

Guillermo Pulido Pulido
Master in Security, Peace and Defense

Mail: guillepulido@hotmail.es

Multi-stable deterrence. The equalizing power of precision and salvo warfare in the third nuclear age

Abstract

The proliferation of long-range precision-guided munitions creates an operational environment that generates hitherto unprecedented strategic effects involving a disruption in the classic concepts of deterrence and strategic stability. In the first place, the equalizing effect of precision is generated, in which the proliferation of guided weapons means that contenders of very unequal size and potential can cause massive mutual damage. Secondly, the trend towards the proliferation of precision weapons leads to the creation of a new type of military conflict that we refer to as salvo warfare. Thirdly, the massive damage caused by conventional precision munitions gives rise to the strategic phenomenon of multi-stable deterrence. The combination of all of the above creates a nuclear third era strategic environment in which nuclear weapons foster instability, as opposed to the stability of the first nuclear era of the Cold War, and escalation.

Keywords

Deterrence, Precision, Nuclear, Salvas, Warfare.

Cite this article:

Pulido Pulido G. (2025). "Multi-stable deterrence. The equalizing power of precision and salvo warfare in the third nuclear age". Journal of the Spanish Institute for Strategic Studies, No. 25, pp. 397-420.

1 Introduction

The proliferation of long-range precision munitions in massive quantities is altering classical conceptions of strategic stability, adding an unprecedented level of complexity, especially in the operational environment and at the strategic level. This proliferation of long-range precision munitions is intertwined with the nuclear deterrence debates of the second and third eras, now adding a new third whose main feature is the effects on strategic stability caused by this class of projectiles.

New military technologies are creating hitherto unheard-of strategic phenomena. In addition, they are also altering the operational environment and changing the character of warfare with the emergence of new forms of armed conflict. The academic literature on the second and third nuclear eras, although it has already made important contributions to the debate on deterrence and strategic stability, has so far overlooked a number of phenomena that will be discussed in this research paper.

The first two parts of the article will present the state of the art regarding the first and second nuclear eras (Gray, 1999; Koblentz, 2012; Yoshihara and Holmes, 2012; Bracken, 2012; Payne, 2021), which will serve as an introduction to the third era (Futter and Zala 2021; Futter *et al*, 2025; Panda, 2025) and several original contributions we make to the discipline. These concepts are those of “precision equalizing power,” “salvo warfare,” and especially that of “multi-stable deterrence.”

2 The first nuclear era

The Cold War was the framework in which the first nuclear era took place, a period in which military technologies and a specific political context converged to form an environment characterized by a solid strategic stability combined with high pre-war hostility and the terror of full-scale nuclear war.

The key lies in the fact that nuclear weapons formed a stable framework, a strategic straitjacket, which set very specific rules of behavior for the actors, leaving little room for freedom of action. This state of affairs was referred to as the nuclear stalemate (Krepon, 1984).

The specific Cold War norms were shaped, according to the nuclear revolution school (Mandelbaum, 1981; Jervis, 1989; Sagan, 1989; Glaser, 1990) by the characteristics of the military technology of that historical moment.

According to this school, nuclear weapons have the effect of revolutionizing the nature of international relations if two requirements are met. The first requirement is that the nuclear arsenal must have the capacity to destroy an adversary by eliminating a large portion of its population centers and poles of economic activity. The second requirement is that the arsenal must be a second-strike arsenal, which means that it must be able to survive a surprise first strike while retaining the capability to destroy the enemy. The combination of both elements formed the strategic situation of mutually assured destruction or MAD (Mutually Assured Destruction).

The quantitative criterion of what exactly is destruction is not a closed question. One example is that of Secretary of Defense McNamara, who stated that destruction (of the USSR) implied eliminating 25-30% of the Soviet population and 50% of its industry. This would require that the U.S. second-strike arsenal against a surprise attack by the Soviet Union have a minimum of 400 megaton equivalents (i.e., destroy an area equivalent to that of 400 one-megaton warheads with any given final warhead configuration). Naturally, destroying smaller states such as Israel, 30% of its population and 50% of its industry requires far fewer megaton equivalent warheads. There are other criteria for defining in strategic studies the term destruction of a country (Kaku, 1987; Kaplan, 2020), but the essential aspect is that it must go beyond the response assured to cause unacceptable damage. The degree of destruction must be that of national destruction for nuclear deterrence to be truly effective.

From the criterion of assured destruction and the success rate that an enemy surprise attack could achieve against the adversary arsenal, the nuclear force structure to be deployed and the specific type of strategy to be adopted were deduced, according to this quasi-technological determinism account (Freedman, 1981; Kaplan, 1983). For example, if in a Soviet surprise attack scenario they were capable of eliminating 90% of the U.S. nuclear force, if the criterion for the destruction of the Soviet Union was 400 megatonnes equivalent, it followed that the total U.S. force structure had to be at least 4000 megatonnes equivalent. Moreover, since the scenario was that of a surprise attack, the nuclear force posture had to be ready for second-strike counterattack immediately. This high level of alert required not only the buildup of at least 4,000 one-megaton warheads, but the launchers or delivery vehicles for the warheads had to be capable of executing the second-strike attack, necessitating the deployment of a complex arsenal of intercontinental land-based missiles (ICBMs), Intercontinental Ballistic Missile), ballistic submarines SSBN (Ballistic Missile Submarine) with SLBM (Submarine-Launched Ballistic Missile) and a force of long-range strategic bombers, forming the nuclear triad and a complex command and control network.

This strategy was called by the U.S. Secretary of Defense McNamara himself as one of assured destruction. Emphasize that it was only a strategy for the United States, it was not mutual with the Soviet Union. It was when the Soviets developed their own second-strike arsenal that MAD was finally arrived at. The strategy of assured destruction that the United States and the Soviet Union ended up adopting was inevitable given the military technology of that historical period. At first both superpowers pursued a strategy of nuclear superiority (Kroenig, 2018; Pulido, 2019), but after a process of trial and error, they assessed that it was an arms race whose goal was impossible to achieve since both contenders had sufficient resources to deploy a second strike force with the capability to destroy the adversary. The technology of the time did not allow for sufficiently accurate nuclear strikes with ballistic missiles, so executing counterforce strikes with them was probabilistically almost impossible. The same was true of submarine-launched ballistic missiles. Strategic bombers did have adequate accuracy, but they were very slow attack vectors that made it impossible to execute a surprise attack, so it was possible that by the time they reached their counterforce targets many of the enemy shells and bombers would have already taken off. Nuclear superiority ultimately did not matter.

This technological straitjacket formed a political framework functional to this context, which moderated military risk-taking behavior and strategies that were too risky, since they ultimately resulted in the destruction of the country's infrastructure.

mutual. It was Gaddis (1987) who best identified the rules that kept the Cold War in check and shaped what he called the "long peace". Comparing the foreign relations of the Soviet Union and the United States before and after World War II, he found that there was a change in the nature of behavior between the two powers. The new moderation and avoidance of direct conflict stemmed from the advent of nuclear weapons in international politics.

