

CHAPTER 1:

SPACE AND MISSILE WARS: WHAT AWAITS

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Sometimes, slow, steady changes produce revolutionary results. A case in point is missile and space technologies. Long-range missiles, satellites, and space launch vehicles used to be high technology exclusive to the superpowers. Now, scores of states have both. As for ballistic missiles and drones, even non-state actors have them, and these systems are far more accurate than anything the superpowers had even at the height of the Cold War. Then, long-range missiles could only be certain of destroying their targets if they were nuclear-armed and wiped out areas as large as cities. Now, drones are so accurate they can pinpoint and kill single individuals.

As for space satellite launchers, they originally were derived from nuclear delivery missiles. None were privately owned. Similarly, almost all space satellites were government property and, until 1965, the owners were only American and Soviet. Now, the French, Chinese, Japanese, British, Indians, Israelis, Ukrainians, Iranians, and North Koreans have all launched satellites of their own. In addition, more than 60 nations own and operate their own satellites and increasingly, satellites are launched, owned, and operated entirely by private entities.

These developments are nontrivial.

First, because of them, the ability of weak actors — smaller states and even non-state actors — to deter and harm major military powers is now greater and is likely to grow greater still. Israel, a nuclear-armed state, now views the prospect of Hezbollah upgrading its

missiles' accuracy (with Iranian assistance) as a military development at least as threatening as Iran's acquisition of nuclear arms. In fact, Israel's military is so concerned, it is contemplating a massive preemptive strike against Lebanon, an attack that might well prompt Tehran to strike back at Israel. Similarly, the Houthis and other Iranian sponsored non-state actors are using ballistic missiles and drones to hit targets in Saudi Arabia and the UAE. In the case of the attack against Abqaiq on September 14, 2019, an Iranian proxy group was able to evade three layers of air and missile defenses and knockout five percent of the world's oil capacity. More debilitating attacks of this sort by weak actors are likely to come.

Second, weak actors are likely to threaten to use the limited number of accurate missiles and drones against stronger states in novel ways. They are already threatening what the Soviets called "sympathetic targets" — civilian and military assets, which if hit, will release far more energy and cause far more harm than the amount of violence required to hit them. Dams, reactors, gas and ammo depots, and petrochemical plants (e.g., Abqaiq) all would be good examples. Already, Hezbollah, the Houthis, North Korea, and China have threatened to strike reactors in Israel, the UAE, South Korea, Japan, and Taiwan. One could argue that such civilian assets have always been potential military targets. The difference now, however, is one can put these targets at risk without having to acquire and operate an advanced air force. Also, with precision, one can hit specific parts of the target (e.g., the administrative office of a power reactor that might not kill anyone) to demonstrate the seriousness of intent without necessarily causing the worst to occur. Think of precision strike as a poor man's ticket to graduated escalation.

The other novel way weak actors could use precise missiles or drones against a stronger state is to attack or threaten the assassination of the country's power elite. The most vivid portrayal of this prospect is the seven-minute video, *Slaughterbots*, in which facial recognition chips are integrated with small explosives on small drones and used to kill specific US senators. More prosaic demonstrations included the 2015 radiation-laced drone that landed on the

roof of Japanese Prime Minister Shinzo Abe's office and the 2018 drone assault of Venezuelan President Nicolas Maduro. These sorts of attacks are likely to become more attractive and frequent. With any bad luck, weak actors may be able to "kill" a nation, not by destroying its military or its key cities or industries, but by merely taking out a few scores or hundreds of key officials with precision facial recognition-assisted drones.

This, then, brings us to yet another way the proliferation of accurate missiles and drones may change the face of war — the increased likelihood of more Sarajevos, i.e., of catalytic wars. In 1914, most military analysts knew who the major combatants of any future war in Europe might be — the UK, Germany, France, Russia, and the Austria-Hungarian Empire. What nobody quite anticipated, however, is how the war might begin (in this case, with an assassin's bullet fired at an archduke in Serbia). Our future may rhyme.

