Since the end of the Cold War, scholars and practitioners alike have debated the potential benefits of a Revolution in Military Affairs (or RMA). Simply put, an RMA is the advancement of technology to such a degree as to give a state’s military a decisive advantage over its adversaries. The United States’ advantage was most prevalent in its nuclear arsenal and precision-guided munitions. The Gulf War in 1991 demonstrated the potential benefits of an RMA: a technologically superior force quickly and effectively achieved stated war aims with little cost to the ground forces or a prolonged burden shouldered by the public. Scholars and practitioners hoped this technological edge would not only deter adversaries but, if war became necessary, limit casualties and the duration of conflict.

However, the past two decades have thrown into question the technological advantage that the US has enjoyed for most of the period since the end of World War II. The proliferation and ease of acquiring precision-guided munitions, guided rockets, mortars, unmanned aerial vehicles, and even nuclear weapons capabilities have markedly increased. This, along with growing geopolitical tensions, has severely hindered the strategic stability the US once enjoyed. Moreover, as a recent Council on Foreign Relations Task Force noted, the US is losing its edge to competitors—primarily China—in emerging technologies such as artificial intelligence, data science, quantum information systems, and robotics. Where the US once dedicated its energies to defeating a single adversary during the Cold War, and thus developed national and military strategies towards that single aim, the US now faces multiple state and non-state actors that each present unique challenges. Not only must the US contend with great and emerging powers acquiring advanced weapons technology, such as intercontinental ballistic missiles (ICBMs) or hypersonic missiles, it must also develop strategies to negate the use of anti-access and area denial capabilities from states such as Russia and China. At the same time, in order to balance competition with strategic stability, the US often sought arms control agreements and other forms of cooperation with competitive great powers. Yet the mutual withdrawal by the US and Russia from the Intermediate Nuclear Forces Treaty calls into question the future of international institutions. Given the rapid pace of technological innovation, the uncertainty of the international system, and the competition for budgets with other domestic priorities, it is essential that the US develops a comprehensive and integrated strategy on nuclear and advanced weapons technology.

Nuclear Proliferation and Arms Control

Since the destruction wrought by the first nuclear weapons in 1945, states have attempted to either develop nuclear weapons on their own or acquire them through those that have the knowledge and technology. Most states or non-state actors seeking nuclear weapons do so for three reasons: “to protect themselves against an external security threat, to satisfy the parochial interests of domestic actors, or to acquire an important status symbol.” Those states that have not sought nuclear weapons or have given them up did so at the behest of the US and Russia. After the Cuban Missile Crisis, US and Soviet leaders realized that nuclear weapons brought a precarious peace at best and sought to reduce proliferation by removing the reasons for acquiring the weapons. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT), brokered by the USSR and the US in 1968, is the only...
binding multilateral treaty that promotes cooperation in the peaceful uses of nuclear energy and removes the reasons for nuclear weapons. However, since 2010 Russia, China, and North Korea have advanced their nuclear capabilities and are actively working to modernize their arsenals and delivery systems.

Thus, long after the end of the Cold War promised such escalatory behavior was left behind, a nuclear arms race has recently emerged. Russia and the US possess 90 percent of the world’s nuclear weapons—about 8,000 warheads—with few arms control institutions remaining from the Cold War. Despite President Trump’s diplomatic initiatives, North Korea continues to thwart the international community’s efforts to stymie its development of nuclear weapons and ICBMs. International institutions—the sets of rules that provide mutual benefit and cooperation between states—are usually pursued to manage nuclear proliferation and arms races. Yet, states fear that they may enter into agreements with which the other side refuses to comply. The US withdrawal from the INF treaty (mentioned above) was justified by the administration as a necessary response to Russia’s violation of the agreement. The withdrawal by the US from the Joint Comprehensive Plan of Action (JCPOA) also raises new questions about how the US will engage or compete with Iran, as well as how other major powers—such as France, Germany, the UK, and China—will respond.

