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A Step Forward for the North Korean War Industry: Hypersonic Missiles

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In January, North Korea carried out six missile tests. 2019 was the last time it did so many tests. However, what is worrying is what they have been testing, rather than the number of tests. According to experts and North Korean media, the missiles tested on the 5 and the 11 January would be hypersonic weapons. If these claims are authentic, the balance of power in East Asia will change dramatically (Santavecchi, 2022).

First, we should understand what hypersonic missiles are and why it is worrying that Pyongyang owns them.
A hypersonic missile has a speed greater than Mach 5, five times faster than sound; such speed makes these missiles "impossible to intercept" by any current missile defence system. Once launched, it will hit the target. The development of hypersonic missiles has brought about a crucial change in world geopolitical balances, necessitating a rethinking of the traditional notion of deterrence. These missiles question both technological power and geography (Partyard military division, 2019; Mauri, 2022).

At the same time, building a weapon that can physically withstand that speed is an engineering challenge. When the object flies through the dense layers of the atmosphere at hypersonic speed, it undergoes an enormous heat flow. This and other physical effects make the development of hypersonic weapons, particularly difficult and expensive. Even the definition of "hypersonic" is not so simple. In general, we define hypersonic missiles that exceed Mach 5. However, this definition is simplistic. The speed of sound depends not only on atmospheric density but also on its temperature. Therefore, the missile's speed also depends on the altitude at which it travels (Kolja Brockmann, 2022).

Speed is a central feature for the definition of "hypersonic". However, during the Second World War, Germany developed missiles (A-4, better known as V-2) that exceeded Mach 5, but no one would define them as "hypersonic". The Missile Defence Advocacy Alliance in the USA has added another feature in the definition: the ability to manoeuvre during the flight. Therefore, a hypersonic missile is a missile that travels at more than Mach 5 and is manoeuvrable at this speed. There are two types of hypersonic: hypersonic cruise missiles (HCMs) and glide hypersonic vehicles (HGVs); the first ones travel at a constant speed higher than Mach 8. The HGVs use re-entry vehicles. Ballistic missiles carry them, so their speed derives from the booster trajectory, the distance and the manoeuvres. The difficulty of defence systems intercepting hypersonic missiles does not depend solely on their speed. In particular, the HGV missiles, moving through the atmosphere at a very high speed, generates a plasma cloud that prevents the defence sensors from perceiving the object. As already mentioned, the technologies required for HGVs and HCMs are very sophisticated and have high costs. However, there is a gap between the offence missile system and defence one. A defence system still does not exist capable of intercepting hypersonic missiles (Kolja Brockmann, 2022; Mauri, 2022; Partyard military division 2019).

According to Dr James Bosbotinis, a specialist in defence and international affairs: "The development and deployment of hypersonic weapon systems will provide states with significantly improved attack capabilities and potentially the means to force. For instance, a large regional power can try to coerce a neighbour, exploiting the threat of hypersonic attacks against critical targets. As a result, the proliferation of hypersonic capabilities of regional states could also be destabilising, disrupting local power balances. However, it could also strengthen the deterrence" (Partyard military division, 2019). Hypersonic missiles can have nuclear warheads, which increases the scale of the threat. However, as the technology of offence advances, so the defence advances and more sophisticated defence systems will emerge. Technologies such as direct energy weapons, particle beams, and other non-kinetic weapons will be likely candidates for effective defence against hypersonic missiles. In addition, the technological complexity and the costs can foster control and non-proliferation efforts. Hypersonic systems require solid intelligence, surveillance network, target acquisition, and reconnaissance. Cyber and electronic attacks could significantly damage the operational effectiveness of long-range hypersonic weapons. Finally, the Missile Defence Agency proposed a network of satellites and space sensors to identify hypersonic gliding vehicles globally as a countermeasure (Partyard military division, 2019; Kolja Brockmann, 2022).

Until today the countries in possession of hypersonic missiles were the United States, Russia, and China.
Despite the UN ban, North Korea continued to conduct missile testing. The first hypersonic missile test, the Hwasong-8, was in September 2021. In January 2022, on the 5th and 11th, two more tests took place. The state news agency KCNA defined both tests as a success and released photos and videos as evidence of the test launches (Mazumdaru, 2022).

The Joint Chiefs of Staff of South Korea has stated that the first missile has travelled more than 700 km, at an altitude of 60 km with Mach 10 of speed; the second would have travelled 1000 km. In addition, the Japanese news agency Kondo reported that the first North Korean weapon would land outside the Exclusive Economic Zone (EEZ) of Japan. However, there is still no confirmation of where the missile landed, suggesting that it did not follow the planned trajectory.

Both tests worried the South Korean and the Japanese governments, who turned to the United States. As mentioned, there are currently no effective defence systems against hypersonic missiles, and North Korean ones threaten both Japan and South Korea. According to Jeffrey Lewis, a missile expert at the Middlebury Institute of International Studies at Monterey, Seul has little choice but to launch pre-emptive attacks against the North Korean leadership. For their part, the United States reacted by imposing new sanctions on North Korea, and at the same time, the Biden administration declared an opening to dialogue. However, Pyongyang lacks confidence in American overtures, calling them empty rhetoric and demanding more substantial changes such as ending sanctions or military exercises. North Korea-US relations, therefore, seem destined to remain critical from the freezing of negotiations in Hanoi on nuclear weapons and the arsenal of ballistic missiles between Kim Jong Un and Donald Trump in 2019 (Sungwon Baik, 2022; North Korea says Wednesday test was hypersonic missile, 2022).

There are mixed opinions about the alarm to North Korean progress. Some experts argue that the threat may be overestimated. John Tierney, who serves as the executive director for the Center for Arms Control and Non-Proliferation, warns that Pyongyang's claims may be exaggerated and suspects that the real value for North Korea of promoting hypersonic weapons is propaganda, not military effectiveness. Some analysts believe that Kim used missile testing as a distraction while solving grave internal problems, including food shortages and economic damage resulting from a collapse of cross-border trade with China during the coronavirus pandemic. Others invite not to lower their guard. Victor Cha, senior vice president and Korea chair at the Center for Strategic and International Studies, said that American missile defence systems are good but geared towards stopping a handful of more primitive missiles. He also points out that, in the past, North Korean capabilities have been repeatedly underestimated: "North Korea is very clear about its intentions. It wants to develop hypersonic abilities and will develop hypersonic abilities." (McCurry, 2022).

Whatever the reason behind the tests, they remain a real danger to the security of Asian neighbours and are potentially destabilising to the balance of the East Asian region. First, missile defence systems cannot detect low-range objects until they are close to the objective. The analyses have shown that both North Korean missiles were hypersonic, so they could travel at low altitudes, evade radar and manoeuvre to avoid last second interception. Secondly, they occurred in a moment of increasing competition between the United States and China and could completely upset the balance at play. The new North Korean threat would bring South Korean and Japanese attention to Pyongyang, decreasing their support for the US in competition with China. Therefore, governments should not overlook the geopolitical implications. (Raplh Savelsberg, 2022)

To counter North Korean new missile threats and prevent them from helping China, the Biden administration needs a more efficient strategy for North Korea, in addition to sanctions. The United States should use the renewed tensions on the Korean peninsula to encourage closer cooperation between Japan and South Korea. The Korean Peninsula, the East China Sea and the Taiwan Strait are increasingly intertwined in the current era of strategic competition. Pyongyang's provocations against the United States and its allies in the peninsula may support the Chinese Communist Party's actions elsewhere. (Sungmin Cho, 2022)

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