Hypersonic Weapons

Technically speaking, hypersonic weapons have existed since the middle of the 20th century. A hypersonic weapon is merely something that travels at Mach-5 or faster, or at least five times the speed of sound. Ballistic missiles have long possessed these speeds.

What differentiates today's emerging class of hypersonic capabilities is the use of aerodynamic lift to allow reentry vehicles to maneuver under guided flight within the atmosphere. While ballistic missiles follow a parabolic trajectory to their target, hypersonic missiles can reenter the atmosphere much quicker. After being launched from rocket boosters, these "boost-glide" vehicles reenter the atmosphere and are guided to their target with the ability to undertake evasive maneuvers to overcome defenses. Boost-glide vehicles can have ranges of up to thousands of kilometers, effectively making them ICBM equivalents. Hypersonic cruise missiles likewise are initially accelerated to hypersonic speeds using a rocket booster, at which point they use an air-breathing scramjet engine to remain powered throughout their flight.

Proliferation Concerns

It is important to understand that the distinct challenge posed by hypersonic weapons is due not to their speed but to their potential to evade midcourse defenses and overcome terminal-phase defenses.

Currently, several states are pursuing hypersonic glide vehicles and hypersonic cruise missile capabilities. Hypersonic cruise varieties have mixed records of success and largely remain in development due to engine limitations and questionable accuracy. Hypersonic boost-glide platforms, meanwhile, are being fielded by Russia, China, and the United States, while other nations have also begun expressing interest. More broadly, the proliferation of hypersonic weapons is being driven by a disconnect between strategic planning and technology acquisition.