Patriot systems to cover the major settlements soon."[81] Finally, data compiled by Petro Ivaniuk reveals that the daily intercept rate averaged 83.5 percent, with the median intercept rate reaching 88.5 percent:

> This high level of intercept efficiency suggests the deployment of advanced missile defense technologies capable of neutralizing a substantial portion of incoming threats on most days.[82]

The Ukrainian case, then, has demonstrated the effectiveness of deploying missile defenses in the homeland to protect against strikes undertaken either for military or for coercive political advantage.

This assessment is critical in understanding how contemporary warfare has evolved. As Shawn Rostker, an analyst at the Center for Arms Control and Non-Proliferation, has stated,

> … [i]n the limited context of the Ukraine war, missile defense can be said to be a useful tool. In a possible future conflict, U.S. forces should expect to be targeted in much the same way as Ukraine, and the lessons learned from its defense should prove valuable.[83]

Russia's reliance on missiles to achieve a quick victory over its enemy – and the difficulties the Kremlin has been facing in the face of Ukrainian missile defenses – should serve as an important example as we consider the applicability of missile defenses to defend not only American bases overseas but also the homeland itself. Aerial threats, mainly composed of missiles and drones, are now the weapons of choice by American adversaries in Europe and in the Middle East, but there remains a real possibility of defending against them.

In the Middle East, another recent conflict has sparked further interest in missile defenses and their effects on deterrence and their role in foiling adversarial strategy. Since the surprise attack carried

out by Hamas terrorist forces on Israeli civilians on October 7, 2023, Israel has responded with ground and aerial attacks against Iran and its affiliated terrorist organizations. At the same time, Iran has counter-attacked with rocket, drone, and missile strikes on Israel, most of them intercepted by Israel's Iron Dome, Arrow, and David's Sling systems (with some help from forward-deployed U.S. missile defense capabilities). Such defensive systems have thus been vital in protecting and securing the Israeli homeland from attacks in almost all directions.

Specifically, Tehran has responded twice to Israel's operations, including in a 12-day-long missile exchange between both countries, and it did so by launching missile and drone strikes in numbers that Israel had not faced before. Indeed, the level of sophistication in these quite long-ranged attacks was far higher than the strikes Israel has faced from Hamas and Hezbollah, terrorist organizations that possessed only rudimentary and antique rocket systems, such as the old Soviet-era Katyusha used, for instance, during the Battle of Berlin in 1945.[84] (These terrorists also possessed smaller numbers of short-range ballistic missiles, such as the Iranian-made Fateh-110, and some drones.[85]) In defense of its homeland since October 7, 2023, Israeli missile defenses have been extremely successful at intercepting Hamas and Hezbollah's rockets, with a success rate reported at 86 percent.[86]

In the case of Iran's strikes against Israel, Tehran launched its first direct strikes against Tel Aviv and other targets in April of 2024, while the second was carried out in October of the same year, using a mix of drones, cruise missiles, and ballistic missiles in the first attack, and faster and more reliable ballistic missiles on the second strike.[87] These attacks tested Israel's and its partners' defensive systems and mechanisms, with some attacker successes reported.

The Iranian attack in April was performed by a salvo of 120 ballistic missiles, around 230 cruise missiles, and about 300 drones.[88] These strikes faced a strong defense led by the Israeli defense systems, which included Iron Dome and David's Sling interceptors for short-range attacks from Iran's proxies, and Arrow 2 and 3 interceptors for

Iran's ballistic and cruise missiles. Moreover, a coalition of countries led by the U.S. also participated in the defense by intercepting most of the drones in the air while also assisting with the interception of several ballistic missiles with SM-3s interceptors launched from American vessels in the Mediterranean Sea.[89] This combined effort, Shaan Shaikh, an analyst at the CSIS *Missile Defense Project*, wrote,

> represents an outstanding success story for air and missile defense. Despite the over 300 ballistic missiles, drones, and cruise missiles launched, there appears to have been minimal damage to Israeli infrastructure and military assets, and the attack resulted in only one Israeli casualty.[90]

The combined allied effort also consisted of interceptors and aircraft from the United Kingdom, France, and Jordan, and the coordination took place at the Al Udeid Air Base in Qatar.[91]

The SM-3 missiles launched from the USS *Arleigh Burke* (DDG-51) and USS *Carney* (DDG-64) destroyers – which successfully intercepted at least six of the Iranian missiles – are particularly notable from the perspective of U.S. homeland defenses, for that operation was the baptism of fire for this system capable of exo-atmospheric interceptions.[92] The SM-3 system is a key component of the current U.S. missile defense architecture, and its now-proven combat efficiency can encourage its integration into a new homeland missile defense posture.

The second attack from Iran against Israel was carried out on October 1st, 2024, by approximately 200 Iranian ballistic missiles. This attack was larger in its scope than the previous attack in April, as the number of ballistic missiles used almost doubled. As in the previous attack, U.S. ships in the Mediterranean Sea provided missile defense support to the Israeli defensive architecture. The attack caused minimal damage on the ground, and "Israel was able to defend itself against the Iranian attack successfully."[93] This attack also provided valuable information to U.S. and Israeli analysts on the benefits of

deployment of an integrated air and missile defense architecture against adversaries that heavily rely on missile strikes for coercion.

In an interview with Tom Karako, Director of the *Missile Defense Project* at the Center for Strategic and International Studies, Moshe Patel, Director of Israel's Missile Defense Organization, stated that

> … [o]n the first day (since the beginning of the Israel-Hamas war), David's Sling and Iron Dome were the main systems that have been working and the first time with so extensive capability and operational successes. The next important date was October 31st, where (*sic*) for the first time ever, the Arrow 2 weapon system intercepted a ballistic missile that came from Iran operationally. … The next important date is November 9th, which was the first Arrow 3 operational interception of a Houthi missile again. It was the first outer space, exo-atmospheric kind of operational interception of a ballistic missile."[94]

Evidence from the Israel case demonstrated how a properly integrated and fielded missile defense architecture can be operationally successful against multiple missile threats. Tehran's attack also demonstrated a complex relationship between Israel and other regional states, since some additional nations also participated in the interception of several of the threats launched by Iran.

