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Case Study on the Trends of North Korean Strategic UAV 'Satbyol'

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Abstract

After 'emphasizing the development of the precision reconnaissance drone' in 2021, North Korea unveiled two strategic drones in July 2023, just two years later. Despite the majority of experts offering negative assessments and stating that "the performance may not be good," North Korea can be seen as having not only enhanced its routine surveillance capabilities through strategic drones but also possessing limited long-range strike capabilities. In other words, although the performance of North Korea's strategic unmanned aerial vehicles (UAVs), namely the 'Satbyol-4' and '9' models, may not match that of U.S. drones, they appear to play a significant role in offsetting North Korea's considerable aerial and surveillance inferiority compared to the joint forces of South Korea and the United States. Based on these trends, North Korea seems to be concentrating on drone development to counterbalance its considerable aerial power and surveillance capabilities deficit compared to the joint forces of South Korea and the United States, especially as the global use of drones continues to increase.

Keywords: *Precision, Reconnaissance, North Korea, Satbyol, Development, Strategic*

1. INTRODUCTION

Foresight With the rapid advancement of technology in the era of the Fourth Industrial Revolution, commercial technology has made significant strides, leading to a revolutionary enhancement in the capabilities of commercial drones. Consequently, recent instances of warfare demonstrate that the evolving military science and technology have the potential to fundamentally change many of the concepts that have existed in warfare until now[1]. The U.S. military has already demonstrated the military utility of drones in future battlefields by actively deploying them in regions where troop access is restricted or where there is a high

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expected level of danger, as evidenced in conflicts in Iraq and Afghanistan[1]. Until now, the utilization of drones in warfare was thought to be a capability exclusive to militarily advanced nations.

However, in the Azerbaijan-Armenia conflict that erupted on September 27, 2020, the Azerbaijani military transformed the course of the war by extensively and aggressively deploying attack drones, demonstrating that drones could play a decisive game-changing role in limited warfare scenarios[2]. Recently, North Korea has continued to escalate provocations even after the establishment of the current government, undermining the 'September 19 Military Agreement' made along with the Panmunjom Declaration. Most notably, in early November 2022, under the guise of a 'large-scale military operation against the South,' North Korea launched ballistic missiles toward the Ulleungdo region, triggering air raid alerts. Furthermore, in late December, for the first time in eight years since the 2014 incident of a small unmanned aerial vehicle crashing in Paju, North Korea surprised not only the South Korean population but also the world by infiltrating five small drones into the airspace over Seoul, Kimpo, Paju in Gyeonggi Province, and Ganghwa in Incheon[3].

Furthermore, North Korea has garnered global attention by not only replicating the physical design of the U.S. high-altitude reconnaissance drone 'RQ-4A Global Hawk' (from now on referred to as 'Global Hawk') and the armed attack drone 'MQ-9 Reaper' (after this referred to as 'Reaper') but also naming its reconnaissance drone as 'Satbyol-4' and the attack drone as 'Satbyol-9,' resembling the American counterparts[4].

2. THEEORETICAL TRENDS IN THE DEVELOPMENT OF NORTH KOREAN UNMANNED AERIAL VEHICLES(UAVs)

Kim Jong-un has been actively involved in the development of attack drones, evidenced by his official visits to the Unmanned Aerial Vehicle (UAV) unit (Aerospace Reconnaissance Bureau in the Western Zone) on December 17, 2011. Subsequently, on April 15, 2012, during the celebration of Kim Il-sung's 100th birthday, he introduced the suicide drone. Moreover, on March 20, 2013, during an observation of the training for a 'precision-guided suicide drone,' he directed, "Confirm the capability to strike with precision up to the airspace in the southern part and ensure that unmanned strike means can input the coordinates of enemy targets without omission"[5].

Furthermore, in his New Year's address in January 2014, Kim Jong-un emphasized the importance of 'unmanned systems' in modernizing weaponry. In March of the same year, he visited North Korea's weapons development research institute, the 1501st Unit, and ordered the development of attack drones. In the 8th Party Congress in January 2021, there was an emphasis on pushing forward with the development of 'precision reconnaissance drones' capable of reaching up to 500 km in the forward area. Additionally, on December 24, 2021, under the strategic military regions, specifically the Central, Eastern, and Western Commands, two drone battalions each were newly established with units directly under the command of their respective headquarters[7].