Therefore, the first rule or condition for maintaining the long peace was the existence of nuclear weapons in a MAD condition, since it ensured strategic stability by rendering arms races in search of primacy futile and the feasibility of launching a first surprise attack. The second rule was to clearly demarcate the spheres of influence to avoid clashes in an attempt to control undefined spaces. This rule derived in the policy of blocs that prevented changes of alliance, this being another safeguard for strategic stability. The third rule derived from the two previous rules was to avoid direct confrontations, either by trying to win allies from the adversary or by attacking the adversary superpower for fear that a nuclear escalation might be unleashed.

The fourth rule for sustaining the long peace was that of bipolarity and balance of power. In international relations theory there is a long debate as to which type of structure of international systems is the most stable: multipolar (Kratochwil, 1978; Bull 2005), bipolar (Waltz, 1979) or unipolar (Organski, 1958; Gilpin, 1987). According to Gaddis (1997), bipolar is the most stable system, since, following a line of argument very similar to that of Waltz (although giving it historical context), equilibrium is reached automatically and not after complex negotiations that may not be successful. Bipolarity, moreover, leaves no room for miscalculations and power games, in which four great powers could coalition against two. As a culmination and consequence of the above (and according to the supporters of the thesis that bipolar systems tend to be more stable) the system has less uncertainty than if there were multipolarity, making it easier to resolve the security dilemma present in all systems of international politics and security. The dilemma would be easier to solve since the power of both states is similar, so any attempt to take advantage of one state over another would be easily countered, returning to a situation of equilibrium. In contrast, coalitions and power imbalances can occur much more frequently in multipolar systems since, by definition, they are not systems with two poles of similar power and, therefore, balanced.

Therefore, and as a conclusion to this epigraph, the first nuclear era shaped a bipolar international system in which atomic weapons generated solid strategic stability.

3 Second nuclear era

In the second nuclear era, the technological and political variables that generated stability were altered to generate a more strategically unstable environment. From

bipolarity to multipolarity, arsenals reduced in size, the accuracy of offensive weapons improved, strategic defenses became more effective, the normative and cultural environment was no longer shared by decision-makers, and the global balance of power gave way to multiple regional balances.

3.1 Multipolarity

If the first nuclear age and the Cold War were characterized by the bipolarity of the strategic environment, the second nuclear age will already be a multipolar world composed of at least three major powers with atomic arsenals of comparable size.

Multipolarity emerges as a result of two main trends. On the one hand, the arms reduction treaties between Russia and the United States had considerable success in reducing strategic nuclear arsenals very appreciably. The New START treaty, signed in 2010, imposed a limit of only 1,550 warheads and 800 launchers (ICBMs, SLBMs, and bombers) as per the particular count stipulated between the United States and Russia (Rogers, Korda, and Kristensen, 2022). This was a considerable reduction from the SALT (first strategic nuclear arms limitation treaty) limits, which allowed the US to deploy 1,054 ICBMs and 710 SLBMs and the USSR to have 1,618 ICBMs, 950 SLBMs, but imposed no limits on either the number of bombers or the number of warheads. Although the New START treaty did not usher in the second nuclear age, it did mean that the ceiling that a nuclear power has to reach to be considered a major power was lowered considerably, making the emergence of new nuclear great powers much more attainable.

On the other hand, the second trend comes from the increase in the size of the arsenals of the smaller nuclear powers to face the growing threats to their security. The paradigmatic case is that of the deterrent triangle between China, India and Pakistan, leading to a dynamic of constant nuclear race and expansion, more difficult to control than that of the bipolarity between the United States and the Soviet Union. As will be explained below, China perceived a growing threat to the credibility of its second-strike arsenal from technological improvements in the U.S. first-strike arsenal (Heginbotham *et al.*, 2015), which made it feasible to execute a first strike that would destroy all to the vast majority of the Chinese retaliatory arsenal. For that reason, China had to start expanding the number of nuclear weapons and delivery vehicles (Hiim, Fravel, and Troan, 2023), to raise the probability of survival against a U.S. first-strike scenario. The increase in the number of Chinese nuclear weapons has an impact not only on its strategic interaction with the United States, but also induces the need for India to in turn increase its own nuclear arsenal to respond to the Chinese threat (Clary and Narang, 2018). In turn, the increase in the Indian arsenal induces Pakistan to have to expand its own as well (Sankara, 2015). Consequently, the above induces India to have to increase its number of warheads and delivery vehicles to respond to the threat coming from China and Pakistan, which forces Chinese deterrence to also have to increase to confront both Americans and Indians. This arms race dynamic means that powers with very small arsenals during the first nuclear

era will have to gradually increase them, approaching the levels of the great powers. It should be noted that, for now, the hypothesis of an arms race due to the instability of a triangular arms race is only clearly being fulfilled in the case of China, which has already added 600 nuclear warheads (FAS, 2025) from just over 300 four years ago, while India is still in the initial phase of expanding its submarine force, while Pakistan has not yet shown any signs of substantial increases in its arsenal.

The difficulty of having to balance several poles, generates instability in the arms race (Koblenz, 2014; Miller and Arbatov, 2021) and the tendency to expand arsenals. The mutually beneficial concessions and trade-offs that could be achieved in a situation of bipolarity, such as during the Cold War, are much more difficult to achieve in a situation of multipolarity because the reduction and trade-off in one dyad (China and the United States) may harm what happens in other dyads (China and India).

This instability does not only occur in arms races but can also affect possible crisis and war scenarios. That is, there could be a circumstance in which two nuclear powers coalition against a third. Thus, in a situation where three nuclear powers have agreed to have arsenals of similar size (as is currently the case between Russia and the United States), it could come to pass that by aligning two against the third power, it could actually have a two-to-one advantage in the nuclear balance. This hypothesis is being taken very seriously by U.S. decision makers and was raised in the Strategic Posture Commission (Creedon *et al* 2023). The conclusions of that commission were that should China continue to increase the size of its nuclear force, at some point in the next few years, the United States would have to make a decision to increase its arsenal to meet a possible joint Russian-Chinese threat. Although a joint strike is an unlikely scenario, it could conceivably undermine the credibility of U.S. nuclear retaliation. The expansion of the U.S. nuclear arsenal could have the consequence of inducing Russia and China to increase their weapons levels, leading to a possible spiral similar to that described between the Chinese, Indians and Pakistanis.

3.2 Reduced size and precision arsenals

The reduction of retaliatory arsenals not only has the effect of facilitating nuclear multipolarity and generating the incipient nuclear arms race *se* underway (SIPRI, 2024; Wilson, 2024), but also has the consequence of undermining the strategic stability of the first strike, inducing possible counterforce and surprise attacks.

This strategic context in which a counterforce first strike can become strategically rational has been termed new-era counterforce (Lieber and Press, 2006, 2017) and is driven by improvements in the precision of strike vectors. The combination of reduced arsenals and precision nuclear weapons alters the strategic probability calculations that have maintained strategic stability since the Cold War.