Finally, in June of 2025, a preventative attack by Israel against Iran's nuclear program unleashed a new series of missile strikes between these two nations. This short-lived conflict saw the deaths of many Iranian nuclear scientist and the damage of most of Iran's nuclear infrastructure.[95] In the 12 days the battle lasted, between 530 to 550 ballistic missiles were launched from Iran against Israel, of which at least 31 landed near military targets or populated areas, and a few dozen more reportedly blasting unpopulated areas.[96]

This final phase (so far) of the Israeli-Iranian conflict seems still to have been a success for Israel. The Israeli government, for instance,

reported that its missile defense systems had an overall success rate of near 86 percent against Iranian ballistic missiles during the recent conflict. The same report also included that these systems prevented more than $15 billion in potential property damage and saved countless lives.[97]

But this last attack may offer additional lessons. According to some U.S. officials, the rate of failed missile launches by Iran saw a decline compared to the two previous attacks from 2024, showing that Tehran has learned from the flaws in those earlier attacks, and that its capabilities are improving.[98] It is also worth noting that according to a report by CNN, the United States used roughly a quarter of its entire arsenal of high-end missile interceptors during the 12-day-long engagement between Tel Aviv and Tehran, showing important limitations regarding the supply chain of these items vis-à-vis the demand generated by America's adversaries.[99]

The U.S. Missile Defense Posture

The U.S. missile defense posture has been a constant in every U.S. presidential administration since President George W. Bush withdrew from the ABM treaty in 2002 and created the foundations for today's posture. During his administration, he announced the creation of a "New Triad": the U.S. nuclear deterrent would be accompanied by a strong industrial infrastructure responsive to evolving threats and by the addition of a new fundamental component of active and passive defenses, including missile defenses.[100] The controversial decision represented a U.S. response to North Korea's rapid advancements in its long-range missile and nuclear programs, and the threat they presented to the U.S. homeland, which suggested that missile defenses would become a vital component of the U.S. national security strategy for as long as North Korea remained a threat.

Today, the U.S. missile defense posture consists only of the Ground-based Mid-course Defense (GMD) system, with its 44 Ground-based Interceptors (GBIs) deployed in Fort Greely, Alaska, and Vandenberg Space Force Base in California. First deployed in

2004, it was designed to defend the U.S. homeland against long-range ballistic missile threats from countries such as North Korea and Iran, and its geographic architecture is built around the DPRK threat.[101]

This system works as follows: To intercept a missile from either of these nations, the GMD system should first detect the missile launch and feed the data (*e.g.*, geographic location, altitude, and trajectory) into the GMD fire control system, which controls how many GBIs are to be launched. These interceptors have three stages, are solid-fueled, and fly into the path of the incoming missile before releasing an Exo-atmospheric Kill Vehicle (EKV), which uses onboard sensors to track and physically collide with the warhead.[102] A future system, the Next Generation Interceptor, is expected to replace the aging GBIs from the GMD system and might include multiple kill vehicles per interceptor. This would potentially enable one interceptor to defend against a greater volume of increasingly complex adversary missile threats.[103]

Still, the scope and scale of these deployments made clear the focus was only on "limited" ICBM attacks to address the "new rogue state threats."[104] This system, then, was never intended to counter the Russian or Chinese nuclear deterrent, though it was meant to continue evolving at the same pace as rogue threats. The Obama Administration accepted this logic and reaffirmed a commitment to the GMD system within the overall U.S. national security apparatus. It continued to emphasize rogue states and their small or rudimentary offensive capabilities, rather than threats from major powers. Moreover, the focus remained exclusively on ballistic missile threats, as these were the dominant threats at the time. Finally, the Obama Administration also highlighted the importance of strategic stability in the missile defense context, meaning this as a message to Russia and China on the limited purpose and role of the GMD system – and hence that U.S. defenses were *not* intended to defend against Russian or Chinese attacks. Before leaving office, however, the Obama administration decided to increase the number of GBIs deployed to the current 44, while redesigning the GBI's kill vehicle in order to stay ahead of the growing threat presented by North Korea's most advanced ICBM at the time, the Hwasong-13.[105]

The First Trump Administration decided to take a step further, however, and ordered the future modernization of the GBI to be replaced with a Next Generation Interceptor (NGI). The 2019 Missile Defense Review (MDR) from that administration, moreover, pointed to a broader shift taking place in the threat environment, concluding that not only were nations continuing to improve and expand their ballistic missile capabilities, but that they were also adding "new and unprecedented types of missiles" to their arsenals.[106] The vision of the role of this system vis-à-vis Russia and China remained the same: that is, the U.S. would continue to "rel[y] on nuclear deterrence to address the large and more sophisticated Russian and Chinese intercontinental ballistic missile capabilities."[107]

The Biden administration's MDR presented more continuity than change, articulating an approach whereby active defenses became part of a comprehensive "missile defeat" approach, which complemented the credible threat of direct cost imposition through nuclear and non-nuclear means.[108] This strategy

> encompasse[d] the range of activities to counter the development, acquisition, proliferation, potential and actual use of adversary offensive missiles of all types, and to limit damage from such use.[109]

The Biden Administration, furthermore, recognized the importance of the continued modernization of the GMD architecture by, for instance, requesting $1.7 billion for Fiscal Year (FY)-25 toward the planned fielding of the 2020 NGIs, expected to be fielded starting in 2028. Still, this effort did not translate into real modernization or enhancement of the GMD system, and as several national security experts have noted, the system might not be able to cope with North Korea's advancements in the short term.[110]

Problems in the U.S. Missile Defense Posture

Two distinct sets of issues seem likely to affect the efficacy of the GMD system. First, as a result of problems of scale, it might not be able to cope with the evolving threats posed by North Korea and Iran. Secondly, the longstanding policy of not seeking to defend against *Russian or Chinese* missiles could jeopardize U.S. national security interests by leaving the United States helpless in the face of low-level nuclear coercion by those powers. This section will address both of these issues, arguing that the current GMD system is inadequate to defend the nation even against a North Korean strike and that, furthermore, it is also inadequate to protect against Iranian, Russian, or Chinese coercive strikes.

One of the most commonly repeated phrases in U.S. missile defense reviews and other related documents has been the mantra of "staying ahead of the threat," used in reference to keeping the GMD system up to date to face the evolving threats of North Korea and others. Actual responsiveness to these threats, however, has not happened. Several experts have noted, for example, that every administration has so far failed to implement the "spiral development" approach that would be needed to cope with the expanding threat by incorporating new technologies on a systematic and continual basis.[111]

Since the Obama Administration, the GBIs have been subject to Service Life Extension Programs (SLEPs) that have prolonged the life expectancy of the systems but have not improved their vital components or operational capabilities. Consequently, the system designed in the early 2000s to protect against America against then-current threats might not be able to do so successfully against today's. General Gregory M. Guillot, Commander of the U.S. Northern Command (USNORTHCOM), stated in a February 13, 2025, congressional hearing that

> … [r]egime rhetoric surrounding the new ICBM suggests Kim [Jong-Un] is eager to transition his strategic weapons

> program from research and development to serial production and fielding, a process that could rapidly expand North Korea's inventory and narrow my confidence in USNORTHCOM's existing ballistic missile defense capacity in the coming years.[112]

Extending the life expectancy of this system is vital, then, but without enhancing some of its core components, such as propulsion systems or targeting software – and without expanding the *number* of targets it can intercept – it is less and less likely that the GMD system will be able to protect America even against North Korean threats, let alone those from other countries.

