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CMSI Translations #2: Dominating the Battlefield—The Advantages of Unmanned Intelligent Combat Forces

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翻译

TRANSLATIONS

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Dominating the Battlefield—The Advantages of Unmanned Intelligent Combat Forces[1]

By Zhao Xiangang and Su Yanqin[2]

In his report to the 20th National Congress of the Communist Party of China, Xi Jinping emphasized the need to accelerate the development of unmanned intelligent combat forces. Looking at the practice of local wars in recent years, unmanned combat forces as represented by drones have become an important part of the joint operational force system, playing an increasingly prominent role as an effectiveness multiplier. Especially with the advent of artificial intelligence technology and its rapid development and widespread use in the military field, unmanned systems are becoming more intelligent and autonomous, and unmanned intelligent operations are showing advantages and effectiveness that are different from those in the past.

Increased Flexibility, Able to More Effectively Achieve Sudden Strike Effects

General unmanned systems have the inherent advantage of carrying out surprise attacks due to their small radar cross section and stealthy design. However, due to their reliance on program control or command control mode, they have poor adaptability and can only rely on favorable environmental conditions to attack fixed or relatively slow targets. Intelligent unmanned systems, on the other hand, can carry out autonomous reconnaissance, identification, decision-making, and actions in more complex battlefield environments, with increasing operational flexibility, without relying on rear control, based on operational authority given beforehand, and can additionally carry out surprise attack operations within a wider range of mission sets.

They can implement agile attacks. On the informatized battlefield, the enemy's key high-value targets usually appear suddenly and randomly in time and space. Attacking them is therefore subject to strict time window restrictions. The opportunity to attack is fleeting, but once the attack is successful, it will produce better combat effects and achieve greater results, leading to greater combat efficiency. Intelligent unmanned systems have strong autonomous decision-

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[1] 赵先刚 [Zhao Xiangang] and 苏艳琴 [Su Yanqin], 叱咤疆场，无人智能作战力量的优势在哪里 ["Dominating the Battlefield—The Advantages of Unmanned Intelligent Combat Forces"], 人民海军 [*People's Navy*], 6 February 2023, p. 3.

Translator's note: This article was part of a series of articles published by *People's Navy* for the purpose of helping Chinese naval personnel to understand the characteristics of intelligent warfare and grasp the implications of Xi Jinping's 20th Party Congress report in which he called for the PLA to "accelerate the development of unmanned intelligent combat forces."

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making capability, which solves the delay problem of rear command and control in transmission time and platform response. It can take advantage of its long endurance to carry out area mobile cruising to important mission areas and conduct persistent reconnaissance and surveillance, quickly and accurately attacking targets when they are discovered, and effectively seizing advantageous combat opportunities. In January 2020, the US military's raid to assassinate Soleimani, the top commander of Iran's "Quds Force," used the semi-intelligent MQ-9 "Reaper" integrated surveillance and attack drone, supported by other intelligence information, entering the skies above Baghdad in advance, and successfully carrying out reconnaissance and a subsequent attack on the target.

They can achieve infiltrative, surprise attacks. Entering deep, core areas of enemy territory to carry out attacks on important targets has always been risky with a low success rate. As the intelligence level of small and micro unmanned systems increases, there is an emerging capability to spread drones deep into the enemy territory by utilizing airdrops or artillery fire, and then use independently-powered flight or ground maneuvers to automatically compare data and autonomously approach the intended target or directly attack it. They can penetrate key parts of large-scale weapon systems and even penetrate internal core locations such as the enemy's combat decision-making, command and control systems, etc. to conduct reconnaissance and surveillance. Additional capabilities could include the timely release of high explosives carried to destroy key points and target nodes or releasing high-energy chemical weapons to kill or injure key or core personnel, implementing "inner-scope reconnaissance" and "minimally invasive strikes," degrading the enemy's operational systems, disrupting the enemy's operational plans, and interrupting the enemy's operational rhythm, thereby instilling a strong psychological shock and confusion. In November 2017, a highly intelligent micro-autonomous attack robot called "Killer Bee" was displayed at the United Nations Convention on Certain Conventional Weapons conference. It is less than the size of an ordinary person's hand, is equipped with wide-angle cameras and tactical sensors, and contains three explosives. The Killer Bee can be used in a swarm and can capably fly indoors, entering through small holes for precise identification and attack.

Enhanced Coordination, Able to More Effectively Implement Swarm Operations

Due to limitations of the level of unmanned systems' intelligence, most common unmanned systems, and the collaboration between unmanned systems and manned systems, mainly rely on pre-planning to coordinate timing and position. Therefore, when the situation changes, coordination needs to be carried out through the rear control station of the unmanned system. Timeliness and accuracy are poor, making it difficult for unmanned systems to adapt to the rapidly changing informatized battlefield. Intelligent unmanned systems can automatically maintain formation maneuvers and combat formations based on the initial state, termination state, and process schedules set by the mission. They can also automatically avoid threats and coordinate to execute combat missions in the optimal path and manner.