It should be borne in mind that arms control treaties such as START and New START were designed following very meticulous calculations so that arms reductions

would not generate a hypothetical possibility of being able to launch a surprise attack. The essence of these calculations lies in the probability that each attacking weapon can destroy an adversary's retaliatory vector. For example, if in a dyad each contender has 1,500 nuclear warheads carried on 1,500 missiles, with an accuracy that provides a 30% probability of destroying an adversary missile, it would take 5,000 warheads and missiles to destroy the entire enemy arsenal, with no surviving warheads to execute a retaliatory strike. Therefore, if the two states in the dyad limit their arsenals to only 1,500 warheads and missiles, the resulting strategic situation would be very stable and there would be no incentive to strike first.

But the strategic situation would become very unstable in the event that the 1,500 warheads were deployed on 750 missiles (two warheads per missile) and the accuracy increased the probability of destruction to 90%. In that case, only 422 attacking missiles with two warheads each would be needed to destroy all 750 adversary missiles. That is why New START limits both the number of warheads and the number of launchers (attack vectors such as bombers, land and submarine-based missiles) and establishes a regime of inspections (with very little notice) that makes it impossible to execute any kind of surprise attack that would destroy the enemy's second strike arsenal (Gottemoeller, 2021).

Technological advances have meant that in recent decades accuracy has improved considerably, making, for example, the probability of destruction of a Russian ICBM silo by a U.S. Trident D5 warhead over 90% by having an accuracy of less than 90 meters and a variable yield of between 100 and 450 kilotons (Kristensen, McKinzie, & Postol, 2017). High-accuracy strategic strike capability with intercontinental missiles is not limited to underwater Trident but is common to all U.S. missiles because of a deliberate technology policy that bore fruit at the end of the Cold War (MacKenzie, 1990). The evolution and proliferation of precision strike capabilities across all types of munitions and platforms is a long-term tenure (Watts, 2013a). This technological trend not only affects strategic weapons such as ballistic missiles or superpower bombers, but is already accessible to states of lesser potential and on platforms that previously could not be converted into long-range precision strike platforms (Watts, 2011; Krepinevich, 2015; Guzinger and Clark, 2015). A paradigmatic example is the Ukrainian A22 Foxbat drones, based on an ultralight aircraft and converted to long-range munitions attacking factories inside Russia (Sutton, 2024).

Moreover, historical research has revealed that during the Cold War, Soviet ballistic submarines were trackable by U.S. hunter-killer submarines and could have been destroyed in the lead-up to a superpower confrontation (Cote, 2003; Long and Rittenhouse, 2014). The proliferation of sensors, cyber instruments and artificial intelligence adds more and more transparency to the battlefield and strategic operations. However, this is a topic still under discussion, as there are authors (Geist, 2023), who argue that, at the strategic level, the growing capability in surveillance and reconnaissance will not come to have implications of fundamental change (that transparency will not be reached at the strategic level), although at the tactical and operational level there have been significant changes. In this regard, the exchange of ballistic missile and drone fire between Iran and Israel in 2024 showed that U.S.

and Israeli surveillance was able to provide early warning of attacks, which seems to support those who maintain that nuclear operations and deterrence will be much less opaque than during the first nuclear era.

Hypersonic missiles (Speier *et al.*, 2017), quasi-ballistic missiles (IISS, 2022) and ballistic missiles specifically designed to follow depressed trajectories by carrying high ballistic coefficient reentry vehicles (Wright and Tracy 2023, 2024), add strategic instability by facilitating the execution of surprise attacks. The common feature of the aforementioned missiles is that they can follow trajectories at much lower altitudes than ballistic missiles, which have to follow a highly arcing parabola, being much easier to detect. In addition, by following a much more direct trajectory, they take less time to reach the target. During the Cold War it was taken for granted that from detection of enemy missiles to impact would take at least 25 to 30 minutes, which allowed time to ensure that the attack was not a false positive and, in the event of a real attack, to organize and order a retaliatory strike (avoiding decapitation), as well as to execute the retaliation before the first impacts destroyed the missiles and bombers in situ. The combination of much greater stealth in the execution of the attack (as the projectiles can only be detected a few minutes after impact), greater information available in the tracking of the launchers and the greater speed in reaching the designated target by flying at hypersonic speeds generates more strategic instability by giving much less time to assess the true magnitude of the threat, inducing decision-makers to put themselves in the worst-case scenario, promoting more escalatory responses.

Therefore, in the age of precision, reduced nuclear arsenals, the proliferation of sensors, hypersonic missiles, advances in artificial intelligence that facilitate the location and tracking of delivery vehicles and launchers, etc., make up a new era of counterforce in which it is strategically increasingly rational to execute strikes against enemy strategic forces, as discussed in the book *The Myth of the Nuclear Revolution: Power Politics in the Atomic Age* (Lieber and Press, 2020). In that work, the scenario is modeled in which a U.S. surprise first strike would destroy the vast majority of the Russian second-strike arsenal.

3.3 *Strategic defenses*

Missile defenses and defenses against projectiles that can achieve strategic effects (drones attacking critical infrastructure) are much more important in the second nuclear age than during the first (Rehberg and Kemp, 2024).

After the end of the Cold War, anti-missile technologies achieved a very remarkable development compared to what was technically feasible in the first nuclear era. Suffice it to compare the poor performance of Patriots against Iraq's Al Hussein missiles in the 1991 Gulf War with the far superior performance of Patriots in the Ukraine war or of Israeli defenses in the two Iranian missile attacks in 2024 (Hoffmann, 2024). If in the 1991 war almost no Scud could be effectively shot down, in Israel in 2024 only slightly more than 20% of Iranian ballistic missiles made it through Israeli defenses.

Another reason why missile defenses are now more relevant than during the Cold War is also related to the reduced size of strategic arsenals. Since the economics of defense always requires more resources (Wilkening, 2004) than offense (needing two or more interceptor projectiles per attacker), when thousands of intercontinental missiles and many thousands of warheads were deployed in the Cold War, the deployment of strategic defenses did not meet the Nitzze cost-benefit criterion (Vaughn, 2002). Nitzze stated that strategic missile defenses should meet three criteria for deployment: they should be effective, they should survive an enemy counterforce attack, and the cost of shooting down enemy projectiles should not be prohibitive.

However, since the strategic arsenals of the major powers have now been so greatly reduced and effectiveness has increased, there is strategic rationality in deploying missile defenses against relatively limited threats. Especially when enemy arsenals can be greatly reduced by highly effective counterforce attacks facilitated by the new precision and information technologies mentioned above.

Anti-missile defenses could knock down the small surviving remnant of the enemy second-strike arsenal, rendering mutual destruction unattainable and undermining strategic stability. Moreover, missile defenses have additional advantages in controlling escalation and making coercive limited strikes more difficult (Costlow, 2022a, 2022b). For confronting regional powers missile defenses have even greater utility precisely because the size of their nuclear forces is also smaller.

3.4 Regional powers and geography

Another difference between the first and second nuclear eras is that smaller regional nuclear powers are of greater importance than in the Cold War. This is mainly due to the increase in the ranges of strategic weapons available to regional powers.

Paradigmatic examples are North Korea and India, which are developing missiles with intercontinental range. In the Cold War, France and the United Kingdom focused on regional threats, deploying medium and intermediate range weapons to deter the Soviet Union. The same was true of Israel, which during the first nuclear age deployed short- and medium-range delivery vehicles sufficient to sustain deterrence with the hostile neighboring states of Egypt and Syria. But once the second nuclear era advanced in time, Israel had to develop a nuclear arsenal of much greater range with which to maintain deterrence with Iran (Pulido, 2019), since in turn the Iranian state initiated a very ambitious long-range missile program (Pulido, 2020) that together with the nuclear program implied an existential threat to Israel.

