

Chinese Hypersonic Weapons Developments Must Be Countered

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KEY TAKEAWAYS

China is now outpacing the United States in hypersonic weapons development.

This dynamic has the potential to undermine strategic and conventional stability and deterrence in the Indo-Pacific.

The United States must address this challenge, developing and/or improving both hypersonic and counter-hypersonic capabilities.

This summer, a Chinese civilian Long March space launch vehicle (SLV) shot through the atmosphere into low-Earth orbit, carrying a hypersonic weapon (HSW).¹ The SLV reportedly orbited the Earth for some distance before releasing a possibly dual-capable hypersonic weapon.²

The HSW, in this case a hypersonic glide vehicle (HGV), re-entered the Earth's atmosphere and was guided to a terrestrial target within China.³ Although the HGV reportedly missed its designated target by nearly 25 miles, the Chinese test of a fractional orbital bombardment system (FOBS)⁴ using an HGV is largely considered a success in national security circles.

This summer's test is without question a significant military milestone in the U.S. great-power competition with the People's Republic of China.

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China's development of HSWs (such as this one, as part of a FOBS) should seriously concern the U.S., as well as allies and partners—especially taking into account other recent, troubling developments surrounding China's strategic programs that were revealed this earlier year.⁵ Washington must address this hypersonic capability gap now, *before* the imbalance undermines strategic stability in the Indo-Pacific and provides China with an operational military edge in a possible future crisis or conflict with the United States.

Hypersonic Weapons

Hypersonic weapons are those capable of speeds in excess of Mach 5 (i.e., five times the speed of sound)—or roughly *one mile per second*. Rockets have flown at hypersonic speeds in space since the 1950s, but the technology that allows missiles to fly significant distances in or near the earth's atmosphere and maneuver around threats at hypersonic speed is relatively new.

The U.S. recognized the need for and the advantages that HSWs provide almost two decades ago with an initiative called the global strike program, which directed the development of these systems. This new class of hypersonic weapons include two basic types: boost-glide weapons (BGWs) and hypersonic cruise missiles (HCMs). BGWs are carried into space on rockets that accelerate to hypersonic speed before releasing them to glide along the edge of the atmosphere until they are within range of a specified target. HCMs are rocket-powered to hypersonic speed until a scramjet engine can ignite using onboard fuel and atmospheric oxygen to achieve hypersonic cruise through target impact. With no need to carry their own oxygen, HCMs can fly for long distances, even at very low altitudes.

These new weapons provide attacking forces with some significant offensive military capabilities and advantages. To wit:

- With speeds that can exceed Mach 17 (i.e., three miles per second), HSWs reduce a defender's attack warning and response times;
- These weapons can be armed with a conventional warhead, a nuclear warhead, or use its own high kinetic energy (derived from its hypersonic speed) to destroy a target, providing significant flexibility to an attacker;
- HSWs are maneuverable, enabling them to evade defenses and create difficulties for a defender to determine the weapon's final target;

- Depending on the size of the initial boost vehicle, HSWs can have a variety of ranges, from short-range to intercontinental-range capability, meaning that no target is out of reach; and
- With the potential to fly at very low altitudes up through the atmosphere and into space and with the ability to approach from any direction, HSWs are difficult to acquire and track due to a variety of limitations, including physics, geography, and the location of U.S. strategic radars and other available sensors.

China's Hypersonic Weapons

The People's Liberation Army (PLA) has several HSW programs—and may have conducted a significant number of tests of these novel weapons.⁶ The most prominent of the Chinese HSWs is the DF-17 medium-range ballistic missile paired with the DF-ZF HGV.⁷ This system is believed to be operational and capable of ranging many U.S. forces in Asia.⁸

Besides the FOBS tested this summer, the PLA is also working on a scramjet-powered HCM and possibly modifying the DF-41 ICBM to carry an HSW.⁹ The PLA will also likely field other missiles of various ranges that will launch with HSWs.

The PLA and its civilian counterparts are investing heavily in testing facilities for HSWs and are also reportedly interested in Russian HSW programs, which, either through espionage or technology-sharing, could diversify and expand China's hypersonic programs quickly.¹⁰

Chinese HSW Program Implications

Beijing is increasingly assertive in its foreign policy, and its ties with the United States are tense because of a number of security issues in the Indo-Pacific and globally. China is developing a world-class military to challenge the United States and to support China's perceived regional and global interests and aspirations. China's HSW program, with its unique capabilities, is part of China's unprecedented conventional and nuclear military build-up—developments which increasingly threaten U.S. vital national interests in East Asia and beyond.

Like Russia, which also has an advanced HSW program, the U.S. should expect that China will eventually provide HSW capabilities to its air, ground, naval, and strategic rocket forces, diversifying the hypersonic threat across the warfare domains. Though not impossible to defend against using

available U.S. “point” defensive systems,¹¹ hypersonic weapons *do* pose a tremendous challenge to current U.S. missile defense systems and sensors, including the fact that the number of potential American and allied targets vastly outnumber these limited defenses.

