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THE INTERCONTINENTAL BALLISTIC MISSILE AND POST COLD WAR DETERRENCE

by

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Biography

Lt Col Kevin O'Rourke graduated from the Pennsylvania State University with a bachelor of science in electrical engineering and was commissioned through the Air Force Reserve Officer Training Corps program. Following his commissioning, he attended Undergraduate Space Training and served as an orbit analyst. Next, he attended Undergraduate Missile Training and completed a tour as a Peacekeeper LGM-118A ICBM crew commander, instructor, and evaluator. He has served in staff tours at the numbered air force, major command, service headquarters, and combatant command levels to include serving as a nuclear effects damage analyst at US Strategic Command. Lt Col O'Rourke is a 1999 distinguished graduate of the Air Force Institute of Technology with a master of science degree in operations analysis and a 2004 resident graduate of Air Command and Staff College. Immediately prior to attending Air War College, Lt Col O'Rourke commanded the training support squadron at Keesler Air Force Base, Mississippi, where he led development, deployment, and sustainment of missile operations and ground missile warning simulators for Air Education and Training Command and Air Force Space Command.

Introduction

Politicians and military leaders often site deterrence—specifically *nuclear* deterrence—as a backdrop for United States national security relations. Nuclear deterrence is regarded as a foundational underpinning of international relations. The US Minuteman III (MM III) Intercontinental Ballistic Missile (ICBM) force has been a valuable element of American deterrence for over 50 years, but the world strategic environment has significantly altered the context in which this non-mobile ballistic missile system exists. With new political realities and technological capabilities, the MM III ICBM—in its current operational configuration—has been rendered superfluous with regard to strategic nuclear deterrence.

This paper will explore those geopolitical and technological changes with regard to deterrence theory and the MM III system, and will recommend adjustments to US strategic posture. First, this paper will discuss deterrent theory and the goal of deterrence. Second, this paper will review the background of the ICBM by examining the evolution of politics and advancement of technology that shaped the current US strategic deterrent posture. Specifically, national security concerns coupled with existent technical constraints led to the deployment of the ICBM as part of a strategic nuclear triad that capitalized on the ICBM's positive attributes. Third, this paper will provide rationale for why the MM III is no longer relevant to strategic deterrence by explaining its decreased military utility, diminished deterrent utility, and those factors that make its use untenable. It is the convergence of these factors that undercuts the fundamental nature of deterrence—capability and credibility. Finally, this paper provides suggestions for an updated US nuclear posture. Recommendations include deploying a survivable land-based deterrent, adopting and announcing a minimal deterrence policy, and conducting a conventional versus nuclear capabilities assessment. Ultimately, the US should

evolve its strategic deterrent posture and adopt new deterrent policies to best serve continuing national security objectives.

Nuclear Deterrence

Nuclear deterrence has been a de facto foundational underpinning of modern international relations for all states, but especially the nuclear states.[1] At the core of deterrence theory, the goal is to prevent, or deter, an adversary from exercising an undesired course of action either by reducing his expected gain or by increasing his perceived cost to such an extent that the course becomes undesirable.[2] With regard to nuclear deterrence, the threat of nuclear retaliation—either as a response to an attack or a first strike to defend vital national interests—results in "too high a cost" to the adversary. Examples include the US threat of a nuclear strike during the Cuban Missile Crisis and the promise of nuclear retaliation against the USSR in response to an attack on the US or NATO.[3]

Deterrence theory assumes that a rational adversary will conduct a cost/benefit analysis that results in a conclusion that a course of action will not be worth undertaking and is thusly deterred. Attributed as fundamental to successfully deterring an adversary is a demonstrated credible capability, a credible will to use the capability, and a communicated promise to use the capability. Capabilities vulnerable to a first strike undermine deterrent stability as they are "use or lose"—specifically they invite a first strike or compel a hasty response.[4] Survivable weapons are credible as they are protected from preemptive destruction and available for a retaliatory strike. This will have special relevance with regard to the MM III as it pertains to modern deterrence.