Consequently, the technological trend towards the increasing accessibility of long-range weapons to lesser powers adds complexity to the simple and predictable strategic calculations of the Cold War, which basically limited the bipolarity between the Western and Soviet bloc, while at today a complicated skein of local conflicts is interwoven that could potentially trigger attacks of intercontinental scope.

3.5 *Culture and deterrence*

Another distinctive feature of the second nuclear era is the cultural differences and asymmetry of interests between the states confronting each other, which contrasts with what we discussed earlier about the predictable rationality of decision-makers during the Cold War.

The Cold War was fought in a rigid context in which a series of unwritten rules prevailed, which were nevertheless known and respected by all the actors. These rules emerged after a process of initial strategic interaction until they were institutionalized, which eliminated uncertainty and allowed cooperation (Jervis, 1976). From this perspective, the stability of the Cold War was not so much due to a material issue because of the mass destruction capacity of nuclear weapons, but above all to very specific cultural and psychological aspects that need not be repeated at other historical junctures (Payne, 2001). This could be the case of a nuclear power with expansionist, messianic ideals or a greater tolerance for punishment. Such would be the case of radical religious leaders of nuclear weapon states (such as Iran and Pakistan) or if Hitler's Germany had developed atomic weapons.

To top it all, the importance of asymmetry of interests in strategic calculations demonstrated by behavioral economics and prospect theory (Kahneman and Tversky, 1979) shows that actors do not value gains or losses symmetrically in the face of the same event. Therefore, the necessary balance of costs and benefits between aggression and retaliation could break down more easily than strategic studies assumed during the Cold War.

This asymmetry provided by prospect theory can be illustrated with the following example. The perceived benefit of executing an aggression could be evaluated by the aggressor with a value of 10, while the defender would perceive a loss of 30. The aggressor could deduce that he executes a limited aggression that would not exceed the nuclear threshold, making a miscalculation and triggering a retaliation that he would interpret as disproportionate.

4 **Third nuclear era**

In recent years, a stream of research has emerged that argues that we are at the dawn of a third nuclear era that overlaps with elements of the previous two, generating a strategically very unstable mix.

As it is a recent research stream and not yet established in the academic literature, the concrete definition of the characteristics of the concept of the third nuclear era is still emerging. However, the central aspect, on which the different definitions coincide, is the importance of Strategic Non-Nuclear Weapons (SNNW).

Fetter's (2021) definition of the third nuclear age is that it is composed of four essential characteristics. First, a growing perception that strategic forces and population centers could be protected against nuclear attack with missile defenses. Second, the

maturation and spread of non-nuclear weapons that could be used to threaten an adversary's nuclear and associated systems. Third, the emergence of unconventional capabilities that provide new means to defend against or attack an adversary's nuclear systems. These include various types of computer network operations, or what are often loosely referred to as cyber attacks. These cyber attacks could disable the use of enemy missiles and attack vectors, temporarily sabotaging them until they could be repaired. This was the case of Israel's attack against a nuclear reactor under construction in Syria, employing a system similar to Suter that disabled Syrian radars (Gasparre, 2008). In a crisis situation or during an exchange of strikes and counter-strikes, disabling a fraction of the enemy's arsenal, without actually destroying them, would be very useful both to facilitate a first strike that undermines the arsenal of second strike and to discourage the use of nuclear weapons by the adversary. The fourth feature is that of a highly transparent, real-time, digitized operating environment, taking advantage of the revolution in *sensorization* to locate and track the adversary's attack vectors.

As the first, third and fourth characteristics actually dovetail with aspects already present in the second nuclear era, in reality what is truly characteristic of the third nuclear era is the proliferation of strategic non-nuclear weapons. The proliferation of SNNWs in massive numbers and with precision links to the concept of precision-equalizing power developed below, which in turn links to multi-stable deterrence.

An additional feature of the third nuclear era, a consequence of the four already noted, is that the firewall or dividing line between nuclear and conventional weapons is blurring (Bowers and Hiim, 2021; Horschig and Aamopoulos, 2023). As conventional weapons can achieve strategic effects, such as destroying nuclear delivery vehicles or damaging critical infrastructure, the lines of separation between the use of nuclear and conventional weapons begin to blur.

During the Cold War, in the event of a conflict between the U.S. and the Soviets, the use of weapons with strategic effects was almost exclusively assumed to involve the use of nuclear weapons, whereas today, precision-guided munitions salvos could be launched that could cause significant damage without the use of atomic weapons.

It should be mentioned that this feature of conventional weapons blurring the nuclear firewall was already described by authors of the second nuclear era (Watts, 2013b). As mentioned above, the specific characteristics of the second and third eras have many points in common, but as the proliferation of long-range precision weapons, or SNNW, is a recent phenomenon (approximately the last 10 years), and perhaps the most distinctive feature of the third era, the consequence they generate from the blurring of the boundaries between the nuclear and the conventional we have ascribed it to it.

4.1 The equalizing power of precision and its strategic effects

There are highly relevant contributions on the strategic and military effects of the proliferation of precision long-range munitions and the information technologies that facilitate them (Schneider, 2019; Futter and Zala, 2021; Plichta and Rossiter, 2024; Hoffman, 2024).

However, there are strategic phenomena not yet investigated in the literature. The first of these is what we refer to as the “equalizing power of precision”, previously outlined by Pulido (2021).

Long-range precision munitions produce what is called the “precision equalization effect,” altering the traditional distribution of military power, which was derived from the size and potential of its economy and demographic size. In the industrial era this meant that the side with more factories and resources with which to produce more war platforms and munitions prevailed. In the first nuclear era there was already an alteration in the distribution of power derived from material power, since the capacity for mass destruction provided by atomic weapons made, for example, two contenders capable of deploying 500 battle tanks and 200 bombers equal to another that could deploy 5,000 battle tanks and 2,000 bombers. Both states could be completely destroyed if they possessed a sufficient number of nuclear warheads. This strategic phenomenon was called the “equalizing power of the atom” (Kartchner, 2004). Before nuclear weapons, the 2,000 strategic bombers could destroy the smaller rival state’s factories and population centers, while the smaller contender’s 200 bombers would find it more difficult to destroy its much larger enemy with many more targets to attack in an attempt to meet the McNamara criterion.

In order to understand the equalizing effect of the proliferation of inexpensive, long-range precision munitions, let’s take the following example. Assume two countries consisting of 200 strategic targets to destroy each other (cities, critical infrastructure, etc.). In the case of a battle with industrial-age military technology, assuming that each munition launched had an accuracy of 1%, the side that could manufacture and fire 20,000 munitions to destroy those 200 targets first would prevail. Therefore, if the economy of one of the warring states could only produce 5,000 munitions and the other 40,000, the latter would prevail.

