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South Korea's spy satellite vulnerable to North's jamming, cyberattacks

Anti-jamming technology, enhanced cybersecurity measures necessary

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The two Koreas are pitted against each other as their first reconnaissance satellites traverse Earth in low orbit, attempting to detect each other's military installations and weapons developments since they were launched.

However, their capabilities are vastly different. South Korea's space vehicle is considered far more sophisticated than North Korea's.

South Korea's spy satellite has a 0.3-meter spatial resolution, which means it can detect objects as small as 30 cm.

Compared to this, North Korea's Malligyong-1 reconnaissance satellite, launched on Nov. 21, 11 days earlier than the South Korean satellite, is believed to have just 3 meters of spatial resolution, which makes it quite difficult to be used for military purposes.

Despite the North Korean satellite's somewhat outdated technology,

it's too premature to conclude that South Korea is the winner.

North Korea has a set of lethal measures that can disrupt the operations of South Korea's satellites. The North has tested their efficacy several times, disrupting communications and suspending air and sea traffic in the South.

"Various measures are available to incapacitate the satellites," retired major Park Jae-wan told The Korea Times.

"You can even destroy a satellite by using force or incapacitate it by launching cyberattacks or jamming communications between ground stations and the satellite."

Park, an adjunct professor at Kookmin University Graduate School of Politics and Leadership, said GPS jamming, cyberattacks and blinding satellites with lasers are some of the known measures that can suspend target satellites.

In outer space, he said that there are tens of thousands of space vehicles as several countries, including the U.S., Russia and China, have put

their satellites into orbit since the world's first satellite, the Sputnik 1, reached orbit in 1957.

"People working at ground stations may not know what went wrong with their satellites, partly because problems occur for various reasons. On top of interference by enemies, intrinsic flaws of the satellites can also be a source of the problem," he said. "In space, there are many satellites that are drifting into space and out of operations. North Korea's first and second satellites, namely the KMS-3 Unit 2 and KMS-4, which were launched into orbit in 2012 and 2016, respectively, are two exemplary cases that became space debris as they didn't function properly as military satellites."

KMS is an acronym for Kwangmyongsong or "guiding star." The KMS-3 Unit 2 is the first satellite that North Korea launched into orbit, which was then followed by the KMS-4 years later. Although they entered orbit, they were incapable of communicating with North Korea's ground stations. In a report, titled "North Korea's Space Capabilities During Kim Jong-un Regime and Its Implications for South Korea," released on Dec. 3, the Institute for National Security Strategy (INSS) identified the North's anti-satellite capabilities as a pressing security threat to South Korea.

"North Korea possesses dozens of vehicles, as well as portable devices which can be used to create GPS jamming in South Korea," the report said. If employed on the satellites equipped with the synthetic aperture radar, the INSS said that the resolution of the images taken by the target satellites can be degraded.

The INSS report warned that North Korea's anti-satellite capabilities, if combined with its nuclear bomb technology, could create catastrophic security consequences for South



A handout photo made available by SpaceX via South Korea's defense ministry shows a SpaceX Falcon 9 rocket carrying South Korea's first military spy satellite lifting off from Vandenberg Space Force Base in Calif., Dec. 1.

SPA-Yonhap

Korea as well as the United States.

In case North Korea was to detonate nuclear bombs in high-altitude airspace or low Earth orbit, the report explained that an electromagnetic pulse (EMP) would be created and consequently, could interfere with South Korea's satellites.

North Korea was able to build its EMP threat with the help of Russia.

According to Peter Vincent Pry, the former intelligence officer at the Central Intelligence Agency (CIA), North Korea has a non-nuclear radio frequency weapon (RFW), dubbed the "EMP Cannon" which was purchased from Russia. The North used the EMP Cannon to impose an "electromagnetic blockade" on air traffic to Seoul, he said.

"Non-nuclear EMP attacks on airliners flying to Seoul threatened their GPS and control systems, forcing the suspension of flights to the city. The repeated attacks by RFW also disrupted communications and the operation of automobiles in several cities in December 2010 and April and May 2011," he said in a 2021 report.

North Korea resumed its anti-satellite attacks in 2012.

The North jammed the military communications running through South Korea's communications satellite, the Koreasat 5.

According to South Korea's military, a powerful signal sent from a location near North Korea's capital had caused interference to military communications on the Koreasat 5 satellite. Launched in 2006, the satellite carries a commercial and military payload.

Another instance of North Korea's interference with South Korea's satellite occurred in 2016. The North

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jammed the GPS navigation systems near its border with South Korea. About 280 South Korea ships suffered as their GPS signals disappeared from time to time and many were forced to return to their ports.

North Korea's anti-satellite capabilities have gained fresh attention from the South after U.S. Space Command and North Korea recently exchanged barbs. Sheryl Klinkel, chief of current operations and public affairs at U.S. Space Command, said that the U.S. could destroy North Korea's reconnaissance satellite. "Joint Force Space Operations could

deny an adversary's space and counter-space capabilities and services using a variety of reversible and irreversible means, reducing the effectiveness and lethality of adversary forces across all domains," she was quoted by Radio Free Asia as saying in a report released on Nov. 29. However, she didn't explain in great detail about the measures the U.S. could take to interfere with North Korea's satellite.

The news report irritated North Korea. The North's Central News Agency said on Dec. 2 that it will consider any interference with its satellite a declaration of war.

"In case the U.S. tries to violate the legitimate territory of a sovereign state by weaponizing the latest technologies illegally and unjustly, the DPRK will consider taking responsive action measures for self-defense to undermine or destroy the viability of the U.S. spy satellites," North Korea's unnamed defense ministry spokesperson said.

DPRK is an acronym of the Democratic People's Republic of Korea, the official name of North Korea.

U.S. experts said North Korea's threats to destroy U.S. satellites are just propagandistic bluster.

"I don't think we should put an awful lot of credence in this idea that they are going to take our satellites," Vann Van Diepen, former principal deputy assistant secretary of U.S. State Department, said in a program hosted by the Voice of America.

"Could North Korea put a nuclear weapon up in proximity to a satellite? Yes, probably. But the cost-benefit of that doesn't work out very well for them."



In this image from video provided by SpaceX, South Korea launches its first military spy satellite from Vandenberg Space Force Base, Calif., Dec. 1, using SpaceX's Falcon 9 rocket. It was the first of five spy satellites South Korea plans to send into space by 2025 under a contract with SpaceX. The launch took place a little over a week after North Korea claimed to put its spy satellite into orbit for the first time as tensions rise between the rivals.

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