There are several variations to the implementation of deterrence—direct, extended (indirect or "umbrella"), and ambiguous—that alter the nature of who is deterring whom. But the fundamental core remains the same: threat of a costly response. Several states cite nuclear deterrence as a fundamental element of nation security, including US,[5] Russia,[6] France,[7] United Kingdom,[8] China,[9] India,[10] Pakistan,[11]and North Korea.[12] The United States and Russia have fielded nuclear forces at levels that strive for parity. These "warfighting" force levels strive for a strategic balance of enough weapons to annihilate opposing nuclear weapons and facilities.[13] Other nations— France, UK, China, India, Pakistan, and Israel—have adopted minimal deterrence postures, i.e., they maintain only enough weapons to inflict an unacceptable punishment on an opponent.[14] Augmenting its claimed nuclear capability, North Korea operates with a conventional deterrence, e.g., significant military capabilities such that it could inflict staggering damages on South Korea using conventional forces alone.[15]

These nuclear states deter directly with their own arsenals, but other states, e.g., Japan, Australia, and NATO allies, benefit from extended, or umbrella, deterrence by relying upon a promise of US nuclear retaliation if they are attacked.[16] This form of deterrence requires belief that the promise of retaliation in accordance with mutual defense treaties will be carried out. Uncertainty in this promise was cited as one of the reasons the UK developed their own deterrent arsenal, to provide a "second decision center" willing to employ if the US would not respond on behalf of the UK.[17] France had similar motivations in developing their own capability.[18] Current US nuclear forces consist of a triad that includes the ICBM.

Shaping Deterrence and the ICBM

The ICBM made sense in the political and technological environment of the Cold War. The US required a weapon system that could deter and respond to a surprise strike, either by

launching quickly before being struck or by surviving the attack for future use—the ICBM provided both of these characteristics. ICBMs could be geographically dispersed and deployed in sufficient numbers to achieve strategic parity with the USSR.[19]

Fearing a disarming surprise attack, US nuclear forces were readied and on continuous alert. Accuracies were low and required a large weapon yield to damage hardened targets. With these operational considerations, the technological benefits of an ICBMs increased throw weight (for heavier warheads or longer ranges) coupled with an increased accuracy would result in better target kill. ICBMs were newly available, the size of the missile would not constrained by the hull of a submarine, and—unlike vulnerable aircraft—the silos would be hard enough to survive against an inaccurate Soviet strike. Thus the ICBM secured a spot in the nuclear deterrent triad along with bomber and submarine-launched ballistic missiles. Studies called for a two-to-one missile to target ratio, i.e., 600 Soviet targets required 1,200 ICBMs, however Secretary of Defense McNamara deemed 1,000 would be sufficient.[20] At the height of the cold war, the US fielded 1,054 ICBM silos.[21]

When fielded, the ICBM had survivability and effectiveness as compelling positive weapon system attributes. Its dispersed basing would require a barrage assault in large numbers to neutralize.[22] The hardened silos provided survivable basing that could ride out an attack—when built in the 1960s, ICBM silos were regarded as "essentially invulnerable" due to limitations of Soviet technologies.[23]

A ballistic flight path to enemy territory gave a high probability of damage to adversary targets. The ICBM would be able to successfully penetrate Soviet airspace and detonate on target; it would not be subject to attrition by enemy air defenses as would the bomber force. An

on alert status provided an immediate strike capability. The ICBM warhead would also be an effective hedge against failures in other legs of the triad, either delivery systems or warheads.

During the Cold War, for these reasons, the ICBM was a complimentary part of the strategic triad; it is included by default as part of strategic forces in the "new triad" but with no rationale provided for maintaining a triad.[24],[25] What was appropriate for the security environment, politics and technology of the Cold War, however, is not necessary appropriate for today.

Obsolescence of the Fixed ICBM

Due to political and technological changes, the MM III's historically positive operational attributes have ceased to possess significant relevance for the US deterrent arsenal and nuclear deterrence writ large. The positive employment attributes—immediate launch of an effective nuclear weapon against a cold war target set coupled with its survivable basing—have been overcome by technological developments and political events. The Minuteman has suffered from diminished military utility, has lost deterrent utility, and is now untenable for use.