In the age of precision, where precision munitions are cheap and plentiful, assuming a contest between two rivals of 200 targets of strategic interest each and that improvements in precision have increased the probability of destruction of the attacked target from 1% to 50%, if the weaker side can only deploy 400 munitions, while its adversary has an arsenal of 4,000, they are actually strategically equal in that both can destroy the other’s infrastructure and economy.

A practical example of this precision-equalizing effect was the missile war between Saudi Arabia and the Houthis in Yemen between 2015 and 2024. When the Houthis were able to employ long-range precision-guided munitions provided by Iran, they began a campaign of attacks against Saudi oil and critical infrastructure that forced the government in Riyadh to initiate talks to stall the war, as the economic damage could become massive if the attacks continued to escalate (Heistein, 2024).

However, while long-range precision weapons have an equalizing effect, they do not have the same equalizing effect as nuclear weapons. Nuclear weapons are capable of wiping out very large areas and eliminating not only critical infrastructure but entire cities. In other words, nuclear weapons can meet the McNamara criterion (eliminating a certain percentage of the population and industry) while conventional

precision munitions, if they are very numerous, could damage a certain percentage of the enemy economy by attacking its critical infrastructure (power plants, sewage treatment plants, ports, airports, etc.). In this sense, the proliferation of conventional precision long-range munitions can be defined as “weapons of mass damage” (since they can damage or destroy the critical infrastructure of a state) rather than weapons of mass destruction such as nuclear weapons.

In addition to the equalizing effect that, each in its own way, nuclear weapons and conventional precision weapons share, both also have in common the emboldening effect. That is, nuclear weapons can produce the effect of emboldening conflicts (Kapur, 2005; Bell, 2015), rather than moderating them as argued by the nuclear revolution school (Glaser, 1990). Continuing with the polarity debates and adding to it the always unfinished debate on offensive theory, historically periods in which military power is more evenly distributed and military technology favors the offensive, the international system tends to be much more unstable and war-prone (Van Evera, 1999). This would support the hypothesis that multipolar systems are more unstable, especially when offensive weapons predominate (Mearsheimer, 2001), as it exacerbates the cooperation problems presented by the security dilemma, pushing powers to behave more aggressively or offensively to increase their security by maximizing their relative power.

When power is more equally distributed, the tendency is for the order maintained by verticality and hierarchy to give way to conflict by making it economical for the previously subordinate strategic actor to opt for resistance or armed attack. The new military technologies that proliferate and democratize access to precision fuel armed conflicts simply because they now provide the opportunity to attack and fight with capabilities previously only accessible to great powers (Vickers and Martinage, 2004; Mahnken, 2006; Singer, 2009; Boyle, 2013). In that sense, Van Evera’s (1999) version of offensive-defensive theory also predicts a greater propensity for conflict as long-range precision munitions are clearly an offensive technology. In contrast to nuclear weapons, which were defensive weapons because of the deterrent effect generated by mass destruction, by increasing the costs of aggression through nuclear retaliation.

4.2 Schelling’s point and the debate on strategy and deterrence

Although the nuclear revolution perspective has been by some way the most popular conception of the nature of the strategy within certain academic sectors, it has been far from unanimous and competes with other schools of deterrence. This is a very lengthy and technical debate that is not relevant to detail here. The essential point that interests us in the present research is that the nuclear weapon was never a magic solution to all threats and potential aggressions with which deterrence could be maintained.

In the United States, during Eisenhower’s presidency and his New Look nuclear policy of massive nuclear retaliation against even limited aggression by the then Sino-Soviet bloc came to a rapid dead end when the Soviet Union developed its

own nuclear arsenal with ICBMs and bombers. Authors of the stature of Kauffman (1956), Kissinger (1957) and Osgood (1957) pointed out the absurdity of the deterrent policy of massive retaliation to the neglect of the conventional capabilities of the U.S. armed forces. It could be the case that the Soviets, with great conventional superiority decided to invade a part of Central Europe, stopping the war at that point and not advancing to take all of Western Europe. The New Look response would have been that of an atomic apocalypse given the great contamination that would have occurred. The criticisms of the three authors mentioned above pointed out that along with a powerful nuclear force, conventional capabilities symmetrical to adversary conventional threats should also be deployed, in the event that the enemy was equipped with a retaliatory atomic force.

Not every aggression that a nuclear-armed power may receive crosses the nuclear threshold. This threshold is the calculation of the possible costs and benefits of a course of action. This threshold is what is now called the Schelling point (1960, 1966). The school of nuclear strategy, which some manuals refer to as the difficulty school (Buzan, 1991), implies a total amendment to the theoretical foundations of the nuclear revolution. In recent years there is a growing literature that criticizes the view of the Cold War as a first nuclear era in which MAD prevailed, providing contrasts and clarifying nuances (Gavin, 2019; Lieber and Press, 2020). For example, Rittenhouse (2020) explains in detail how U.S. nuclear policy and strategy during the 1970s did not agree with what the school of the nuclear revolution said states would behave once they were equipped with atomic weapons (deterrence strategy limited to guaranteeing the second strike, little importance to conventional forces, etc.), but rather maintained a strategy of counterforce, control of escalation and with powerful conventional forces, in order to escape nuclear stalemate and regain strategic freedom of action. In this sense, authors defending the nuclear revolution thesis, such as Jervis (1984), spoke of the illogic of the U.S. nuclear strategy. The Soviet case did not fit either with what the nuclear revolution school claimed to be strategically rational behavior (Kolkowicz and Mickiewicz, 1984).

That is, the asymmetry between interests, military capabilities, benefits and costs actually broke the nuclear stalemate. This even happened in the field of the arms race (Rittenhouse, *op cit*) where the revolution school said that deploying certain nuclear capabilities was strategically absurd in a strategic MAD situation. However, what the nuclear revolution school did not take into account was that, while an all-out confrontation was absurd, the maneuvers and strategies that take place under Schelling's point do have strategic rationality.

Some historical examples of conventional military conflicts with nuclear powers that did not trigger nuclear retaliation are the Korean War and the Yom Kippur War. However, it cannot be deduced from these cases that nuclear weapons have no strategic utility, since in fact they forced that, although they were fought with a great deployment of means, the objectives of offensives and counter-offensives were constricted, entering into the realm of limited warfare that were inaugurated with the appearance of nuclear weapons. In the Korean War, the Americans chose not to escalate the conflict, attacking with nuclear weapons the Chinese bases in Chinese

territory because of fear that this would lead to a general war with the USSR (which had nuclear weapons since 1949). The strategy then was not at a stalemate, but simply induced to execute maneuvers below Schelling's point through escalation control strategies and calibrated aggressions.

4.3 *Multistability*

It is here that the question of whether strategic nuclear weapons have a pacifying or destabilizing effect is resolved. As we have seen, some authors support the nuclear revolution theory and others the emboldening theory, without ever resolving the debate. The key to solving the problem was provided by Hermann Kahn in his posthumous work *Thinking about the Unthinkable* in the 1980s (1984) with the concept of "multistable symmetric deterrence".