The current GBI fleet is supposed to be able to deal with a strike by a limited number of North Korean nuclear warheads, but it is not clear how these would be effective against Iranian missile threats. Tehran does not yet possess weapons long-ranged enough directly to threaten the United States, but such capabilities are (or soon will be) within its technical reach, and relatively nuclear weaponization has been an option for Iran for years if it resumes its long-paused (but never eradicated) nuclear weapons program. Iran's recent strategic setbacks in the Middle East – such as the damage done to Hezbollah by the Israelis and the fall of the regime of Bashar al-Assad in Syria, and the Israeli and U.S. attacks upon Iranian nuclear facilities in June 2025 – could encourage Tehran toward nuclear weaponization as a last resort, and the country's new defense relationship with Russia (and Russia's with North Korea) might permit Iran to acquire any additional technology needed to threaten long-range missile attack on America. There is no sign that the GMD system, in its current configuration, would be able to cope with such an Iranian missile threat, or indeed one from any state other than North Korea, for the system has not been designed to face such challenges.[113]

As noted earlier, apparently in hopes of not provoking Russia and China, prior U.S. administrations adopted policies of intentionally designing the GMD system to avoid any capability to defend against even limited attacks by those nations on the U.S. homeland.[114] Yet

missile threats from Russia and China continue to grow, even as their military doctrines seem increasingly to be preparing for campaigns of limited coercive strikes. Until recently, the United States has disregarded such threats, and Russian and Chinese technological advances such as new ballistic and also hypersonic and cruise missile capabilities that present threats of conventional as well as low-yield nuclear attack.

These deficiencies have been the subject of growing concern. Robert Soofer, who is now acting Principal Deputy Assistant Secretary of War for Nuclear Deterrence, Chemical and Biological Defense Policy and Programs, has criticized the ambiguity and incoherence of prior U.S. homeland missile defense policy. As mentioned, it has been U.S. policy to rely only on strategic deterrence – that is, the threat of nuclear counterattack – to defend against nuclear-armed ballistic missile threats from either Russia or China. At the same time, however, prior policies admit to the existence of growing threats of coercive attack using conventional missiles. The 2022 MDR, for instance, states that to deter "attempts by adversaries to stay under the nuclear threshold and achieve strategic results with conventional capabilities," the United States will need to "examine active and possible defense measures to decrease the risk from any cruise missile strike against critical assets, regardless of origin."[115]

According to Soofer, however, it is irrational to defend against *some* Russian or Chinese missiles but not others. He expressed his concerns as follows: "While one might question the value of defending against cruise and ballistic missile threats, … defending against one and not the other makes no strategic sense."[116] Indeed, this contradiction might even seem to *encourage* coercive missile attack, in that Russia and China could employ conventionally armed ballistic missiles against U.S. nodes of control and critical infrastructure, perhaps deeming such attacks both to be *easy* (because the United States lacks defenses capable of defeating them) and to be *low-risk* (because U.S. officials have signaled that America's nuclear deterrent is reserved for nuclear attacks).

Another problem for U.S. planners lies in the difficulty of identifying whether an incoming missile is nuclear-armed or not when both Russia and China have so many dual-capable systems. (As noted earlier, in the near future, even an incoming ICBM might conceivably carry only a conventional warhead.) For example, one of China's more recent and advanced missiles, the DF-27, is an intermediate-to-intercontinental range ballistic missile capable of carrying nuclear or conventional warheads, while its most recent system, the DF-61, is also road mobile.[117] If such missiles were to be used against the United States, would it make more sense simply to intercept as many as possible, or to let them hit their targets and only *then* decide whether to retaliate with nuclear weapons (in the event of nuclear detonations) or simply to absorb the damage (if it turned out to be a conventional attack)? America deserves a more sensible policy, born from a new conceptual framework.

What the U.S. Homeland Missile Defense Policy Should Be

It is clear that the threats facing the United States have grown exponentially. As the threats posed not only by rogue states but also by America's strategic competitors have expanded, many experts now agree that U.S. defenses are not fit for purpose. For these reasons, an adjustment of U.S. missile defense strategy is overdue. The modifications to the U.S. missile defense posture that will be described in this section can serve as a conceptual framework for a new approach. For starters, an attempt to update U.S. policy would be to declare that:

> The U.S. missile defense policy will update and enhance GMD system and employ and integrate other systems in order to protect the American homeland against multiple threats: Pyongyang's increasingly modern and dangerous arsenal; possible future Iranian missile threats; and limited attacks by China and/or Russia involving not only ballistic missiles but also cruise and hypersonic systems and drones with either conventional or nuclear warheads as

> these countries implement strategies of coercive intimidation and extortion.

This simple statement could be further expanded as the threats and their strategies evolve, and as more importance is placed on protecting the homeland. This approach would be consistent with the growing chorus of calls for improved defenses, such as the SPC report that recommended that the United States "develop and field homeland IAMD [integrated air and missile defense] capabilities that can deter and defeat coercive attacks by Russia and China."[118] As Soofer has also emphasized,

> … [t]he United States requires not simply a new architecture for accomplishing the same old mission better but rather a new architecture and strategy that layers in new capabilities designed to meet the challenges posed by Russian and Chinese limited strikes as well as the expansion of North Korea's missile capabilities.[119]

The new missile defense policy put forward by President Trump may be an important step in this direction. The parameters of the announced "Golden Dome" approach have yet to be made clear, and so far the plan has raised far more questions than it answers. Will it survive, be fully funded, and prove effective – thus perhaps completely changing the strategic and technological equation, rendering strategic missiles and other such weapons all but useless – as President Trump seems to suggest – or will it fail to develop and wither away, as did Ronald Reagan's Strategic Defense Initiative (SDI)? And what, precisely, *is* Golden Dome trying to accomplish? Does it merely intend to expand U.S. homeland missile defenses to cover growing North Korean threats, possible emerging Iranian ones, and the prospect of limited Russian or Chinese attack? Or is the hope to defend even against *larger-scale* missile assaults?

Some experts are not optimistic about whether any of this is really possible. Henry Sokolski, for instance, executive director of the Nonproliferation Policy Education Center, recently wrote that "[t]he

[Golden Dome] project could easily run over budget and behind schedule. Therefore, I recommend hedging with a[n] [alternative] narrative that could garner bipartisan support – something which has not yet been attempted."[120] And even if President Trump's optimistic-sounding budget projections for Golden Dome *are* realistic, without bipartisan support, securing these funds could be in jeopardy.

On these efforts, the NDAA for the FY-26 was passed in mid-December, fully funding the Golden Dome of America and missile defense in general, with about $25 billion requested for Golden Dome alone plus $43.3 billion for Missile Defeat and Defense, which encompasses investments for the Missile Defense Agency (MDA), for regional and strategic missile defense capabilities outside of MDA, and for advanced technology missile defeat efforts and other left-of-launch activities.[121] At first, this project seems to be intended to proceed with the development and integration of already-fielded systems, such as Aegis battleships, or other programs-of-record, such as the Next Generation Interceptor, but it could also "deploy next-generation technologies across the land, sea, and space, including space-based sensors and interceptors," in the words of President Trump.[122]

The Trump Administration is attempting to adapt U.S. homeland missile defense posture to the current international security environment. And some updating is clearly necessary. Previous U.S. policies of only defending against very limited North Korean attacks could perhaps actually *encourage* Pyongyang to continue to expand its missile capabilities in order to overwhelm America's very limited defenses, even while leaving America defenseless against other quite real and growing aerial threats, both nuclear and conventional. Whatever the ultimate extent of Golden Dome, it seems likely to lead to important augmentations of U.S. missile defense capability, and this is much needed.