The Minuteman has diminished military utility due to advances in both enemy offensive systems and adversary defensive measures; it is no longer an effective weapon in the face of peer competitor capabilities. The MM III is no longer survivable when confronted with peer offensive capabilities. With silos that were designed and constructed in the early 1960s, the ICBM is unable to survive versus the current threat. Although there was "hardness modification" in the mid-to-late 1970s with updates in 2009, adversary offensive systems are now much more capable—both in terms of improved accuracy and increased yield.[26] Studies in the early 1980s concluded that over 90% of fixed Minuteman III ICBM silos would be destroyed if Russian missiles could reach an accuracy of 600 feet—current accuracies are assessed as better

than 200 feet.[27],[28] Strategic Air Command's General Richard Ellis stated—*in 1981*—that improved accuracy and yield of Russia "have put our Minuteman at risk to the point where we could not respond in an effectively coherent manner."[29] Initially, US silo locations were unknown to the USSR; today, the US has provided silo coordinates to Russia as part of treaty obligations.[30] Consequently, Minuteman silos are "soft targets" at known locations—as such, they are no longer survivable and have lost this key deterrent attribute.[31]

Adversary defenses are also much more capable than when ICBMs were conceived and deployed. With predictable flight trajectories, ballistic warheads are susceptible to missile defense intercepts from dedicated anti-ballistic missile (ABM) systems, such as the Moscow ABM site, as well as advanced air defense systems, to include the Russian S-300, S-400, and S-500 systems.[32] The currently operational S-300 and S-400 systems claim advanced capabilities against ballistic missiles at speeds of 4,800 meters per second; Russia has sold these systems to 12 nations.[33] One recipient, Iran, claims to have created its own spin-off system even more sophisticated than the S-300.[34] When operational in 2012, the S-500 is expected to outperform the S-400.[35] Ground based missile defenses can easily "out-proliferate" incoming warhead numbers. The net effect is a lower probability that a ballistic warhead would arrive at its intended target. A destabilizing loss of deterrent capability could follow from a perception that inbound ballistic warheads can be defeated.

Additionally, peer competitors are familiar with Minuteman warhead capabilities and have hardened targets or located potential facilities to render them relatively impervious to a strike. A target can be hardened to an extent that a successful strike would require a weapon with such a high yield and degree of accuracy as to be unobtainable.[36] For instance, studies deemed "both ground bursts and multiple strikes [are] necessary to achieve a high probability of

destroying the newest hardened Russian silos with W88 or W76 warheads."[37] And the hardness of Chinese silos is assessed as comparable.[38]

Would-be target facilities can also be located with regard to terrain features such that they are shielded from attack via estimated ballistic trajectories. Chinese DF-5A ICBMs are sheltered in a network of deep underground tunnels beneath high mountains to ensure survivability.[39] Many vital strategic facilities are constructed deeply buried underground. They are impervious to all but "earth-penetrating" nuclear weapons.[40] Unfortunately, the Minuteman warhead is not "earth-penetrating." The net effect is a reduced likelihood that a MM III warhead would damage a sufficiently hardened target. This perception also diminishes deterrent credibility.

In addition to this loss of military utility against peer competitors, the Minuteman has lost deterrent utility due to new threats that are non-responsive to Minuteman deterrence. ICBMs were deployed in response to a Warsaw Pact threat and consequently optimized for targets in that general vicinity. Simple calculations based on the Air Force's published range estimate of 6,000 miles rapidly exclude large portions of the globe which are invulnerable to strike and hence not within a sphere of deterrent influence, to include Southern China, Iran, India, Pakistan, and Sub-Saharan Africa.[41] However, some sources claim the MM III has a range of up to 8,000 miles which includes the entire globe except the southern-most portions of Africa and the Indian sub-continent.[42] Figure 1 depicts range arcs from Minot AFB at 6,000, 7,000, and 8,000 miles.

However, with an assumed longer range, MM III ballistic flight paths to nuclear states require a launch toward and overflight of Russia for any target (excepting those in Europe or Africa). This in itself would trigger the Russian early warning network. Figure 2 depicts launch arcs.

