



CENJOWS

THE COMPETITION IN HYPERSONICS

China's Drive for Military Supremacy: Hypersonics

1. China is spending huge sums to create hypersonic missiles that will go so fast (***up to twenty times the speed of sound***) that military chiefs believe they will be invulnerable to any form of defence.
2. Indeed, some analysts fear that human capability to respond to such lethal weapons will be inadequate and that ***the only way to protect against them would be to rely on artificial intelligence and computer systems.***
3. Travelling several miles a second as they deliver surprise attacks within minutes of being launched, they have been described as a 'game-changer' for warfare. Such missiles, capable of carrying nuclear warheads, would deliver precision attacks on people, vehicles and buildings.
4. Although America, too, has such Star Wars-style weapons in development, General John E. Hyten, Commander of US Strategic Command, told a Senate committee three years ago: 'We don't have any defence that could deny the employment of such a weapon against us.'
5. To test such weapons, the Beijing government said three years ago it was building a wind tunnel that simulated conditions up to 25 times the speed of sound. And a contractor has said it has carried out a six-minute test flight for a hypersonic missile.
6. China showed off a rocket-boosted hypersonic glide vehicle (HGV) of its own, the Dongfeng-17, in a recent military parade.
7. In August 2018, the Xingkong-2 "waverider" hypersonic cruise missile (HCM) was tested by China Academy of Aerospace Aerodynamics through

the stratosphere – attained Mach 6, or six times the speed of sound. ‘According to the Communist Party’s *Global Times*, the HCM’s speed and maneuverability would enable the new weapon to “breakthrough any current generation anti-missile defense system.”

8. Intercontinental ballistic missiles (ICBMs) also attain Mach 6 when they re-enter the atmosphere from space. But because they arc along a predictable ballistic path, like a bullet, they lack the element of surprise. In contrast, hypersonic weapons such as China’s waverider maneuver aerodynamically, enabling them to dodge defenses and keep an adversary guessing about the target.

<https://www.dailymail.co.uk/news/article-9233269/Chinas-drive-military-supremacy-Beijings-armoury-weapons.html>

<https://www.sciencemag.org/news/2020/01/national-pride-stake-russia-china-united-states-race-build-hypersonic-weapons>

Development of Hypersonics by Other Countries

Russia

9. From a base in the Ural Mountains on 26 December 2018, Russia’s armed forces launched a ballistic missile carrying an HGV called **Avangard**. After separating from its carrier in the stratosphere, the HGV zigzagged 6000 kilometers across Siberia at a searing **Mach 27**, Russian officials claimed, then smashed into a target on the Kamchatka Peninsula. Afterward, a beaming Russian President Vladimir Putin called Avangard “the perfect New Year’s gift for the country.” Russia’s defense ministry announced last month that it has put the nuclear-armed HGV into combat duty - allowing Putin to claim that Russia is the first country armed with hypersonic weapons. Russia also unveiled a weapon called the **Kinzhal**, said to reach Mach 10 under its own power.

USA

10. Since the dawn of the Cold War, the Pentagon has periodically thrown its weight behind the development of maneuverable hypersonic weapons, only to shy away when technological hurdles such as propulsion, control, and heat resistance proved daunting. But the research and development in this field was underfunded and largely forgotten for many years. But now, the U.S. Department of Defense (DOD) is leading a new charge, pouring more than \$1 billion annually into hypersonic research. Competition from ambitious programs in China and Russia is a key motivator. All three nations appear to have made substantial progress in overcoming key obstacles, such as protecting hypersonic craft from savage frictional heating. Recently, US President Donald Trump touted “a super-duper” missile. He claimed that the missile was capable of travelling 17 times faster than anything currently in the US missile arsenal.

11. Other nations are chasing the trio of leaders—or teaming up with them. Australia is collaborating with the United States on a Mach 8 HGV, and India with Russia on a Mach 7 HCM. France intends to field an HCM by 2022, and Japan is aiming for an HGV in 2026, the U.S. Congressional Research Service noted in a July 2019 report.

<https://www.sciencemag.org/news/2020/01/national-pride-stake-russia-china-united-states-race-build-hypersonic-weapons>

India

12. After a failed attempt in 2019, India finally joined the club of elite nations by successfully conducting the maiden test flight of the High-Speed Technology Demonstrator Vehicle (HSTDV) using an indigenously developed propulsion system in September 2020.

13. The HSTDV test vehicle is developed by the Defence Research and Development Organisation (DRDO) and can be mounted on a solid rocket motor, which will take it to a required altitude, and once it attains a certain speed, the cruise vehicle will be ejected out of the launch vehicle. Subsequently, the scramjet engine will be ignited automatically.

14. DRDO is reportedly working on a hypersonic anti-ship missile known as BrahMos-II, which will succeed BrahMos anti-ship missile. According to reports, it is expected to achieve over six times the speed of sound on hypersonic scramjet technology.

<https://eurasianimes.com/as-india-joins-hypersonic-club-which-country-has-the-most-powerful-hypersonic-missiles/>

SPACE TECHNOLOGY – CHINESE REMOTE SENSING

15. **China has Launched Three more Yaogan 31 Reconnaissance Satellites to Orbit.** According to media reports, on 23 Feb 21, China successfully sent three reconnaissance satellites into orbit. A Long March 4C rocket carrying the Yaogan-31 satellites flew into space from Jiuquan Satellite Launch Center in the Gobi Desert at 9:22 p.m. EST (0222 GMT) as per the China's state news provider CCTV. In its short report, CCTV added that, "Having entered their planned orbits, the satellites will be used for electromagnetic environment surveys and other related technology tests".