They can implement swarming operations. The improvement of the intelligence and autonomy of unmanned systems is the material condition for multiple unmanned systems to be jointly organized and used in clusters (swarms), and is an important basis for functionally employing effective unmanned combat operations. In an intelligent unmanned cluster, each combat platform can, based on different combat purposes and mission requirements, focus on the combat target,

exchange information with each other through interconnection and interoperability, dynamically and autonomously combine, and conduct subsequent mobile assault and overall defense in a coordinated manner. During offensive operations, they can carry out predetermined targeted strikes successively or simultaneously from multiple directions in a highly coordinated manner, overwhelming the enemy and making it difficult to defend itself, paralyzing its combat system or damaging key parts in a short period of time. It can also conduct deception or interference operations or conduct electronic attacks and other “soft kill” operations. Hard fire destruction operations can be automatically synchronized and coordinated at the best time to avoid mutual influence and conflicts in target selection, effectively support fire operations, and improve overall combat effectiveness. In defensive operations, an intelligent adaptive defense system can be established to form automatic response protection "bubbles" around one's own combat units or valuable positions in need of protection, build three-dimensional and multi-level interception networks, and dynamically implement perimeter warning, interception, and threat response. The system can respond flexibly to attacks and protect the safety of important assets and positions at sea or on the ground.

They can implement manned/unmanned coordinated operations. The mixed grouping and integrated operation of manned combat forces and unmanned systems is an important combat mode formed with the development of unmanned intelligent combat forces. It can maximize the complementary and synergistic advantages of the two and improve the overall combat capability. The mixed grouping and integrated operation of manned combat forces and unmanned systems is an important combat method formed with the development of unmanned intelligent combat forces. It can maximize the complementary and synergistic advantages of both manned and unmanned forces and ultimately improve overall combat capability. During operations, according to combat missions, conflict intensity, battlefield environment, and other conditions, multiple manned combat platforms and unmanned combat platforms can rely on advanced information and intelligent technologies to dynamically match forces and flexibly organize. While under the control of manned combat forces responsible for formation command, intelligent unmanned systems can forward deploy to quickly grasp the battlefield situation and expand early warning detection range. They can also accurately direct and guide firepower, extend the strike arm of manned combat platforms, and improve long-range combat effectiveness. They can also conduct advance operations to discover and attack the enemy first, creating opportunities and favorable conditions for manned operations. At the same time, effective utilization can feasibly keep manned combat forces outside the enemy's threat range, thereby reducing the possibility of being attacked by the enemy and improving battlefield survivability. Evaluation of the effectiveness of foreign military helicopter/unmanned reconnaissance collaborative operations shows that the time to perform tactical reconnaissance missions is shortened by 10 percent on average, the amount of targeting data increases by 15 percent, the survivability of airborne personnel increases by 25 percent, and the weapon system kill potential increases by more than 50 percent.

Increased Control, Able to More Effectively Improve Command Effectiveness

The intelligence of unmanned intelligent combat forces is reliant upon the intelligence of the entire unmanned system, which is not only reflected in the autonomous capabilities of the unmanned combat platform, but also in planning and control. Whether the case is operators at rear control stations or commanders of manned/unmanned collaborative combat formations,

intelligent control systems can assist in completing mission planning and combat control quickly and efficiently, greatly improving command efficiency.

It manifests as the universalization of platform controls. The unmanned system's control unit is the "brain" of the entire unmanned system and the command node for unmanned combat forces to perform tasks. Its responsibilities include tasks such as pre-planning, delivery/retrieval, information processing, command issuance, and coordination with other operational forces when the unmanned platform is operating. The intelligent control system has an open architecture and strong interoperability. While greatly reducing the workload of the operator, it achieves the transformation from "one controlling one" to "one controlling many." That is, one control unit can simultaneously control multiple unmanned combat platforms or unmanned clusters in different spaces and with different mission types, and can also interact with multiple different communication networks to enable information sharing and effective combat coordination with other combat units. In addition, the enhanced central control capabilities of intelligent unmanned combat platforms can self-correct minor errors or deviations in command signals, which also promotes efficient command and control of unmanned intelligent operating forces. The "universal control of shipborne unmanned systems" plan proposed and implemented by foreign military forces is to achieve unified control of various types of shipborne unmanned aerial vehicles and surface/underwater unmanned systems, effectively coordinating the actions of maritime combat forces.

It manifests by hastening human-machine interaction. Efficient human-machine interaction is the key to effective control of unmanned combat platforms. The intelligent control system can not only independently maintain situational awareness, combat decision-making, and mission planning and other work, but can also comprehensively present the corresponding results in a simple and intuitive form, so that the operator can understand it well and confirm it with a single, direct operation. In particular, the interlinked relationship between human and computer in the intelligent control system can receive multiple modes, accurately understand and identify the intentions expressed by the controller through non-contact interaction methods based on physiological characteristics such as voice, gestures, expressions, and EEG, and quickly identify them. It is converted into task instructions that can be recognized by the unmanned combat platform and distributed or issued on demand, which improves interaction efficiency and command and control effectiveness. For example, one foreign military's "Best Role Assignment Management and Control System for UAV Control" project consists of intelligent UAV autonomous behavior software and an advanced user interface. The system interface is optimized for the control of multiple UAVs and is equipped with a touch screen The interactive glass cockpit and auxiliary target recognition system allow a helicopter mission commander to effectively control three drones at the same time, improving situational awareness and mission effectiveness without increasing the workload.

The unique advantages of unmanned intelligent combat have improved the battlefield adaptability of unmanned intelligent combat forces, enabling them to more effectively perform combat missions jointly with other combat forces in complex environments with high dynamics and strong conflict intensity. Especially with the future realization of "improved artificial intelligence," unmanned systems with better deep learning capabilities and higher autonomous decision-making capabilities will have a disruptive impact on the rules of war and combat methods.