The Administration now has three years left in which to make good on President Trump's promise, for as Sokolski has written, "[i]n fewer than 40 months, President Trump's presidency will end. The

question is, will his signature project — the Golden Dome — die with it?"[123]

A More Practical Issue: Supply Chains and Missile Defense

Beyond the insufficiencies of from America's outdated missile defense *policy*, there is an additional important obstacle to overcome if the United States truly desires a new missile defense posture: its lack of a defense industrial base currently capable of *building* and *maintaining* a sound defensive architecture.

According to CNN, U.S. forces in Israel countered Iran's barrage of missiles during the June 2025 conflict with at least 100 THAAD interceptors.[124] This barrage of interceptors were fired by only two batteries, and yet they represented a significant portion of the entire U.S. stockpile of these anti-missile missiles worldwide. Reports indicate that between 20 percent and 25 percent of the global supply of THAAD interceptors was used up during the 12-day-long campaign, meaning that thwarting attacks in any more sustained campaign could vastly outpace U.S. production capabilities.

On a similar note, CSIS Fellow Wes Rumbaugh wrote in late 2024 that U.S. defense of Israel against the two prior Iranian attacks of April and October of that year had revealed deficiencies in the American supply of SM-3 missiles as a dozen of these were used in each engagement. In this article, Rumbaugh noted that "[s]ome commentators have observed that the U.S. Navy fired a year's worth of SM-3 interceptors in a single day," and that "[b]ased on the procurement numbers projected in the FY 2025 budget proposal, this is technically true.[125] That said, Rumbaugh notes the missiles expended in those campaigns are a smaller proportion of the total U.S inventory. He argues, for instance, that counting all types and versions of the SM-3s, the 12 interceptors used during the October 1, 2024, attack on Israel would only amount to 2.5 percent of the total amount of SM-3 in stock. According to him, such expenditure of missiles "would be a small price to pay to limit the damage of the Iranian

attack, provide space for diplomacy, and avoid an immediate Israeli retaliation."[126]

Still, this argument misses an important point. If 12 interceptors represent 2.5 percent of the total number of SM-3s, then 480 interceptors would represent 100 percent of it. If the United States were to enter into a war against a heavily missile-reliant adversary such as Iran and use up its interceptors at the same rate seen in the October and then June of 2025 strikes, America would have missile defense capabilities for only 40 days until it would run short of munitions. Against a larger missile-armed adversary such as Russia or China, the interceptor "burn rate" could be even higher – and America's resulting combat endurance even less.

Moreover, the production of different types of SM-3s was put on pause by the Department of Defense in order to concentrate all efforts on the more sophisticated SM-3 Block IIA. Counting only this type of SM-3, only 64 were procured in the last four fiscal years.[127] This would give the U.S. ships and forces only five days of autonomy to defend themselves against missile strikes. Although the SM-3 Block IIA is advanced and has impressive interception rates, these numbers are not sufficient for serious missile defense against serious foes.

This situation was recently recognized by both members of the armed forces and Congress. In a June 2025 hearing before the Senate Appropriations Committee, Chief of Naval Operations Admiral James Kilby stated that U.S. interceptors are being used up at an "alarming rate."[128] For his part, Appropriations Committee Chair Senator Mitch McConnell (R-KY) declared:

> We need more munitions. Air defense, interceptors, long-range fires, artillery, recent conflicts tell us we need a lot more of them. Recent experience tells us our industry ain't [*sic*] producing them fast enough.[129]

It is thus becoming increasingly clear that the U.S. supply chain for missile defense interceptors is out of step with the new methods of warfare and is inadequate to current and future missile defense needs.

Congress has recently decided to reverse the five-year plan embedded in the FY 25 budget request that reduces the production of SM-3 Block IB to zero over the next five years. In May 2025, the Department of Defense granted SM-3's manufacturer, RTX (formerly known as Raytheon), a significant contract for the delivery of more of these missiles. In addition, efforts are also underway to enhance the production of the Block IIA version.[130] It is far from clear, however, that this will be enough – especially if Golden Dome is serious about providing more comprehensive defenses.

Final Words and Implications

The year 2025 might turn out to be one that redefined the future defense and national security policies of the United States, the policies of its partners and allies, and the threats posed by its adversaries. The Second Trump Administration has already taken what may be important first steps in enhancing America's defense posture by revising America's traditional approach to missile defense by reinforcing the importance and need for improved homeland protection.

This article has sought to outline the threats posed by America's adversaries and demonstrate the inadequacy of prior U.S. approaches to missile defense, which have been frozen in time since their last modification during the early 2000s after the United States withdrew from the ABM Treaty. The many strategic and tactical threats that the United States now faces, not only from rogue states but also from near-peer competitors, have expanded and evolved. North Korea continues to expand and modernize its nuclear arsenal, even testing the advantages of hypersonic technology. Iran might not pose a threat yet, especially after the latest round of strikes with Israel, but the strategic losses it has faced could encourage the Ayatollahs not merely to

rebuild and expand their missile arsenal, but also to develop nuclear weapons to deliver atop such missiles.[131]

In the case of America's near-peer competitors, Russia continues to use the Ukraine conflict as a testing ground for some of its "superweapons" and other modern long-range munitions, and continues to develop and refine its doctrines of coercive intimidation using both conventional and nuclear delivery systems. In case of conflict, a diverse range of Russian weapons could be used with conventional or low-yield nuclear warheads, allowing Russia the capability to attack the U.S. homeland without – Russian planners might assume – necessarily eliciting an American strategic nuclear response, and current U.S. missile defenses would be unable to meet this threat.

China is following a similar path, for it has not only modernized but also heavily expanded its nuclear arsenal. It is possible that China will reach effective nuclear parity vis-à-vis the United States by the 2030-2035 timeframe, by which point its arsenal will actually also contain a range of dual-capable systems (and potentially soon even an intercontinental-range ballistic missile) for which no U.S. counterparts exist. America's adversaries, then, have diversified and enhanced their offensive capabilities, giving them capabilities the use of which it may prove increasingly difficult to deter by the traditional U.S. approach of relying only upon strategic nuclear threats. It is for this reason that it has become increasingly urgent to improve U.S. homeland missile defenses.

As this article has shown, U.S. missile defense policy has become outdated. Against this new strategic environment, a new missile defense policy for the United States is needed against the increasingly dangerous North Korean threat, the short and mid-term evolution of the Iranian threat, the already considerable Russian threat, and equally challenging, and rapidly expanding, Chinese military capabilities.

But merely developing a new homeland missile defense *policy* may not be enough if America cannot *build* and *maintain* the expanded

system it needs – and the United States currently faces glaring flaws in its industrial base vis-à-vis the production of missile interceptors. The recent Iranian campaign has helped highlight both the strategic necessity of homeland missile defense and its challenges, providing us with fertile soil from which to harvest interest and information on how to better update the U.S. approaches.