A Chinese Long March 4C rocket lifts off from the Jiuquan Satellite Launch Center in the Gobi Desert, carrying three Yaogan 31 Group 3 satellites to orbit. (Image credit: CASC)

16. As per the Western defense analysts the People's Liberation Army uses the Yaogan series of satellites for tasks such as surveillance, intelligence or reconnaissance. The satellites may carry asynthetic aperture radar for day and night and all-weather observation and could even carry electronic intelligence payloads.

17. Past Yaogan satellite launches indicate that these satellites maintain orbits of roughly 680 miles (1,100 kilometers) in altitude and inclined by 63 degrees, passing over maritime regions such as the South Shetland Islands.

18. This is the second batch of Yaogan31 satellites launched from China. The second group went to space just a few weeks ago, on Jan. 28, according to the contractor, China Aerospace Science and Technology Corp.¹

19. **Comments.** The Yaogan satellites are remote sensing satellites. The Yaogan satellites are being launched since 2006. As per the Chinese media, these satellites are meant for scientific experiments and innocuous civil tasks such as land survey, crop yield assessment, and disaster monitoring but, the western defence analysts suspect that Yaogan constellations are also being used for the military purpose. Three constellations of Yaogan satellites have been launched in quick

¹<https://www.space.com/china-launches-yaogan-31-03-military-satellites>

succession in three months, first on 27 Dec 20, next of 29 Jan 21 and the third on 23 Feb 21 which speaks highly of their capacity to build and launch satellites.

20. Yaogan 31 series is the next generation remote sensing satellites. The first constellation of Yaogan 31 comprising three satellites was launched 29 Jan 21. This was followed by the second batch of three satellites on 24 Feb 21. These are expected to boost Chinese ISR and their military capability by keeping a given area under constant surveillance. As per a NIAS publication, China already has an operational Yaogan satellite constellation comprising ELINT, SAR and EO satellites that provide it with large area surveillance capabilities especially over the Pacific Ocean. With ISR capabilities to detect adversaries at distances far away from its coastline enables China to pursue their anti access and area denial strategy.

21. It is estimated that all areas of security concern viz Taiwan strait, the Korean peninsula, the southern islands and shores of Japan, Guam, the South and East China Seas and the various access routes from the Indian to the Pacific Oceans all fall within this coverage region of the Yaogan satellites.² One could also expect East Ladakh and other areas on LAC with India to be under constant surveillance. This serves as a pointer for India to ramp up its own space observation capability if needed.

ARMED UAVs – CHINESE WJ-700

22. **China's WJ-700 Armed Reconnaissance UAV Flight Tested.** China is emerging as a major designer and supplier of UAVs of many categories. It's well planned infrastructure and enablement for innovations is creating new and powerful UAVs for multiple applications. Its latest creation in the form of new WJ-700 high-altitude, long-endurance and high-speed armed reconnaissance UAV successfully completed its maiden flight on 11 January 2021. This UAV is capable of executing both attack and reconnaissance missions according to a statement of the Third Academy of the state-owned China Aerospace Science and Industry Corp (CASIC)³. The UAV resembles the US MQ-9 Reaper which is made by General Atomics.

23. This UAV was first displayed at Air show China, in 2018, and is expected to have an endurance of 20 hours and maximum take-off weight of 3,500 kg. It is powered by a jet engine and can fly at altitudes of up to 12 km at a max speed of 700 kmph.

² *NIAS publication*

³ *"China's WJ-700 Armed Reconnaissance Drone Completes Maiden Flight", Defense World.Net, 15 January 2021*
<https://www.defenseworld.net/news/28768#.YEM6BmgzZPY>. 06 March 2021



(China's WJ-700 UAV Photo: Weibo)

24. The UAV is planned to have four under-wing hard points which could carry CM-102 anti-radiation missile, C-701, and C-705KD anti-ship missiles, and land attack munition⁴. WJ-700 reportedly, would be capable of undertaking air-to-surface precision strikes in multiple situations such as stand-off ground attacks, anti-ship, and anti-radiation attacks. In addition, it will be capable of undertaking early-warning and electronic jamming roles when equipped with related equipment. This high-altitude long-endurance (HALE) UAV is expected to be operational within a decade⁵. Designed by Liu Liu, it is being developed by 'Haiying General Aviation Equipment' which is a subsidiary of China Aerospace Science and Industry Corporation (CASIC) and is claimed to be the only high-altitude, high-speed, long-endurance combat/reconnaissance UAV in China in future.

25. Employment of UAVs in multiple roles, recently in Armenia-Azerbaijan war and before that in Syria and Saudi Arabia have forced the war planners to take a serious note of these machines. Developments in artificial intelligence and associated sciences are sure to add more versatility to these weapon systems. An indigenous development capacity of UAVs and innovativeness in their employment will be considered an important element of force development by major military powers in the years to come.

⁴ Arun Mathew, "China's WJ-700 HALE UAV Makes Maiden Flight", DEFPOST, 17 January 2021. <https://defpost.com/chinas-wj-700-hale-uav-makes-maiden-flight/?amp>. 06 March 2021.

⁵ *ibid*