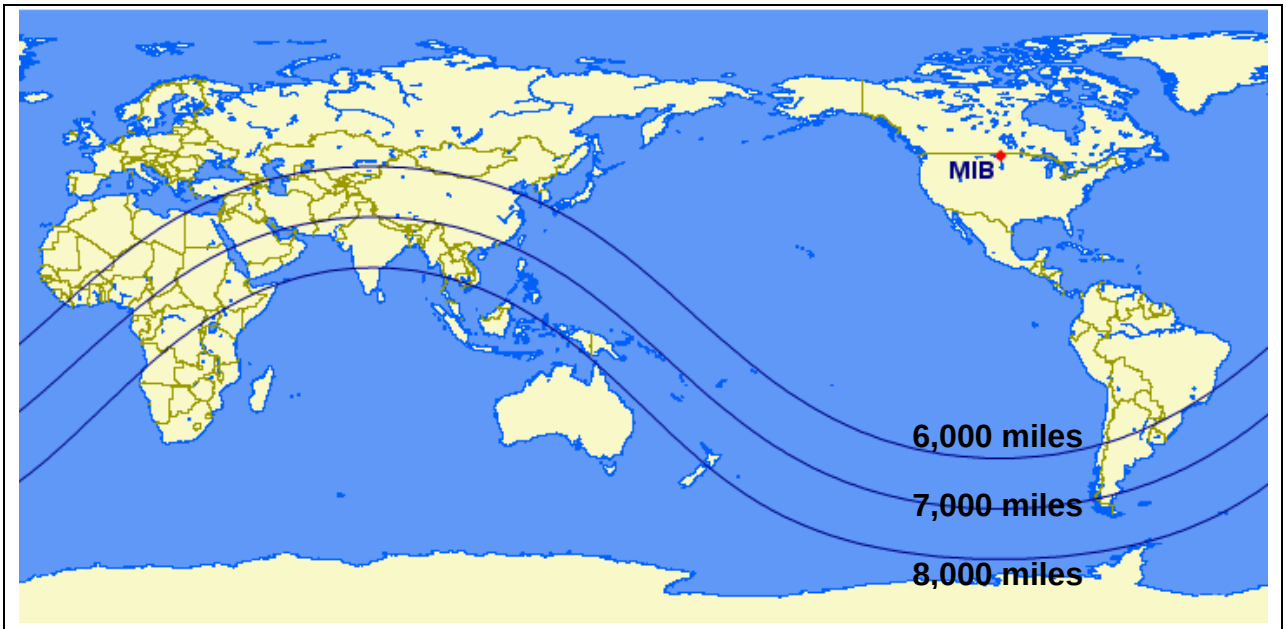

Figure 1. 6,000-, 7,000-, and 8,000-mile range arcs from Minot AFB (MIB).[43]

Figure 2. Notional launch arcs towards nuclear states overfly Russia (shaded).[44]

But perhaps more problematic, a potential Minuteman ballistic flight may require a launch azimuth perilously similar to a strike against a Russian target as shown in figure 3. A great circle route towards Teheran overflies Moscow; a route to Pyongyang approaches Vladivostok. This ambiguity could be diplomatically problematic at best—at worst, it could trigger a Russian nuclear strike upon the US.[45]

This combination of factors—range, overflight, and ambiguity— functionally limits employment of the Minuteman to Russian targets. This is not surprising as the ICBM was conceived and built to provide capability and deterrence against the Soviet Union.[46]