Overall, this paper has provided evidence of the multiple threats the country faces from different regimes around the world, the likely effectiveness and benefits of developing a new homeland missile defense policy to counter these regimes, and some of what will be needed if we are to deploy a nationwide, integrated homeland missile defense architecture. President Trump's Executive Order on building an America "Golden Dome" architecture suggests that U.S. officials understand the need to do more, and the FY26 defense budget request provides more evidence of this trend. Much research and development, and a great deal of money, will surely be needed in order to acquire the capabilities needed. But this effort must start with solidifying bipartisan agreement upon the need for improved defenses. After all, deterrence is never ironclad, and therefore, America needs to reinforce its walls.

* * *

About the Author

Dr. Santiago Spadiliero *serves as professor and researcher at Missouri State University. He specializes in Latin American and Missile Defense issues. He possesses a Master's and Doctoral degree in Defense and Strategic Studies from the aforementioned university. The views expressed herein are entirely his own, and do not necessarily represent those of anyone else.*

Notes

[1] "The Iron Dome for America," *The White House*, January 27, 2025, https://www.whitehouse.gov/presidential-actions/2025/01/the-iron-dome-for-america/.

[2] "Secretary of Defense Pete Hegseth Statement on Golden Dome for America," *U.S. Department of Defense*, May 20, 2025, https://www.defense.gov/News/Releases/Release/Article/4193417/secretary-of-defense-pete-hegseth-statement-on-golden-dome-for-america/.

[3] Robert Soofer et al., "'First, we will defend the homeland': The case for homeland missile defense," *Atlantic Council*, January 4, 2025, https://www.atlanticcouncil.org/in-depth-research-reports/report/first-we-will-defend-the-homeland-the-case-for-homeland-missile-defense/#executive.

[4] Missile Threat, "Missiles of North Korea," *CSIS Missile Defense Project*, November 22, 2022, https://missilethreat.csis.org/country/dprk/.

[5] National Intelligence Council, *National Intelligence Estimate 95-19: Emerging Missile Threats to North America During the Next 15 Years* (U.S. Government Printing Office, November 1995) [hereinafter "*National Intelligence Estimate 95-19*"], 2-3, https://www.cia.gov/readingroom/docs/EMERGING%20MISSILE%20THREATS%20%5B16382509%5D.pdf.

[6] *National Intelligence Estimate 95-19,* 2.

[7] Donald H. Rumsfeld et al., "Executive Summary of the Report of the Commission to Assess the Ballistic Missile Threat to the United States," *U.S. Congress*, July 1998, https://irp.fas.org/threat/bm-threat.htm.

[8] For more on the repercussions of this test, *see* Keith B. Payne, *The Fallacies of Cold War Deterrence and a New Direction* (University Press of Kentucky, 2001), and Jeffrey A. Larsen & Kerry M. Kartchner, "Emerging Missile Challenges and Improving Active Defenses," *Future Warfare Series*, No. 25, 2004, https://apps.dtic.mil/sti/tr/pdf/ADA446185.pdf.

[9] Joseph S. Bermudez Jr., "A History of Ballistic Missile Development in the DPRK," *Monterrey Institute of International Studies*, 1999, occasional paper No. 2, ii, https://www.nonproliferation.org/wp-content/uploads/2016/09/op2.pdf.

[10] Hans Kristensen et al., "Nuclear Notebook: North Korean Nuclear Weapons, 2024," *Bulletin of the Atomic Scientists* 4, Vol. 80 (2024), 251-271, 251, https://www.tandfonline.com/doi/epdf/10.1080/00963402.2024.2365013?needAccess=true.

[11] Mary Beth D. Nikitin, "North Korea's Nuclear Weapons and Missile Programs, "*Congressional Research Service*, December 19, 2023, 2, https://crsreports.congress.gov/product/pdf/IF/IF10472.

[12] Victor Cha & Ellen Kim, "North Korea Announces Nuclear-Powered Submarine Development," *Center for Strategic and International Studies*, March 10, 2025, https://www.csis.org/analysis/north-korea-announces-nuclear-powered-submarine-development.

[13] Sung Chull Kim & Michael D. Cohen, *Entering the New Era of Deterrence: North Korea and Nuclear Weapons*, (Washington DC: Georgetown University Press, 2017) 32.

[14] Kim & Cohen, *Entering the New Era of Deterrence*, 33.

[15] Jan Lodal & Ashton Carter, news conference transcript, July 31, 1995. (mimeo), *in* Hearings Before the Committee on Foreign Relations, United States Senate, *Ballistic Missiles: Threat and Response* (GPO, 1999), https://www.govinfo.gov/content/pkg/CHRG-106shrg56777/html/CHRG-106shrg56777.htm.

[16] Payne, *The Fallacies of Cold War Deterrence and a New Direction,* 83-84.

[17] For more on these, see Keith B. Payne, *The Great American Gamble: Deterrence Theory and Practice From the Cold War to the Twenty-First Century* (National Institute Press, 2008)

[18] Bruce W. Bennett, "North Korean Desperation: Its Two Korea Theory," RAND Corporation, November 20, 2024, https://www.rand.org/pubs/commentary/2024/11/north-korean-desperation-its-two-korea-theory.html.

[19] U.S. Department of Defense, Missile Defense Review 2022 (Department of Defense, 2022), 3, https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.pdf

[20] Robert G. Joseph & Peppino A. DeBiaso, "Homeland Missile Defense: Responding to a Transformed Security Environment," *National Institute for Public Policy*, Information Series, No. 585 (May 2024), 37, https://nipp.org/information_series/peppino-debiaso-and-robert-joseph-u-s-homeland-missile-defense-charting-a-different-course-no-585-may-6-2024/.

[21] James Acton, in John Mecklin, "Carnegie nuclear expert James Acton explains why it would be counterproductive for Israel to attack Iran's nuclear program," *Bulletin of the Atomic Scientists*, October 5, 2024 [hereinafter "Mecklin Interview with James Acton"], https://thebulletin.org/2024/10/carnegie-nuclear-expert-james-acton-explains-why-it-would-be-counterproductive-for-israel-to-attack-irans-nuclear-program/.

[22] Paul K. Kerr, "Iran and Nuclear Weapons Production," *Congressional Research Service*, March 20, 2024, https://crsreports.congress.gov/product/pdf/IF/IF12106.

[23] Joseph Rodgers, Heather Williams, & Joseph S. Bermudez Jr., "Damage to Iran's Nuclear Program—Can It Rebuild?," *Center for Strategic and International Studies*, August 6, 2025, https://www.csis.org/analysis/damage-irans-nuclear-program-can-it-rebuild.

[24] Office of the Director of National Intelligence, "Annual Threat Assessment of the U.S. Intelligence Community," March 11, 2024, https://www.odni.gov/index.php/newsroom/reports-publications/reports-publications-2024/3787-2024-annual-threat-assessment-of-the-u-s-intelligence-community.