One must start from the theoretical assumption that MAD situations could actually become very unstable strategically as it would be absurd to respond with a full nuclear retaliation (which would be mutually destructive) to contain limited aggression. In cases where there is an asymmetry of interests and one of the contenders values a bidding object much more highly than the other contender, the cost of executing a limited aggression would be below the Schelling point of his adversary, who is not compensated to risk a full nuclear retaliation since the probability of such a retaliation would be 100% in case the opponent decided to execute it (safe second-strike force).

Kahn's (1984) concept of multistability describes the strategic situation in which the probability that the second strike force survives a first surprise attack is not 100% but 50%. Or, in other words, the probability of success of a first surprise counterforce attack is 50%. Thus, Kahn reintroduces chance and uncertainty into the strategic design to maintain stability, just the opposite of the nuclear revolution or nuclear supremacy schools, in which certainty, either of failure (revolution school) or success (supremacy school) in the first strike was the pillar of strategic stability.

Having a 50% probability of destroying the adversary's second-strike arsenal implies that in times of peace and no security crisis (absence of an imminent threat of attack), launching a pre-emptive first strike is absurd because there is a 50% chance of being annihilated in the retaliatory strike. However, having a 50% probability of destroying the enemy's second strike arsenal makes a nuclear strike rational in the event that, for example, a full-scale conventional war has been launched involving an existential risk of suffering a military defeat.

That is, in the case of a state facing an existential military threat, if it had a 0% chance of success in a counterforce first strike, such a nuclear employment would be strategically irrational since the consequence would be suicide (worse than invasion). But if in such a scenario of an unstoppable large-scale invasion, if the probability of destroying the enemy's second strike arsenal were 50%, the consequence might not be suicide but rather the achievement of nuclear supremacy. That is, in a hypothetical situation of multi-stability, in which the probability of success in a first strike was

only 50%, even if there was a strong conventional military imbalance in favor of one of the states of the dyad, there would be no incentive to initiate a large-scale attack under any circumstances, resolving the dilemma between surrender or suicide of the school of the nuclear revolution.

Therefore, according to Kahn (1984), the nuclear policies that should be negotiated by the nuclear powers should not be like those agreed to under treaties such as New START, which are based on strategic conceptions of securing 100% second-strike strength against a surprise attack, but rather should mutually establish arsenals that have a probable capability of destroying the retaliatory force by 50%.

4.4 Multi-stability and salvo warfare

The strategic consequence of the proliferation of long-range precision weapons, and their equalizing power, in the third nuclear age is that deterrence becomes multi-stable.

Recall that Schelling's point is the concept that allows strategies that do not trigger nuclear retaliation, being the key to deterrence and escalation control strategies. Long-range precision weapons not only make it possible to execute massive damage attacks, but also give the possibility to do so in a very calibrated manner. For example, by launching just one salvo of precision munitions so that they destroy a portion of critical enemy infrastructure. As long as it does not escalate to above a certain limit, the calibrated attack would fall below the Schelling point of the nuclear threshold. The optimal way to respond would be similar to what Kissinger or Kauffman recommended when they criticized the New Look. That is, with long-range precision weapons strikes that destroy critical enemy infrastructure without crossing the Schelling point.

We then enter a war of precision munitions salvos, in which missile defenses play a key role in limiting the damage that enemy munitions can cause. The strategic risk of the proliferation of long-range precision munitions is that they allow limited wars to be fought, below the Schelling point. By falling below the Schelling point, it would be disproportionate to trigger a major conventional military conflict, let alone a nuclear confrontation, in response. In other words, armed conflicts will be more likely to be triggered because they reduce the cost of initiating them (by bringing them below Schelling's point).

Blast warfare takes the form of combat and duels of rockets, missiles, kamikaze drones, air-launched munitions and defense systems (anti-missile, etc.). Since the objective of this new and emerging class of warfare is duels aimed at destroying enemy munitions launchers, damaging adversary infrastructure and shooting down the projectiles launched by the adversary, rather than surrounding and destroying the enemy's conventional force to take territory, salvo wars have a very limited participation of conventional armies. This is not to say that the wars of the future will be only salvo warfare, but rather that, like air or naval warfare, it is a particular

type of warfare that has emerged because of the massive proliferation of long-range precision-guided munitions. A recent example of this new type of warfare was the conflict between Israel and Hezbollah between 2023 and 2024, with Iran in 2024 and the Houthis between 2023 and 2025.

But multi-stability is not exhausted by exchanging salvos to destroy critical infrastructure to coerce below the Schelling point. Multiinstability is the confluence of the most unstable aspects of both nuclear and conventional strategy.

As Futter and Zala wrote, long-range precision munitions can destroy at least a portion of the adversary nuclear and strategic arsenal. In the Ukrainian war that began in 2022, Ukrainian drones were able to knock out Russian early warning radars that monitor the approach trajectories of nuclear ballistic missile strikes. Ukrainian drones have also successfully attacked Russian strategic bombers. Although this has not yet been the case, they could go on to destroy in-port ballistic submarines and some of the mobile ballistic missiles.

Although in the future evolution of the proliferation of long-range precision munitions it is unlikely that they will completely destroy the enemy's nuclear arsenal, they could erode the effectiveness of the adversary's nuclear arsenal. For example, the degradation of effectiveness in the enemy arsenal (destroying part of its surveillance systems, its command and control structure, disabling nuclear-capable air bases) could, for example, increase the probability of launching a strike that would destroy the adversary's second strike force from 50% to 80%, moving from a situation of multi-stable deterrence to one of multi-stable deterrence. On the other hand, the rationality of nuclear use would not only be for the side with relative superiority, but the side in inferiority faces a dilemma of using or losing its nuclear arsenal following a damage limitation strategy. From in fact, that is the strategic context on the Korean peninsula (Bowers and Hiim, 2021). Finally, by progressively damaging radar and other command, control, and information infrastructure, salvo warfare could lead to nuclear weapon employment through inadvertent escalation (Posen, 1991; Acton, 2018).

5 Conclusion

The proliferation of precision weapons that characterizes the third nuclear era generates an operating environment and strategic context in which strategic stability faces unprecedented challenges.

- First, the equalizing power of precision causes the military structure to equalize offensive capabilities, thus moving from a bipolar and then unipolar system to one in which the different states are more equal, and thus similar, in some respects, to a multipolar one. The recent U.S. campaign against the Houthis, in which the Yemeni militia was able to hold a duel with the U.S. Navy, is a possible foretaste of this growing trend.
- Secondly, salvo warfare and nuclear weapons combine the most negative aspects (more instability) of nuclear and conventional strategy, generating the

phenomenon of multi-stable deterrence. The salvo war, on the other hand, facilitates calibrated and limited military offensive actions, entering into a growing spiral of attacks and counterattacks. The March 2025 military conflict between India and Pakistan (Newdick, 2025) is another example of how the proliferation of long-range precision-guided munitions makes direct clashes between powers more likely, even when they are nuclear states.

- On the other hand, nuclear weapons, combined with the proliferation of long-range conventional precision weapons, as the very example of the March 2025 conflict between India and Pakistan demonstrated, can quickly lead to inadvertent escalation. In this regard, the U.S. government was forced to intervene in that conflict given alarming intelligence indicating “a high probability of dramatic escalation” (Treene, 2025) between Pakistan and India, this being another foretaste of the growing trend noted toward a multi-stable deterrence environment.