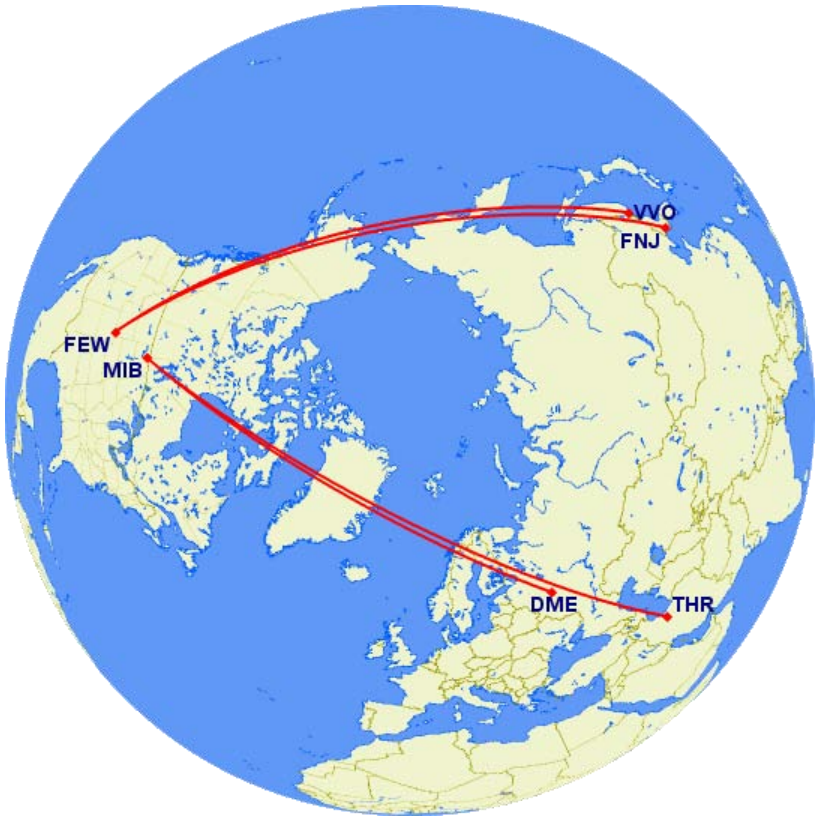

Figure 3. Ambiguous launch arcs threaten Russian strategic areas on the same azimuth. Depicted are notional launch arcs from Minot AFB (MIB) to Moscow (DME) and Tehran (THR) and from FE Warren AFB (FEW) to Vladivostok (VVO) and Pyongyang (FNJ).[47]

ICBMs were originally deployed for a rapid, instantaneous nuclear launch in response to the threat of a first strike feared from the USSR; if required, a rapid reaction ICBM force would immediately deliver a salvo of extreme destruction.[48]

Today, tensions have significantly relaxed with Russia. The US has no significant fear of a first strike from Russia or China; both nations would have "too much to lose" in the face of the response of a reprisal strike from survivable US submarines alone. Existing US survivable capability represents a sufficient minimum deterrent.[49] The Minuteman cannot hold at risk actively mobile targets; consequently, there is no deterrent utility in the first strike capability that an alert-force provides. Because they are not survivable, Minuteman does not represent a sufficiently credible second strike deterrent even in the Cold War mindset. An ICBM first strike is "overkill" when compared with those states with too much to lose.

The Minuteman adds little deterrence against those states and actors with "too little to lose," specifically those without infrastructure held at risk by the MM III weapon system.[50] There are states assessed as un-deterred by existing nuclear forces, to include Iran and North Korea. The constant presence of significant numbers of US conventional forces in South Korea points to this. Additionally, North Korea possesses sufficient numbers of survivable conventional weapons to inflict unacceptable losses on South Korea if it chose to do so. This capability is relatively invulnerable, and in this scenario the Minuteman adds no deterrent utility.[51] Iran has not been deterred from seeking nuclear capabilities. In these scenarios, the MM III is "underkill" against those with too little to lose.

Non-deterred non-state actors, e.g., Al Qaeda (AQ), operate in a dispersed transitory non-centralized method without sovereign infrastructure. This results in minimal ability to deter by threatened retaliation with nuclear forces in general. The US was unable to deter attacks on the

homeland; AQ was not deterred by alert nuclear forces when it conducted its 11 September 2001 attacks against the United States. And the rapid instantaneous launch of a Miniuteman—whose flight path would transit uninvolved sovereign states—against terrorist targets is highly improbable. This points to perhaps to a deficiency in the US willingness to use the Minuteman specifically and nuclear weapons generally.

As previously written, theory states successful deterrence requires a capability coupled with a perceived willingness to use. While the Minuteman's military utility has diminished, the US has also demonstrated a reluctance to use nuclear weapons in any circumstance. In the author's opinion, this reluctance stems from an estimation that nuclear weapon employment is untenable in light of ambiguous effects, acceptable alternatives, and political resistance.

Arguments could be made that the US lacks the political will to use nuclear weapons. Post-WWII, the US has not employed nuclear weapons in any conflict overseas, even when losing, e.g., Korea, Vietnam.[52] These were not attacks on the homeland, but still there was no nuclear use in response to 9/11 attacks killing nearly 3,000 on American soil. Based on simple estimations, the US could have conducted a limited number of nuclear strikes against AQ locations—suitably isolated targets with no fallout and minimal collateral damage predictions—in Afghanistan.[53] Hence there must be additional factors that preclude use.