[25] Madelyn R. Creedon et al., "America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States," *Institute for Defense Analyses,* October 2023, 21, file:///D:/Descargas%20de%20internet/Strategic-Posture-Commission-Report.pdf. For a debate on the possible repercussions of an Israeli attack against Iran's nuclear capabilities or their intent to further accelerate its nuclear program, see Mecklin Interview with James Acton, and "After the decapitation of Hizbullah, Iran could race for a nuclear bomb," *Economist*, September 30, 2024, https://www.economist.com/briefing/2024/09/30/iran-could-race-for-the-bomb-after-the-decapitation-of-hizbullah.

[26] Bilal Y. Saab and Darren D. White, "Lessons Observed from the War Between Israel and Iran," *War on the Rocks,* July 16, 2025, https://warontherocks.com/2025/07/lessons-observed-from-the-war-between-israel-and-iran/.

[27] Anthony H. Cordesman, "The Iranian Missile Challenge," *CSIS*, June 2019, 2, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/20190604.Iran_Missile_Challenge.Revised.pdf.

[28] Creedon et al., "America's Strategic Posture," 22.

[29] Joseph & DeBiaso, "Homeland Missile Defense," 41.

[30] "Iran Bolsters Missile Capacity with Satellite Launches," *Foundation for Defense of Democracies*, January 29, 2024, https://www.fdd.org/analysis/2024/01/29/iran-bolsters-missile-capacity-with-satellite-launches/.

[31] Creedon et al., "America's Strategic Posture," 10.

[32] Jon Gambrell, "IAEA chief: Iran is poised to 'quite dramatically' increase stockpile of near weapons-grade uranium," *The Associated Press*, December 6, 2024, https://apnews.com/article/iran-space-launch-mideast-tensions-26b332d54d39173db8524b006848b6c8.

[33] Creedon et al. "America's Strategic Posture," 16.

[34] Joshua Ball, "Escalate to De-Escalate: Russia's Nuclear Deterrence Strategy," *Global Security Review*, 2021, https://globalsecurityreview.com/nuclear-de-escalation-russias-deterrence-strategy/.

[35] Joseph and DeBiaso, "Homeland Missile Defense," 41.

[36] In fact, there is a debate on the possibility and possible outcomes of a limited nuclear escalation of the war in Ukraine. For more on this debate, see Joseph & DeBiaso, "Homeland Missile Defense," and J. Andres Gannon, "If Russia Goes Nuclear: Three Scenarios for the Ukraine War," *Council on Foreign Relations,* November 9, 2022, https://www.cfr.org/article/if-russia-goes-nuclear-three-scenarios-ukraine-war.

[37] Mark B. Schneider, "Escalate to De-escalate," *U.S. Naval Institute,* February 2017, https://www.usni.org/magazines/proceedings/2017/february/escalate-de-escalate.

[38] Vladimir Soldatkin & Guy Faulconbridge, "Putin issues nuclear warning to the West over strikes on Russia from Ukraine," *Reuters*, September 25, 2024, at https://www.reuters.com/world/europe/putin-says-russia-reserves-right-use-nuclear-weapons-if-attacked-2024-09-25/.

[39] Russia has indeed formally annexed these territories. *See* Pjotr Sauer & Luke Harding, "Putin annexes four regions of Ukraine in major escalation of Russia's war," *The Guardian*, September 30, 2022, https://www.theguardian.com/world/2022/sep/30/putin-russia-war-annexes-ukraine-regions.

[40] Daniel S. Hamilton, "Forward resilience: How to help Ukraine win on and off the battlefield," *Brookings Institution*, December 8, 2022, https://www.brookings.edu/articles/forward-resilience-how-to-help-ukraine-win-on-and-off-the-battlefield/

[41] Richard Connoly, "Putin's Super Weapons," in *Advanced military technology in Russia,* Chatham House, September 23, 2021, at https://www.chathamhouse.org/2021/09/advanced-military-technology-russia/03-putins-super-weapons.

[42] Alexander H. Montgomery & Amy J. Nelson, "Ukraine and the Kinzhal: Don't believe the hypersonic hype," *Brookings,* May 23, 2023, https://www.brookings.edu/articles/ukraine-and-the-kinzhal-dont-believe-the-hypersonic-hype/.

[43] Creedon et al., "America's Strategic Posture," 17.

[44] Not without incidents, as the recent failed test of a Sarmat-28 ICBM shows. For more information on the incident, see Mark Trevelyan, "Images show Russia's new Sarmat missile suffered major test failure, researchers say," *Reuters*, September 23, 2024, https://www.reuters.com/business/aerospace-defense/russian-missile-failed-during-test-researchers-imagery-indicate-2024-09-23/.

[45] Creedon et al, "America's Strategic Posture," 11.

[46] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China* (Annual report to Congress, Washington, DC, October 2023), ii.

[47] Christopher A. Ford, "The Substructures of Chinese Grand Strategy, and Why Resolute US International Engagement Matters," *Hoover Institution*, May 2024, https://www.hoover.org/sites/default/files/research/docs/Ford_Substructures_WebreadyPDF.pdf.

[48] "The Taiwan Strait Crises: 1954-55 and 1958," U.S. Department of State, Office of the Historian, https://history.state.gov/milestones/1953-1960/taiwan-strait-crises.

[49] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China,* iv.

[50] Koichiro Takagi, "New Tech, New Concepts: China's Plans for AI and Cognitive Warfare," *War on the Rocks*, April 13, 2022, at https://warontherocks.com/2022/04/new-tech-new-concepts-chinas-plans-for-ai-and-cognitive-warfare/.

[51] Sam Bresnick, "China Bets Big on Military AI," *Center for European Policy Analysis,* April 3, 2024, https://cepa.org/article/china-bets-big-on-military-ai/.

[52] Creedon et al., "America's Strategic Posture," 12.

[53] Demetri Sevastopulo & Kathrin Hille, "China tests new space capability with hypersonic missile," *Financial Times*, October 16, 2021, https://www.ft.com/content/ba0a3cde-719b-4040-93cb-a486e1f843fb.

[54] Timothy Wright, "Is China gliding toward a FOBS capability?," *International Institute for Strategic Studies*, October 22, 2021, https://www.iiss.org/online-analysis/online-analysis/2021/10/is-china-gliding-toward-a-fobs-capability/.

[55] U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China* (Annual report to Congress, Washington, DC, 2024), 65.

[56] "No-first-use of Nuclear Weapons Initiative," *Ministry of Foreign Affairs, The People's Republic of China*, July 23, 2024, https://www.mfa.gov.cn/eng/xw/wjbxw/202407/t20240723_11458632.html#:~:text=On%20October%2016%2C%201964%20when,to%20use%20nuclear%20weapons%20against.

[57] *See, e.g.*, Christopher A. Ford, "Nuclear Posture and Nuclear Posturing: A Conceptual Framework for Analyzing China's Nuclear Weapons Policy," National Institute for Public Policy *Occasional Papers*, vol. 4, no. 2, February 2024, 34-40, https://nipp.org/wp-content/uploads/2024/02/Vol-4-No-2-final.pdf.

[58] Santiago Spadiliero, "China's Growing Power and the Inevitable End of 'No First Use,'" *Global Security Review*, July 2024, https://globalsecurityreview.com/chinas-growing-power-and-the-inevitable-end-of-no-first-use/.