Combining Kim Jong-un's actions over the past decade and previous instances of North Korean drone infiltrations, it can be deduced that North Korea is intensifying its development efforts at the party level, positioning drones as a key force for reconnaissance and Pre-action strikes, with some units already being organized[8]. As evidenced by an intrusion case on December 26, 2022, the form of North Korean drones appears similar to those that intruded in the past, with a size of approximately 2 meters. However, there have been changes in their operational aspects, including irregular use of segmental speed and flight altitude.

Notably, the first small drone detected by the military entered Seoul's airspace through the Han River estuary near Kimpo and engaged in a confrontation. When our military responded with fighter jets and light attack aircraft (KA-1), four other drones conducted sea-disruption flights near Incheon's Ganghwa-gun Kyodong Island at intervals of several tens of minutes, diverting our military's attention. All five drones returned without incidents. This demonstrates North Korea's confidence in using drones for deception and surprise attacks while also suggesting that they have to some extent perfected tactics using various attack drones[8].

3. ANALYSIS OF TRENDS IN THE STRATEGIC UAV 'SATBYOL'

3.1 Satbyol-4

The 'Satbyol-4' was initially captured by the U.S. satellite company 'Planet Labs' on June 3, 2023, at the Panghyon Airbase in North Pyongan Province, North Korea. Subsequently, it was identified twice more via satellite imagery on June 12 and June 14. The wingspan of the identified 'Satbyol-4' is approximately 35 meters, bearing a striking resemblance to the 'Global Hawk' (wingspan 35.4m). Military experts both domestically and internationally speculate that North Korea may have replicated the 'Global Hawk' by hacking into U.S. drone companies to steal relevant design information[10]. The U.S. 'Global Hawk' is a high-altitude reconnaissance drone capable of operating at an altitude of 19,500 meters for up to 36 hours. It is equipped with state-of-the-art Synthetic Aperture Radar (SAR) and Electro-Optical/Infrared (EO/IR) reconnaissance sensors, allowing it to identify objects as small as 30cm from a ground distance of 20km[11].

Source : https://namu.wiki

Figure 1. Satbyol-4

3.2 Satbyol-9

The 'Satbyol-9' was first identified at the Panghyon Airbase on September 4, 2022, preceding the identification of the 'Satbyol-4 T'. Subsequently, it was identified two more times on December 7 and June 3 of the following year. With a wingspan of approximately 20 meters, its configuration closely resembles the U.S. attack drone 'Reaper,' suggesting that it may have been replicated. Before the public revelation of the 'Satbyol-9 Type,' some had speculated that North Korea had imported China's attack drone 'Caihong (CH-

4)'[12]. The U.S. 'Reaper' is a well-known armed attack drone that gained notoriety for its pinpoint strike in January 2020, assassinating Quds Force Commander Soleimani of the Iranian Revolutionary Guard. It can carry up to 14 Hellfire missiles, operate at an operational altitude of 7,600 meters, and has a maximum endurance of 28 hours (14 hours in fully armed configuration), earning it the nickname 'Sky Assassin'[13].

Source : https://namu.wiki

Figure 2. 'Satbyol-9'

4. CONCLUSION

Even if the performance of the 'Satbyol-4' and 'Satbyol-9' may fall short of the performance of U.S. drones, it appears that they could play a significant role in North Korea, where surveillance and reconnaissance capabilities are considerably inferior compared to the ROK/US combined forces. Despite the limitation of long-range beyond line-of-sight flights due to the absence of communication satellites in North Korea, the installation of relay stations on major elevations would enable operations up to 200 km within North Korean airspace. When operated in the DMZ area, the assessment suggests that there is sufficient capability for information gathering across the Korean Peninsula[14]. While the precise performance of North Korea's disclosed strategic drones, 'Satbyol-4' and 'Satbyol-9' remains unknown, the mere replication of U.S. drones indicates North Korea possesses considerable technological capabilities.

Based on this study, future research could focus on developing a comprehensive roadmap for the evolution of unmanned combat systems, with the potential to become a practical game-changer that overwhelms North Korean drone capabilities. It is anticipated that visible strategies will be implemented to effectively counter the increasing military threat posed by North Korea's small drones and strategic drones on the battlefield.

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