HSWs have both tactical and strategic ramifications. The asymmetric operational deployment of these weapons in significant numbers by the PLA could affect both conventional and strategic deterrence and stability, undermining political and security stability in the Indo–Pacific.

U.S. geopolitical missteps in 2021, such as the chaotic Afghanistan withdrawal, have emboldened our strategic adversaries, and the U.S. must be willing to retake the lead in hypersonic weapons to put China’s recent advances in check and to reassure allied and partner nations’ confidence in their political–military ties with the U.S.

Recommendations for Washington

The late summer test of the fractional orbital bombardment system with an HGV serves as the latest in a series of wake-up calls for U.S. policymakers about the political and military challenges presented by the People’s Republic of China and the PLA. In response, Washington must act to protect and advance U.S. interests, as well as maintain strategic and conventional deterrence.

As such, Washington should:

- **Continue to prioritize the development of HSWs.** Until 2014, the U.S. led the world in HSW research, development, test, and evaluation, when defense sequestration budgetary measures forced funding cuts. The U.S. Navy, Air Force, and Army are working on HSW programs, and these programs should continue to be fully funded, not merely to counter Chinese (and Russian) advances in HSWs, but to accelerate past them. When mutually beneficial, the United States should engage and work with allies on developing these capabilities.
- **Develop and deploy a comprehensive, layered missile defense system.** Alongside offensive hypersonic capabilities, the U.S. must continue to develop and deploy a comprehensive, layered missile defense system to counter Russian and Chinese offensive HSWs. This should include the development of a space-based sensor layer to improve the capability to acquire, track, and destroy these weapons. Once again, when mutually beneficial, the United States should engage and work with allies on developing these capabilities.

- **Continue to recapitalize and modernize U.S. conventional forces for great-power competition with China.** The goal is to enhance U.S. conventional deterrence in the Indo–Pacific region, especially on issues involving Taiwan, the Korean Peninsula, the South China Sea, and other regional territorial disputes, thus reducing the likelihood of any conflict that could escalate from the conventional to the strategic warfare domain.
- **Modernize strategic forces by adequately funding U.S. nuclear weapons modernization programs and the infrastructure supporting them.** Washington must accept the fact that a modern and flexible nuclear force structure is the best way to deter nuclear attack on the United States.
- **Seek strategic stability talks with China with the purpose of more fully understanding Chinese intentions and doctrine.** This is particularly important with regard to hypersonics and China’s unprecedented nuclear enterprise growth. Diplomacy and dialogue are critical elements involved in avoiding the chance for misperceptions, miscommunications, and mistakes that could have dire consequences for both sides.

Conclusion

The United States could—and should—quickly catch up with Chinese and Russian advances in offensive hypersonic weapons. It is an important undertaking for both conventional and strategic stability in a time when there are growing questions about U.S. leadership in the world.

China’s launch this summer may not be exactly a near-Sputnik moment, as the Chairman of the Joint Chiefs of Staff recently suggested,¹² but it is certainly a hypersonic shot across the bow of the American ship of state.

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Endnotes

1. Demetri Sevastopoulo, "Chinese Hypersonic Weapon Fired a Missile Over South China Sea," *Financial Times*, November 22, 2021, <https://www.ft.com/content/a127f6de-f7b1-459e-b7ae-c14ed6a9198c> (accessed November 30, 2021).
2. Ibid.
3. Ibid.
4. A Fractional Orbital Bombing System (FOBS) is a system originally envisioned and developed by the Soviet Union in the 1960s to deliver nuclear weapons. FOBS was designed to complicate the ability of the United States to detect a ballistic missile attack by flying over the South Pole and by using a low-trajectory launch with a perigee below low-Earth orbit—approximately 100 miles in altitude. A missile overflying the South Pole avoids a series of U.S. radar sites known as the ballistic missile early warning system, oriented to detect an attack from missiles flying over the North Pole.
5. Peter Brookes, "Beijing's Bomb Buildup Continues as Third New ICBM Field Uncovered," *The Daily Signal*, August 19, 2021, <https://www.dailysignal.com/2021/08/19/beijings-bomb-buildup-continues-as-third-new-icbm-field-uncovered/> (accessed November 30, 2021).
6. "Hypersonic Weapons: Background and Issues for Congress," Congressional Research Service *Report for Congress*, October 19, 2021, <https://sgp.fas.org/crs/weapons/R45811.pdf> (accessed November 30, 2021).
7. Ibid.
8. Ibid.
9. Ibid.
10. Ibid.
11. When placed around a city like Washington, DC, for "point defense," Patriot, Terminal High Altitude Area Defense (THAAD), and SM-3 missiles have a limited ability to intercept HSWs that target that a city or small geographic area.
12. Sara Sorcher and Karoun Demirjian, "Top U.S. General Calls China's Hypersonic Weapon Test Very Close to a 'Sputnik Moment,'" *Washington Post*, October 27, 2021, <https://www.washingtonpost.com/nation/2021/10/27/mark-milley-china-hypersonic-weapon-sputnik/> (accessed November 30, 2021).