In a general sense, the US is unable to employ nuclear systems. Most models to predict damage effects are highly idealized and most appropriate for Cold War planning scenarios when collateral effects were secondary considerations. The US has voluntarily abstained from nuclear testing since 1992.[54] Thus, blast, overpressure, thermal, radiation, and fallout effects are largely ambiguous. Thermal fireball, fallout transport, terrain interaction, blast damage, and population density models are all highly dependent on the methods and assumptions. This can result in

variations of over "four orders of magnitude"—from hundreds to millions killed.[55] A concern with a Minuteman launch is first stage re-entry could damage populated territory. Together, the result is uncertain and problematic collateral weapon effects predictions which restrict nuclear use in all but the most dire of circumstances.

Also restricting is the ambiguous effect on high-technology systems. There have been numerous advances in technological infrastructure since the last batch of atmospheric and high altitude tests were conducted by the US and USSR. Vacuum tubes were replaced by transistors; microwave and fiber optic communication links are now in wide use; satellites have proliferated by orders of magnitude. Much of the technology of modern society is susceptible to the charged particles of a nuclear detonation, and space systems are no exception. The US "Starfish" high altitude test energized the Van Allen Belts and within days disabled three orbiting satellites, as well as the Telstar satellite launched the day after the test.[56] Some sources estimate the impact on modern space systems to be "eventual complete loss" of everything within certain altitude ranges.[57] This amount of collateral damage—to include significant fratricide—would be unacceptable. Untoward electromagnetic effects are not limited only to high altitude detonations.

In lieu of a nuclear weapon, the US arsenal contains many suitable conventional weapon options. Treaty-based arms reductions have reduced US nuclear force levels to an extent that there are already too many strategic targets and worldwide adversaries to be targeted exclusively with nuclear strikes. The US has already accepted a nuclear force level that portends minimum deterrence, and instead relies upon highly accurate and capable conventional systems for holding targets at risk and conducting military strikes.

Highly accurate and capable conventional systems can provide "nuclear-like" target kill capabilities. These include bunker busting weapons able to penetrate several layers underground including the 2,000-pound BLU-109/B, 5,000-pound BLU-113, and 5,000-pound BLU-122 penetrator bombs,[58] the 21,500-pound Massive Ordnance Air Burst (MOAB) weapon, new Massive Ordnance Penetrator (MOP) weapon, a 30,000-pound class weapon with the ability to destroy "supposedly untouchable facilities…far underground."[59] High precision, combined with structure penetrating, ability gives the US a conventional capability to destroy hardened targets that formerly could only be defeated with a nuclear weapon. It is the combination of uncertainties in effect, political resistance, and suitable conventional alternatives that belie a perceived US willingness to use nuclear weapons.

There is no compelling requirement for an immediate nuclear strike of 450 missiles, as there is no advantage to the ready salvo Minuteman launch for anything outside of pre-planned and pre-approved mission set. In other cases, the US will have sufficient time to generate an aircraft or sea-launched mission to conduct the strike. The Minuteman is cited for superb response time, but although weapon system execution may be short, the political decision making process will be the constraint.[60] Worse, given technical and operational constraints on use, there is another restriction—the policital impediment.

Tannenwald sums this up with her description of a "nuclear taboo"—the bomb is not "just another weapon." Domestically it is subject to presidential control, while internationally it is categorized by the UN as a weapon of mass destruction. Popularly it has been vilified as an abhorrent immoral weapon unacceptable for use. Consequently, US leaders have been historically constrained from using nuclear weapons.[61] The result is enormous political resistance to using a nuclear weapon, especially when there are substitute conventional options.

This is not merely a political phenomenon, but has military implications. In a 1996 interview regarding the first Gulf War, General Chuck Horner stated "even if Sadam Hussein used a nuclear weapon on us, we would have to retaliate on a conventional basis."[62] Philosophically, the Minuteman force is still a monolithic Cold War arsenal standing by for a response against Russia. If the fixed ICBM is now militarily obsolete and politically unusable, the US should adjust its strategic deterrent posture.

Recommendations: Changing US Nuclear Deterrent Posture

The US should implement nuclear force posture changes and strategic deterrent policy changes to maintain an assured credible capability commensurate with the threat. These changes include de-alerting and de-activating the MM III force, preserving survivable deterrent forces, adopting a minimum deterrent posture, announcing a new nuclear deterrent policy, and conducting a capabilities shortfall review.