[59] Michael Tkacik, "Will China Embrace Nuclear Brinkmanship as It Reaches Nuclear Parity?," *The Diplomat*, August 5, 2023, https://thediplomat.com/2023/08/will-china-embrace-nuclear-brinkmanship-as-it-reaches-nuclear-parity/.

[60] Joseph and DeBiaso, "Homeland Missile Defense," 42.

[61] *Dierpaobing zhanyixue (The Science of Second Artillery Operations)* (Yu Jin, ed.) [partial translation by Gregory Kulacki] (People's Liberation Army Press, 2004) 294-96, https://www.ucs.org/sites/default/files/attach/2014/09/Kulacki-Translation%20of%20Coercion%20section%209-22-14.pdf.

[62] Gregory Weaver, "The role of nuclear weapons in a Taiwan crisis," *Atlantic Council,* November 22, 2023, https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/the-role-of-nuclear-weapons-in-a-taiwan-crisis/.

[63] Creedon et al., "America's Strategic Posture," 7.

[64] Chas W. Freeman Jr., in Patrick E. Tyler, "As China Threatens Taiwan, It Makes Sure U.S. Listens," *New York Times,* January 24, 1996, https://www.nytimes.com/1996/01/24/world/as-china-threatens-taiwan-it-makes-sure-us-listens.html.

[65] Jacob Stokes, "China's Nuclear Buildup is About More Than Nukes," *Just Security*, January 4, 2022, at https://www.justsecurity.org/79622/chinas-nuclear-buildup-is-about-more-than-nukes/.

[66] Stokes, "China's Nuclear Buildup is About More Than Nukes."

[67] Ian Williams, "Russia Isn't Going to Run Out of Missiles," *CSIS*, June 28, 2023, https://www.csis.org/analysis/russia-isnt-going-run-out-missiles.

[68] Ian Williams, "Putin's Missile War," *CSIS*, May 2023, 3, https://www.csis.org/analysis/putins-missile-war.

[69] William Alberque, "What has the war on Ukraine revealed about Russia's non-strategic missiles?" *International Institute for Strategic Studies*, March 6, 2023, https://www.iiss.org/de-DE/online-analysis/online-analysis/2023/03/what-has-the-war-revealed-about-russias-non-strategic-missiles/.

[70] Williams, "Putin's Missile War," 5.

[71] Williams, "Putin's Missile War," 8.

[72] Benjamin Jensen & Yasir Atalan, "Assessing Russian Firepower Striker in Ukraine," *CSIS*, October 23, 2024, https://www.csis.org/analysis/assessing-russian-firepower-strikes-ukraine.

[73] "Combat Launches, 1982-1988: Iran-Iraq War," *Missile Defense Advocacy Alliance*, https://missiledefenseadvocacy.org/missile-threat-and-proliferation/combat-missile-launches/#:~:text=1982%2D1988:%20Iran%2DIraq,out%20by%20Iraq.%5B10%5D.

[74] Guy Perrimond, "1944-2001: The threat of theatre ballistic missiles," *TTU Europe*, 2002, https://web.archive.org/web/20071016094525/http://www.ttu.fr/site/english/endocpdf/24pBalmissileenglish.pdf.

[75] Williams, "Russia Isn't Going to Run Out of Missiles."

[76] Ibid.

[77] Pavel Polityuk and Tom Balmforth, "Russia stages first missile attack on Kyiv since August, Ukraine says," *Reuters*, November 13, 2024, https://www.reuters.com/world/europe/blasts-heard-ukraines-kyiv-reuters-witnesses-report-2024-11-13/.

[78] Montgomery & Nelson, "Ukraine and the Kinzhal."

[79] Williams, "Russia Isn't Going to Run Out of Missiles."

[80] Ibid.

[81] Hlib Parfonov, "The State of Ukrainian Air Defense (Part One)," *Eurasia Daily Monitor* 21, no. 94 (June 20, 2024) https://jamestown.org/program/the-state-of-ukrainian-air-defense-part-one/.

[82] Jensen & Atalan, "Assessing Russian Firepower Strikes in Ukraine."

[83] Shawn Rostker, "The Right and Wrong Lessons to Learn from Missile Defense in Ukraine," *Center for Arms Control and Non-Proliferation,* October 19, 2023, https://armscontrolcenter.org/the-right-and-wrong-lessons-to-learn-from-missile-defense-in-ukraine/.

[84] Jean-Loup Samaan, *Another Brick in the Wall: The Israeli Experience in Missile Defense* (U.S. Army War College, 2015), 18; "Missiles and Rockets of Hezbollah," *CSIS Missile Defense Project,* August 10, 2021, https://missilethreat.csis.org/country/hezbollahs-rocket-arsenal/.

[85] In fact, in October of 2024, Hezbollah launched the deadliest drone attack since the outbreak of the conflict, killing four Israeli soldiers in the area of Binyamina. For more, see Yonah Jeremy Bob, "Hezbollah's drone attack near Binyamina kills four soldiers, wounds seven," *Jerusalem Post*, October 14, 2024, https://www.jpost.com/breaking-news/article-824417.

[86] Samaan, *Another Brick on the Wall*, 27.

[87] Alex MacDonald, "What missiles did Iran use to target Israel?," *Middle East Eye*, October 2, 2024, https://www.middleeasteye.net/news/what-missiles-did-iran-use-target-israel.

[88] Moshe Patel, "Transcript: Israel's Missile Defense Engagements Since October 7th," *CSIS*, July 12, 2024, https://www.csis.org/analysis/israels-missile-defense-engagements-october-7th; Raffi Berg, "Why has Israel attacked Iran?," *BBC*, October 26, 2024, https://www.bbc.com/news/world-middle-east-68811276.

[89] Brad Lendon, "How Israel and allied defenses intercepted more than 300 Iranian missiles and drones," *CNN*, April 14, 2024, https://www.cnn.com/2024/04/14/middleeast/israel-air-missile-defense-iran-attack-intl-hnk-ml/index.html.

[90] Shaan Shaikh, "The Iran-Israel Air Conflict, One Week In," *CSIS*, April 19, 2024, https://www.csis.org/analysis/iran-israel-air-conflict-one-week.

[91] Shaikh, "The Iran-Israel Air Conflict."

[92] Sam Lagrone, "SM-3 Ballistic Missile Interceptor Used for First Time in Combat, Officials Confirm," *U.S. Naval Institute News*, April 15, 2024, https://news.usni.org/2024/04/15/sm-3-ballistic-missile-interceptor-used-for-first-time-in-combat-officials-confirm.

[93] C. Todd Lopez, "U.S. Assets in Mediterranean Again Helped Defend Israel Against Iranian Missiles," *DOD News,* October 1, 2024, https://www.defense.gov/News/News-Stories/Article/Article/3923123/us-assets-in-mediterranean-again-helped-defend-israel-against-iranian-missiles/.

[94] Patel, "Transcript: Israel's Missile Defense Engagements Since October 7th."