**Hypersonic Missiles**

The emergence of hypersonic missiles—weapons with the potential to travel more than 15 times the speed of sound and maneuver around air defense systems—also presents new challenges for the US. During a speech in March 2018, Russian President Vladimir Putin warned the US that his country was building Intercontinental Ballistic Missiles and hypersonic weapons that would render air defense systems “useless.” Both Russia and China are pursuing hypersonic missiles equipped with conventional as well as nuclear warheads. In response, the US Congress required in law that American hypersonic missiles become operational by 2022; President Trump’s defense budget included $2.6 billion earmarked for these weapons.

Despite the apparent positive response by the US, two challenges remain. First, although the administration increased the defense budget to Cold War-levels, will public opinion support expensive programs? A survey conducted by Gallup in May 2019 revealed that “the majority of Americans express views consistent with not spending more on defense.” After years of war in Afghanistan and Iraq, the American public may be more hesitant to spend precious dollars on defense. Second, is a new arms control agreement on hypersonic weapons possible? As previously mentioned, arms control agreements are difficult to achieve, given fear of cheating as well as the need for multiple states to agree on the language of the document and the mechanisms to enforce the agreement. Given the novelty of these weapons programs, cooperation will be challenging. At the same time, scholars argue that flexible institutions to manage hypersonic missiles could provide an opportunity to reduce misperception, arms races, and inadvertent escalation between major powers.

**Automation and Artificial Intelligence**

In addition to missile technology, recent advances in unmanned aircraft, robotics, and artificial intelligence is challenging long-held beliefs about deterrence and warfare. As former Deputy Secretary of Defense Robert Work noted to an audience at a policy think tank: “The nature of war is all about a collision of will, fear, uncertainty, and chance. You have to ask yourself, how does fear play out in
a world when a lot of the action is taking place between unmanned systems? The possibility for weapons to operate or even make decisions without human involvement should alert policymakers to not only the strategic, but also the ethical, challenges of automation. Unmanned Aerial Vehicles (UAV) have been used by both state and non-state actors for targeted killings and surveillance. For instance, the US often relies on drones to eliminate terrorist safe havens, while Venezuelan President Nicholas Maduro alleges that an opposition group attempted to assassinate him with an explosive UAV. In terms of surveillance and control, dictators may leverage drones to conduct surveillance on their own citizens. There are currently no international institutions that regulate the use of drones in war or on foreign soil: as drones become cheaper and proliferation becomes more intense, policymakers should consider the opportunities for cooperation between states to reduce miscalculation or escalation.

The use of automation and artificial intelligence has major implications for American politics. The Department of Defense is attempting to reduce US reliance on Chinese drone technology in the fear that the rising competitor could exploit this vulnerability. In fact, the administration is considering banning all Chinese-built drones from US military use. Although this would increase revenue for US-based technology companies, the costs of reducing trade with China may result in unintended consequences. The use of drones for domestic control is not confined to authoritarian states. Fears of the potential for drones to be used for domestic spying is even prevalent amongst some Americans who fear the potential of this technology to infringe on civil liberties. Although artificial intelligence may be useful to gather intelligence on competitors, major legal questions about the ethical use of machine learning remain as scrutiny over Facebook’s data collection reveals.

Questions and Policy Options for the US

Despite the technological advantage the US has enjoyed over the last seven decades, its edge appears to be dwindling. US military superiority demonstrated through its dominance on the battlefield is at risk of being supplanted by competitors such as China. Given the rapid pace of innovation in weapons technology, artificial intelligence, and automation, how should the US respond? Should the US prioritize competition by acquiring and investing in more weapons technology, or instead seek ways to cooperate through international institutions such as a new arms control treaty? Given the state of American public opinion, is cooperation with competitors even possible? The interaction between international agreements and domestic politics was best illustrated by Robert Putnam’s “Two-Level Games.” Although the US president may seek an international agreement on arms control with China or Russia, any treaty would require Congressional approval. Moreover, as the US attempts to end the wars in Iraq and Afghanistan, as well as reduce its budget deficit, does the US public have the “will” to spend precious dollars on new weapon systems? Given the pace of technological change, the answers to these questions are unclear, but as important as ever.
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