Bibliography

- Acton, James. 2018. Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War. *International Security*. Volume 43, Issue 1. Summer 2018.
- Bell, Mark. 2015. Beyond Emboldenment: How Acquiring Nuclear Weapons Can Change Foreign Policy. *International Security* Vol. 40, No. 1 (summer 2015).
- Bowers, Ian and Hiim, Henrik, 2021. Conventional Counterforce Dilemmas: South Korea's Deterrence Strategy and Stability on the Korean Peninsula. *International Security*. Volume 45, Issue 3 Winter 2020/21.
- Boyle, Michael, 2013. The Costs and Consequences of Drone Warfare. *International Affairs*. Vol. 89, No. 1.
- Bracken, Paul, 2012. *The Second Nuclear Age: Strategy, Danger, and the New Power Politics*. Times Books. New York.
- Bull, Hedley, 2005. *The Anarchic Society: A Study of Order in World Politics*. Catarata. Madrid.
- Buzan, Barry, 1991. *Introduction to Strategic Studies*. Ediciones Ejercito. Madrid.
- Clary, C. and Narang, V, 2018. “India's Counterforce Temptations: Strategic Dilemmas, Doctrine, and Capabilities,” *International Security*, Vol. 43, No. 3. Winter 2018/19.
- Costlow, M, 2022. *A Curious Criterion: Cost Effective at the Margin for Missile Defense*. NIPP.
- Costlow, M., 2022. *Vulnerability is No Virtue and Defense is No Vice*. NIPP.
- Cote, Owen, 2003. *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines*. Naval War College. Newport.

- Creedon, M. Kyl, J. Billingslea, M. Gottenmoeller, R. Heinrichs, R. Scher, R. Miller, F. Duffy, G. Gordon Hagerty, L. Hyten, J. Kroening, M. Tomero L, 2023. *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States*. IDA.
- FAS, 2025. Chinese Nuclear Weapons, 2025: Federation of American Scientists Reveals Latest Facts on Beijing's Nuclear Buildup. Federation American Scientists
- Freedman, L, 1981. *The evolution of nuclear strategy*. The International Institute of Strategic Studies. London.
- Futter, A and Zala, B, 2021. Strategic non-nuclear weapons and the onset of a Third Nuclear Age. *European Journal of International Security*. Volume 6, Issue 3.
- Futter, A., Catelli, L., Hunter, C., Samuel, O., Silvestri, F., Zala, B, 2025. *The Global Third Nuclear Age: Clashing Visions for a New Era in International Politics*. Routledge. New York.
- Gaddis, John, 1997. *The Long Peace. Inquiries Into the History of the Cold War*. Oxford University Press. New York.
- Gasparre, Richard, 2008. The Israeli 'E-tack' on Syria - Part II. *Airforce Technology*.
- Gavin, Francis, 2019. Rethinking the bomb: Nuclear weapons and American grand strategy. *Texas National Security Review*, 2:1.
- Geist, E, 2023. *Deterrence under Uncertainty: Artificial Intelligence and Nuclear Warfare*. Oxford University Press. Oxford.
- Gilpin, R, 1987. *The Political Economy of International Relations*. Princeton University Press. Princeton, New Jersey.
- Glaser, Charles, 1990. *Analyzing Strategic Nuclear Policy*. Princeton University Press. Princeton, New Jersey.
- Gottemoeller, Rose, 2021. The Standstill Conundrum: The Advent of Second-Strike Vulnerability and Options to Address It. *Texas National Security Review*. Vol 4, Iss 4 Fall 2021....
- Gray, Colin, 1999. *The Second Nuclear Age*. Lynne Rienner Publishers. Colorado.
- Guzinger, M and Clark, Brian, 2015. *Sustaining America's Precision Strike Advantage*. CSBA. Washington.
- Heginbotham, E. Nixon, M. Morgan, F. Heim, J. Hagen, J. Li, Sheng. Engstrom, J. Libicki, M. Deluca, P. Shlapak, Dvid, D. Frelinger, B. Brady, K. Morris, L, 2015. *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power 1996-2017*. RAND. Santa Monica.
- Heistein, Ari, 2024. *Saudi-Houthi Agreement: Four Scenarios and Their Potential Impact*. Middle East Institute.
- Hiim, H., Fravel, M.T. and Troan, M, 2023. *The Dynamics of an Entangled Security Dilemma: China's Changing Nuclear Postur*. International Security. Volume 47, Issue 4.

- Hoffman, F. (2024). The strategic-level effects of long-range strike weapons: A framework for analysis. *Journal of Strategic Studies*. Volume 47, 2024 - Issue 6-7.
- Hoffmann, F. 2024. *Strategic Stability and the Ukraine War Implications of Conventional Missile Technologies*. CNA.
- Horschig, D and Adamopoulos, N, 2023. *Conventional-Nuclear Integration to Strengthen Deterrence*. CSIS. Washington D.C..
- Iiss, 2022. *MDI Missile Technology: Accelerating Challenges*. The International Institute for Strategic Studies. London.
- Jervis, Robert, 1976. *Perception and Misperception in International Politics: New Edition*. Princeton University Press. Princeton, New Jersey.
- Jervis, Robert, 1984, *The illogic of American nuclear strategy*. Cornell University Press. Ithaca.
- Jervis, Robert, 1989. *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon*. Cornell University Press. Ithaca.
- Kahneman, Daniel and Tversky, Amos, 1979. *Prospect Theory: An Analysis of Decision under Risk*. *Econometrica*, Vol. 47, No. 2 (Mar., 1979).
- Kakku, M, 1987. *To Win a Nuclear War: The Pentagon's Secret War Plans*. Black Rose Books. New York.
- Kaplan, Edward, 2015. *To Kill Nations: American Strategy in the Air-Atomic Age and the Rise of Mutually Assured Destruction*. Cornell University Press. Ithaca.
- Kaplan, Fred, 1983. *The Wizards of Armageddon*. Standford University Press. Standford, California.
- Kapur, Paul, 2005. India and Pakistan's Unstable Peace: Why Nuclear South Asia Is Not Like Cold War Europe. *International Security*. Volume 30, Issue 2. Fall 2005.
- Kartchner, Kerry, 2004. The Great Equalizer. Reviewed Work: The Spread of Nuclear Weapons: A Debate Renewed. *The SAIS Review of International Affairs* Vol. 24, No. 1 (Winter-Spring 2004), pp. 169-172.
- Kissinger, Henry. 1957. *Nuclear Weapons And Foreign*. Harper and Brothers. New York.
- Koblentz, Gregory, 2014. *Strategic Stability in the Second Nuclear Age*. Council on Foreign Relations. New York.
- Kolkowicz, Roman and MICKIEWICZ, Ellen, 1984. *The Soviet Calculus of Nuclear War*. Lexington Books. Toronto.
- Kratochwil, F, 1978. *International Order And Foreign Policy: A Theoretical Sketch Of Post-war International Politics*. Westview Press. New York.
- Krepinevich, Andrew, 2015. *Maritime Competition in a Mature Precision-Strike Regime*. CSBA. Washington.