With the proliferation of accurate strike systems to an ever-longer list of weak actors, count on there being ever more opportunities for Sarajevo moments. Hezbollah missiles strike Haifa. Israel strikes missile attack staging areas in Lebanon. Iran responds by striking select Israeli military targets. Israel, then responds by striking targets in Iran. Russia sides with Iran. The United States sides with Israel. At this point, one could easily imagine a replay of the Suez crisis in which two superpowers (the US and Russia) face each other in a nuclear standoff, this time in the Gulf. Consider this example and reflect on India and Pakistan (and the myriad of discontented proxies each could arm) or what North Korea might do with precise conventional missiles against civilian targets in South Korea or Japan. One might add the greater Middle East, Central Asia, the Balkans, and the Baltic. As precision strike systems spread, so too will the list of possible catalytic and potentially catastrophic war scenarios.¹

1. See Henry Sokolski, "Dr. Strangelove's New Passion: Precision-Guided Mayhem," *American Purpose*, March 17, 2021, at <https://www.americanpurpose.com/articles/dr-strangeloves-new-passion-precision-guided-mayhem/>.

Of course, precise missile and drone attacks are only as good as their targeting information, which increasingly relies on sensors and cameras based in space. Thus, all of the major militaries of the world have launched satellite systems of their own. Just as important, the world's civil and commercial sectors are now highly dependent upon space-based imagery (e.g. Planet), navigation systems (e.g., GPS), and communications relay systems. In the near future, internet and communications relays consisting of thousands of small satellites in low-Earth orbit will drive economic growth. Once deployed, these commercial systems and their private space launch systems will be used more and more for military purposes.

Similarly, civilian space activities, once kept relatively separate from the military are being conflated with it. Civil lunar exploration and related activities can and will be exploited to hold military satellites at geosynchronous and lower orbits at risk. These satellites include some of the world's (and America's) most important military systems — navigational; command, control, and communications; and early warning satellites.

Compounding this conflation is the increasing number of dual-use capable space systems. These include: ground-based lasers used for ranging and other civil purposes that can also be used to dazzle, blind, or damage satellite systems; and rendezvous satellites that can refuel, repair, and reposition satellites or de-fuel, damage, and take them out of position. Combine each of these developments with the increasing number of states and private entities that are engaged in space launch and satellite ownership and operation and you set the stage for space “conjunctions” and interactions both welcome and hostile.

With so many new space actors, attribution of any unwanted action in space will be difficult. Nor will it help that there are few, clear agreed redlines for international space behavior. The major powers have generally favored maintaining secrecy and military options in space over clarifying what clearly constitutes illicit, hostile actions. Again, this too is a prescription for strategic miscalculation. As the front lines of strategic deterrence gravitate toward the satellite sys-

tems that the world's navies, air forces, armies, and economies rely on, space will become the first field of battle. Clarifying what competition and conflict in space may look like is difficult.

This volume of essays is designed to help. It is divided into two sections. The first focuses on space; the second on missiles. Peter Garretson's first chapter projects what war in space might look like one to two decades from now. Brian Chow's second chapter considers how private space firms' desire to avoid satellite collisions (and the loss of their satellites) might encourage adherence to space rules of the road that the world's civil, commercial, and military space sectors might follow. Xavier Pasco's third chapter details French space policies which include the world's clearest articulation of why space keep-out zones will be necessary and how they might best be enforced. The last space-focused chapter is the winning US collegiate national debate submission on space warning zones as a diplomatic approach to dealing with the rendezvous satellite threat.

The balance of the volume is focused on missiles and drones, how they might be used and controlled. The first of these chapters, mine, is on the future of missile and drone warfare. The second, David Cooper's, is on why missile controls are both needed and unlikely. Finally, the third, John Maurer's, is a guide to how one might coordinate increased missile competitions with controls.

More, of course, could and will be written. This volume, however, is a start.