[95] "Significance of the Targeted Nuclear Scientists in the 12-Day War," *Institute for Science and International Security*, July 15, 2025, https://isis-online.org/isis-reports/significance-of-the-targeted-nuclear-scientists-in-the-12-day-war.

[96] Sebastien Roblin, "How Did Israel's Air Defenses Fair Against Iran's Ballistic Missiles?" *Forbes*, June 30, 2025, https://www.forbes.com/sites/sebastienroblin/2025/06/30/how-did-israels-air-defenses-fair-against-irans-ballistic-missiles/.

[97] Flash Brief, "Israeli Assessment of Recent Conflict With Iran Reveals 86 Percent Success Rate in Missile Interception," *Foundation for Defense of Democracies*, July 2, 2025, https://www.fdd.org/analysis/2025/07/02/israeli-assessment-of-recent-conflict-with-iran-reveals-86-percent-success-rate-in-missile-interception/.

[98] Roblin, "How Did Israel's Air Defenses Fair Against Iran's Ballistic Missiles?"

[99] Gianluca Mezzofiore, Tamara Qiblawi, & Madalena Araujo, "US used about a quarter of its high-end missile interceptors in Israel-Iran war, exposing supply gap," *CNN*, July 31, 2025, https://www.cnn.com/2025/07/28/middleeast/us-thaad-missile-interceptor-shortage-intl-invs.

[100] Charles D. Ferguson, "Nuclear Posture Review," *NTI*, July 31, 2002, https://www.nti.org/analysis/articles/nuclear-posture-review/.

[101] U.S. Department of Defense, "The Ballistic Missile Defense System," *2019 Missile Defense Review Factsheet*, 1, https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/MDR-BMDS-Factsheet-UPDATED.pdf.

[102] Missile Threat, "Ground-based Midcourse Defense (GMD) System," *CSIS*, July 26, 2021, https://missilethreat.csis.org/system/gmd/.

[103] Jon Ludwigson, "Next Generation Interceptor Program Should Take Steps to Reduce Risk and Improve Efficiency," *Government Accountability Office*, June 2024, 6, https://www.gao.gov/assets/870/869706.pdf.

[104] Robert Soofer et al., "'First, we will defend the homeland': The case for homeland missile defense."

[105] Ibid.

[106] Ibid.

[107] U.S. Department of Defense, Missile Defense Review 2019 (Department of Defense, 2019), iii & vii, https://www.war.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/The%202019%20MDR_Executive%20Summary.pdf.

[108] Soofer et al., "'First, we will defend the homeland': The case for homeland missile defense."

[109] U.S. Department of Defense, "Missile Defense Review: Factsheet," 1.

[110] Soofer et al., "'First, we will defend the homeland': The case for homeland missile defense."

[111] Joseph & DeBiaso, "Homeland Missile Defense."

[112] Gregory M. Guillot, "Statement Of General Gregory M. Guillot, United States Air Force Commander United States Northern Command And North American Aerospace Defense Command Before The Senate Armed Services Committee," February 13, 2025, 9, https://www.armed-services.senate.gov/imo/media/doc/guillot_statement1.pdf.

[113] Indeed, some experts and lawmakers are considering the option of constructing a third GMD missile defense site on the Eastern Coast of the U.S. to better protect that area from a trans-Atlantic attack by Iran or any other state.

[114] Joseph & DeBiaso, "Homeland Missile Defense."

[115] U.S. Department of Defense, "Missile Defense Review: Factsheet," 6.

[116] Soofer, et al., "'First, we will defend the homeland'."

[117] Department of Defense, *Military and Security Developments Involving the People's Republic of China*, 65; Joseph Rodgers and Heather Williams, "Parading China's Nuclear Arsenal Out of the Shadows," *Center for Strategic and International Studies,* September 4, 2025, https://www.csis.org/analysis/parading-chinas-nuclear-arsenal-out-shadows.

[118] Creedon et al., "America's Strategic Posture," 105.

[119] Soofer et al., "'First, we will defend the homeland'"

[120] Henry Sokolski, "Golden Dome: What's its story?" *SpaceNews*, October 8, 2025, https://spacenews.com/golden-dome-whats-its-story/.

[121] Stephen Losey, "Senate passes major policy bill authorizing $900 billion for Pentagon," *Defense News*, December 17, 2025, https://www.defensenews.com/congress/2025/12/17/senate-passes-major-policy-bill-authorizing-900-billion-for-pentagon/; Office of the Under Secretary of Defense, "Defense Budget Overview 2026," *U.S. Department of Defense*, July 2025, https://comptroller.war.gov/Portals/45/Documents/defbudget/FY2026/FY2026_Budget_Request_Overview_Book.pdf. As a matter of reference, the FY-25 NDAA enacted about $25 billion for missile defense and defeat as a whole.

[122] President Donald J. Trump, in "America's 'Golden Dome' Explained," *Center for Strategic & International Studies*, June 4, 2025, https://www.csis.org/analysis/americas-golden-dome-explained.

[123] Sokolski, "Golden Dome: What's its story?"

[124] Mezzofiore, Qiblawi, & Araujo, "US used about a quarter of its high-end missile interceptors in Israel-Iran war, exposing supply gap."

[125] Wes Rumbaugh, "Did the U.S. Defense of Israel from Missile Attacks Meaningfully Deplete Its Interceptor Inventory?" *Center for Strategic and International Studies*, December 4, 2024, https://www.csis.org/analysis/did-us-defense-israel-missile-attacks-meaningfully-deplete-its-interceptor-inventory.

[126] Rumbaugh, "Did the U.S. Defense of Israel from Missile Attacks Meaningfully Deplete Its Interceptor Inventory?"

[127] There were 16 in Fiscal Year (FY) 22, 24 in FY 23, 12 in FY 24, and another 12 in FY 25. Missile Defense Agency, "Department of Defense Fiscal Year (FY) 2024 Budget Estimates," *Department of Defense*, March 2023, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2024/budget_justification/pdfs/02_Procurement/PROC_MDA_VOL2B_PB_2024.pdf; Office of the Under Secretary of Defense, "Program Acquisition Cost by Weapon System, FY 25," *Department of Defense*, March 2024, https://comptroller.defense.gov/Portals/45/Documents/defbudget/FY2025/FY2025_Weapons.pdf.

[128] Admiral James Kilby, in "A Review of the President's Fiscal Year 2026 Budget Request for the Navy," Congressional Hearing, Washington DC, June 24, 2025, https://www.appropriations.senate.gov/hearings/a-review-of-the-presidents-fiscal-year-2026-budget-request-for-the-navy.

[129] Senator Mitch McConnell, in "A Review of the President's Fiscal Year 2026 Budget Request for the Navy."

[130] Jake Epstein, "US Navy warships are firing top ballistic missile interceptors at an 'alarming rate,' admiral says," *Business Insider*, June 24, 2025, https://www.businessinsider.com/us-warships-fire-top-missile-interceptors-alarming-rate-admiral-says-2025-6.

[131] *Economist*, "After the decapitation of Hizbullah, Iran could race for a nuclear bomb."