- Krepon, Michael, 1984. *Strategic Stalemate: Nuclear Weapons and Arms Control in American Politics*. Palgrave Macmillan.
- Kristensen, Hans, Mckinzie, M. and Postol Theodore, 2017, How US nuclear force modernization is undermining strategic stability: The burst-height compensating super-fuze. *The Bulletin of the Atomic Scientists*.
- Kroening, Matthew, 2019, *The Logic of American Nuclear Strategy: Why Strategic Superiority Matters*. Oxford University Press. New York.
- Lieber, Keir and PRESS Daryl, 2006. The End of MAD? The Nuclear Dimension of U.S. Primacy. *International Security*. Volume 30, Issue 4. Spring 2006.
- Lieber, Keir and Press, Daryl, 201. The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence. *International Security*, Vol. 41, No. 4 (Spring 2017).
- Lieber, Keir and Press, Daryl, 2020. *The Myth of the Nuclear Revolution: Power Politics in the Atomic Age*. Cornell University Press. Ithaca.
- Long, Austin. and Rittenhouse Grenn, Brendan, 2014. Stalking the Secure Second Strike: Intelligence, Counterforce, and Nuclear Strategy. *Journal of Strategic Studies*. Volume 38, 2015 - Issue 1-2.
- Mackenzie, D, 1990. *Inventing Accuracy. A Historical Sociology of Nuclear Missile Guidance*. MIT Press. Cambridge, Massachusetts.
- Mahnken, Thomas, 2011. Weapons: The Growth and Spread of the Precision-Strike Regime. *Daedalus, the Journal of the American Academy of Arts & Sciences*, Vol. 140, No. 3. Summer 2011.
- Mandelbaum, M, 1981. *The Nuclear Revolution. International Politics Before and after Hiroshima*. Cambridge University Press. Cambridge.
- Mearsheimer, John, 2001. *The Tragedy of Great Power Politics*. W.W. Norton. New York.
- Miller, S. and Arbatov, A, 2021. *Nuclear Perils in a New Era Bringing Perspective to the Nuclear Choices Facing Russia and the United States*. American Academy of Arts and Sciences.
- Osgood, Richard, 1957. *Limited War: The Challenge to American Strategy*. The University of Chicago Press. Chicago.
- Panda, Ankit, 2025. *The New Nuclear Age: At the Precipice of Armageddon*. Polity Press. Cambridge.
- Payne, Kenneth, 1996. *Deterrence in the Second Nuclear Age*. The University Press of Kentucky.
- Payne, Kenneth, 2001. *The Fallacies of Cold War Deterrence and a New Direction*. The University Press of Kentucky.
- Plichta, M and Rossiter, A, 2024. A one-way attack drone revolution? Affordable mass precision in modern conflict. *Journal of Strategic Studies*. Volume 47, 2024 - Issue 6-7.

- Posen, Barry, 1991. *Inadvertent Escalation: Conventional War and Nuclear Risks*. Cornell University Press. Ithaca
- Pulido, Guillermo, 2019. Israel's nuclear strategy. Evolution and logic of the Israeli nuclear strategy. *Ejércitos Magazine*.
- Pulido, Guillermo, 2019. Nuclear supremacy - Is it possible to win an atomic war? *Ejércitos Magazine*.
- Pulido, Guillermo, 2020. The evolution of Iran's missile strategy and force. From the war of the cities to the gray zone. *Ejércitos Magazine*.
- Pulido, Guillermo, 2021. *Multidomain and mosaic warfare. El nuevo pensamiento militar estadounidense*. Catarata. Madrid.
- Reberg, C. and Kemp, H, 2024. *Strengthening the Phalanx: Layered, Comprehensive, and Distributed Air and Missile Defense in the Indo-Pacific*. CSBA. Washington.
- Rittenhouse, Brendan 2020. *The Revolution that Failed: Nuclear Competition, Arms Control, and the Cold War*. Cambridge University Press. Cambridge.
- Rogers, J. Korda, M. and Kristensen, H, 2022. Nuclear Notebook: The long view- Strategic arms control after the New START Treaty. The Bulletin of the Atomic Scientists
- Sagan, Scott, 1990. *Moving Targets: Nuclear Strategy and National Security*. Princeton University Press. Princeton, New Jersey.
- Sankaran, J, 2015. Pakistan's Battlefield Nuclear Policy: A Risky Solution to an Exaggerated Threat. *International Security*. Volume 39, Issue 3 Winter 2014/15.
- Schelling, Thomas, 1960. *The Strategy of Conflict: With a New Preface*. Harvard University. Cambridge.
- Schelling, Thomas, 1966. *Arms and Influence*. Yale University Press. New Haven.
- Schneider, Jacquelyn, 2019. The capability/vulnerability paradox and military revolutions: Implications for computing, cyber, and the onset of war. *Journal of Strategic Studies*. Volume 42, 2019 - Issue 6.
- Singer, Peter, 2009. *Wired for War: The Robotics Revolution and Conflict in the 21st Century*. Penguin Press.
- Sipri, 2024. Role of nuclear weapons grows as geopolitical relations deteriorate-new SIPRI Yearbook. Stockholm International Peace Research Institute.
- Speier, R. Nacouzi, G. Lee, C. and Moore, R, 2017. *Hypersonic Missile Nonproliferation: Hindering the Spread of a New Class of Weapons*. RAND. Santa Monica.
- Sutton, H. 2024. Guide To Ukraine's Long Range Attack Drones.
- Treene, Alayna, 2025. Vance called Indian prime minister to encourage ceasefire talks after receiving alarming intelligence, sources say. CNN.
- Van Evera, Stephen, 1999. *Causes of War: Power and the Roots of Conflict*. Cornell University Press. Ithaca.

- Vaughn, John, 2002. *The Nitzze Criteria and the Bush Missile Defense Architecture*. Army War College.
- Vickers, M. and Martinage, R, 2004. *The Revolution in War*. CSBA. Washington.
- Waltz, Kenneth, 1979. *Theory of International Politics*. Waveland Press. Illinois.
- Watts, Barry 2013. *Nuclear-Conventional Firebreaks and the Nuclear Taboo*. CSBA. Washington.
- Watts, Barry, 2011. *The Maturing Revolution in Military Affairs*. CSBA. Washington.
- Watts, Barry, 2013. *Evolution of Precision Strike*. CSBA. Washington.
- Wilkening, Dean, 2004. *Ballistic-Missile Defence and Strategic Stability*. Oxford University Press. New York.
- Wilson, G, 2024. Trump, the United States, and the New Nuclear Arms Race. *Arms Control Association*.
- Wright, D, and Tracy, C, 2024. Hypersonic weapons are mediocre. It's time to stop wasting money on them. *The Bulletin of the Atomic Scientists*.
- Wright, D. and Tracy, C, 2023. Hypersonic Weapons: Vulnerability to Missile Defenses and Comparison to MaRVs. *Science and Global Security* 31, no. 3 (2023).
- Yoshihara, Toshi, and Holmes, James 2012. *Strategy in the Second Nuclear Age: Power, Ambition, and the Ultimate Weapon*. Georgetown University Press. Washington, DC.

Article received: February 15, 2025

Article accepted: June 2, 2025