The US should de-alert and deactivate the MM III ICBM force and replace it with a survivable alternative. De-alerting could be accomplished immediately as was done by President George H. W. Bush with the bomber and Minuteman II forces.[63] Next, deactivation of the 450 launch facilities and 45 launch control centers could follow in a phased plan to remove materiel and flow personnel where needed, using the Minuteman II, Peacekeeper, and Minuteman III-Deuce actions as a template.

There is international precedence for deactivating a land-based missile force due to deterrent obsolescence. The UK stood down their land-based ballistic missile force in 1963.[64] France stood down their ballistic missile force in 1995. Similar to US systems, the French system consisted of fixed hardened launch sites with missiles on constant alert with the range to strike Warsaw Pact targets. Following a capabilities assessment, French officials assessed the 18

launch facilities to be vulnerable to enemy, e.g., Russian, preventative strike and the predictable missile flight paths were vulnerable to enemy defense, i.e., Moscow ABM system. Leaders concluded that these factors limited the system's military utility and rendered their fixed ballistic missiles an ineffective strategic deterrent.[65] It is worth noting that the decision to decommission their missiles was made in lieu of upgrading and modernizing an aging missile force at substantial expense. France opted to maintain instead a seagoing day-to-day alert capability with ballistic missile submarines as well as an aircraft force that could be generated to deliver nuclear strikes.[66]

In association with a reduced nuclear arsenal, those remaining forces must be preserved as survivable deterrent elements while advanced deterrent capabilities are developed and fielded. The US must maintain, upgrade, and procure capabilities to ensure survivability of sea-based ballistic missile forces. US ballistic missile submarines are currently superior to any adversary and rely on stealth for their survivability. There is a constant threat, however, that an advance in detection capabilities could eliminate this advantage. A survivable land-based system could mitigate this concern.

To reduce the potential vulnerabilities of an entirely sea-based ballistic missile force, US should acquire a survivable land-based ballistic reserve capability. To overcome the limitations affecting the current ICBM force, any new system should be survivable with regard to basing and target penetration. When examining basing concepts, there is a tradeoff between "dispersed and survivable" and "consolidated and secure." The optimum plan would incorporate both. Survivable basing concepts include mobile, hidden, or impervious launch facilities, e.g., extremely hardened or extremely deep. Several starting concepts are readily available from survivable basing studies accomplished in the 1970s and 80s.[67] Weapon storage areas should

also be made survivable to the same extent. Parameters of a replacement system are beyond the scope of this paper, but could include existing MM III in replacement silos, a garrison-based road-mobile missile, or a trench mobile missile. "It might be better to develop a new mobile ICBM only to improve survivability…such a course would seek to avoid the potentially destabilizing aspects of counterforce capability, yet it would respond to the growing vulnerability of silo-based ICBMs."[68] The 1980s Ground-Launched Cruise Missile squadrons provide suitable starting point for organization.

Additionally, any ground-based system must have the capability to overcome defenses. Penetrating warhead concepts, e.g., maneuverable reentry vehicle and hypersonic glide, should be incorporated to provide an unpredictable flight path to target. Survivable basing and assured penetration would restore a measure of credibility to our deterrent forces in the face of a capable peer adversary.

The history of warfare is replete with advances in offenses and defenses countering each other. Defense of US ICBMs has been essentially stagnant since when the silos were constructed in the 1960s.[69] At the time, survivability was based on the LF being "hard enough" of an enemy strike that would not be accurate enough to damage the structure. Adversaries have made considerable strides in the advancement of their ICBM survivability with hardened or mobile systems. But the MM III has foregone the principles of war of maneuver, surprise, economy of force for in-place expediency.

As highlighted in the "new triad" report, the US must maintain an adequate nuclear weapons knowledge base to maintain a requisite intellectual capability with regard to nuclear weapons effects, systems engineering, weapons engineering, facility construction, etc.[70] The US should form, resource, and incentivize a partnership among industry, academia, government, and

military to establish programs, policies, and capabilities. Prioritized ROTC scholarships for nuclear engineering students, bonuses for nuclear proficiency, nuclear cadre program, etc.

