Nuclear Deterrence in the Age of Speed and Precision

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One of the greatest successes since World War II is the absence of a great -power, global wars, primarily due to nuclear deterrence. Nuclear weapons are considered the ultimate instrument of deterrence, protecting those who possess them from invasion or other major attacks.

However, emerging technologies are deteriorating the foundation of nuclear deterrence. Modern conventional warfare is structured to emphasize speed, precision, surveillance, and integrated military capabilities, making it difficult to distinguish conventional from nuclear actions, making strategic stability far more vulnerable.

Adding to the complexity, global nuclear order is transforming toward the Third Nuclear Age, where conventional precision-strike capabilities have become the means of strategic signaling, independent of nuclear deterrence. The key feature of the Third Nuclear Age is the development of Strategic Non-nuclear Weapons (SNNW), weapons that operate below the nuclear threshold yet have a significant decisive strategic effect. These weapons include hypersonic systems, precision-strike weapons, missile defense systems, kinetic and non-kinetic ASAT capabilities, and advanced remote sensing systems.

Hypersonic weapons travel at speeds exceeding Mach 5 (five times the speed of sound), thereby being capable of attacking an adversary's strategic assets with little warning. These weapons have revolutionized modern warfare as they threaten first-strike stability by reducing decision-response time in the face of perceived threat, potentially risking inadvertent escalation. Hypersonic missiles use advanced onboard processors and sophisticated guidance systems which enable them to achieve small Circular Error Probability (CEP), estimated to be below 10 meters. Therefore, they have the advantage of high speed and precision.

The other important technological aspect of this Third Nuclear Age is the development of unconventional capabilities, such as cyber warfare and artificial intelligence (AI), which offer new avenues of targeting an adversary's nuclear forces or its command-and-control system as a precursor to further actions. Cyber operations are an essential part of military training and planning. These operations are meant to influence and disrupt the adversary's human and automated decision-making while protecting one's own. Furthermore, AI may be the most essential element in the contemporary advancements in which global nuclear strategy advances. AI enhances the ability to track, monitor, and target an adversary's nuclear strike, command, control, communication, or intelligence assets. Analysts have claimed that superintelligent AI will be capable of using sensors to find an adversary's nuclear arsenal in the future and use autonomous drones to disrupt them.

Major nuclear-armed states are advancing their nuclear capabilities while simultaneously reinforcing them with non-nuclear capabilities for a compound strategic effect. Several states are increasingly developing and deploying supersonic to hypersonic missiles capable of carrying nuclear and non-nuclear warheads with great speed and precision. This can lead to the possibility of misinterpreting a non-nuclear warhead as a nuclear one and vice versa. The

most plausible scenario of the outbreak of nuclear war begins with the escalation of a conventional attack, triggering the "use it or lose it" dilemma. Therefore, in the contemporary nuclear age, nuclear deterrence will equally be shaped by developments in the SNNW arsenal as by nuclear weapons.

The other paramount feature that threatens the credibility of nuclear deterrence is that conventional and nuclear forces become increasingly integrated, giving rise to entanglement. The most critical manifestation of conventional nuclear entanglement is the development of dual-use precision strike technologies and the vulnerability of non-nuclear threats to nuclear forces and their command, control, and communication systems. These non-nuclear capabilities, when combined with developments in nuclear weapon technology, pose significant challenges to the established way the nuclear operations are managed. Entanglement is not a new challenge to deterrence stability, but it has become a major concern in the contemporary era because it increases the uncertainty and the potential for inadvertent escalation.

Nuclear deterrence is based on the threat of retaliation. However, with stated developing dual-use precision strike weapons capable of destroying most types of counterforce targets, the credibility of this threat is eroding. For instance, a conventional attack launched by a dual-use hypersonic missile could be misinterpreted as a nuclear attack, or a non-nuclear attack on the dual-use intelligence assets could be taken as an operation intended to prepare the battlespace for the potential future employment of nuclear forces. Hypersonic missiles, while compressing decision-making time and increasing uncertainty regarding the nature of the attack, create the risks of misperception and unintended consequences.

As states are developing and deploying SNNWs, the warnings about the escalation risks that would likely reach the nuclear threshold have also grown louder. These developments signal the vulnerability of deterrence stability as it is being replaced by ambiguous notions of nuanced, complex, or integrated deterrence. Improved accuracy, remote sensing, conventional precision technologies, AI, and cyber warfare capabilities are making nuclear arsenals easier to locate, target, and disable, thereby undermining nuclear deterrence.

The fast-paced proliferation of advanced technology platforms and dual-use weaponry requires a rethinking of nuclear deterrence strategic as it introduces new risks of inadvertent escalation. Nuclear weapons may no longer guarantee permanent stability under the current strategic concepts. The rationale is not that nuclear deterrence will disappear. With emerging technologies and revolution in military affairs, effective counterforce capabilities may strengthen deterrence against conventional aggression. However, these same capabilities create a security dilemma, increase fear of vulnerability, encourage an arms race, and precipitate incentives for pre-emption.

Therefore, the future in which nuclear deterrence remains relevant requires constant technological and strategic adaptation. Technological trends will continue to evolve and will pose a growing threat to deterrence regardless of whether a state intends to enhance its strategic strike capabilities. In this era of speed and precision, technological advancement appears inevitable. Therefore, exercising restraints may limit options without offering significant benefits. Deterrence will only benefit those states that can keep their arsenals survivable and adapt effectively to the new strategic landscape and will disadvantage those that lag.

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