Requisite to revamping the deployed nuclear force structure, the US should conduct a conventional capabilities versus nuclear capabilities review. The intent of the review would be to identify any conventional weapon capability shortfalls, e.g., target types that are insensitive to current conventional weapons effects, but vulnerable to nuclear weapons. Advances in conventional weapons capabilities, to include "bunker busters," "MOABs," and the recently tested "MOP" have significantly narrowed the gap between conventional and nuclear capabilities. Nuclear weapons do possess an advantage in blast and overpressure effects, but they are not universally effective against all targets. The capabilities review would further DTRA efforts to identify necessary improvements and upgrades in conventional weapons capabilities to replace any lost nuclear weapons advantages.

In association with changes to nuclear force structure, the US should implement strategic nuclear deterrence policy changes and clarify intentions to restore deterrent credibility. These changes include implementing a minimal deterrence posture, adopting "no first strike" policy, engaging with nuclear states for force reductions, and openly announcing US strategic nuclear policy.

Minimal deterrence consists of maintaining only enough nuclear weapons to retaliate with a response that "makes the cost too high" for an adversary. As previously discussed, theorists believe the US currently has enough nuclear weapons for minimal deterrence. Determination of exact levels is beyond the scope of this paper, but a critical review would be required with careful consideration of the role of a land-based deterrent.

The US should openly declare a "no first strike" policy to accompany engagement efforts. The US is repeatedly challenged for not having a "no first strike" policy and questioned as to why a first strike capability is desired or maintained. China has long advocated that the US adopt a no first strike policy.[71] Such a policy would be intellectually congruent with a minimal deterrent posture and would demonstrate US commitment to a strategic nuclear philosophy that is both defense and deterrence focused.[72] However, some allies have expressed concern over a no first strike policy; the US must seek opportunities for diplomatic and defense engagement to maintain necessary security assurances.[73]

Adopting a minimal deterrent posture and announcing a no first strike policy provides renewed opportunity to diplomatically engage with Russia and China for reciprocal nuclear force reductions consistent with Nuclear Non-proliferation Treaty intent. China has been actively updating its forces, and Russia is on the cusp of modernizing its strategic nuclear forces.[74] Arms reduction efforts would provide an incentive to hold weapons levels at those agreed upon for minimum deterrence. Requisite is an enforceable, verifiable framework similar to those included in previous strategic arms treaties.[75]

Conclusion

In conclusion, this paper explored geopolitical and technological changes with regard to deterrence theory, the Minuteman III ICBM, and recommended adjustments to US strategic posture. First, this paper reviewed nuclear deterrence, explored the advancement of weapons technology, and provided rationale on why the MM III is no longer relevant for global deterrence. At the core, the Minuteman III has lost a demonstrated capability and a perceived credibility to use it thus eroding its fundamental utility to deter. It is the ultimate use-it or lose-it hair-trigger weapon[76]—a destabilizing target set that invites a first pre-emptive strike. Moreover,

it has problematic and uncertain collateral effects and a political resistance to use that makes its employment untenable.

The US should update its nuclear posture and modify its nuclear force structure by de-alerting and then deactivating the MM III ICBM force, replacing it with a survivable deterrent elements, and adopting a minimal deterrent posture. The US should conduct a capabilities assessment, develop advanced conventional systems, and formulate and publicize strategic nuclear policy changes to best serve national security objectives.

An updated nuclear force structure and deterrent policy to match current world political and technological landscape could provide the US with a new opportunity to lead the world effort toward verifiable and complete global nuclear disarmament. While some will point to the folly of the Kellogg-Briand Pact's attempt to outlaw war, positive precedence for disarmament exists with US unilateral cessation of chemical weapons program, multilateral restrictions on offensive biological weapons programs, and nuclear free zone treaties. These efforts are wholly consistent with US Nuclear Non-Proliferation Treaty signatory obligations to pursue "complete and effective [nuclear] disarmament under strict and effective international control."[77]

But in the interim, the US must maintain a credible nuclear deterrent capability. As such, it should abandon the Minuteman III ICBM—a stagnant and dogmatic portion of the triad—and replace it with an evolved and more capable land-based system that will be survivable and effective if needed. This best serves to bolster deterrence and provide for the common defense.

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