**Global cognitive warfare: using the invisible to defeat the visible**

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Cognition is the process by which people acquire, process and apply information and knowledge. Today, war is no longer limited to physical domains, information domains and other spaces. The cognitive domain has gradually become a new battlefield for competition. Cognitive warfare has gradually received attention from various countries and has entered the era of "global cognitive warfare". Global cognitive warfare mainly includes global cognitive perception, global cognitive fusion and global cognitive attack and defense. Compared with traditional warfare, global cognitive warfare aims to strengthen cognitive protection through the comprehensive use of multiple means, while interfering with, influencing and controlling the feelings, perceptions, thinking, imagination, experience, beliefs, etc. of personnel in hostile countries, so that their subjective cognition and objective reality deviate and confuse, thereby achieving the goal of winning the war dominance with cognitive advantages or even defeating the enemy without fighting.

**Global cognitive perception is the prerequisite**

Information is the basic "ammunition" of cognitive warfare. Information advantage determines the formation of cognitive advantage, which inevitably determines that the global and accurate perception of information is the premise of cognitive warfare. In future wars, both hostile parties will do their best to ensure timely, accurate and comprehensive grasp of information in various dimensional domains, so as to achieve a comprehensive grasp of the battlefield space and ensure that their own command decisions and various actions can be fully guaranteed by cognitive information. Since information is not restricted by dimensional domains, the space of cognitive confrontation not only covers traditional physical domains such as land, sea and air, but also covers information domains such as electricity and the Internet, and also includes the cognitive space of people, that is, the cognitive domain. Information can be mutually integrated, infiltrated and acted together between the physical domain, information domain and cognitive domain. Global perception needs to focus on the characteristics of information in cognitive confrontation, such as globality and integration, and implement accurate information perception in the global scope. From the perspective of perception scope, it includes not only land, sea, air, space, electricity and Internet domain information involved in traditional warfare, but also information in the fields of politics, society, economy, diplomacy, culture, public opinion, etc. related to people's thoughts, thinking, spirit and will. From the perspective of perception, it involves not only the intentions and wills at the national strategic level, but also the guidelines, development plans, and cultural construction of a certain organization or field, as well as the spirit, thoughts, wishes, psychology, habits, and habits of the basic components of society. From the perspective of perception time, information has no boundaries between peacetime and wartime. Peacetime is wartime, and wartime relies on peacetime. It can be said that cognitive perception is "wartime all the time."

The realization of global cognitive perception is a complex system engineering, involving a wide range of areas, multiple domains, and complex and diverse perception pathways. The rapid development of information network technology has provided possible conditions for the realization of global perception. The perception information of each dimensional domain can only be aggregated through the information network, and the perception information data can only play a role with the support of the information network. From the perspective of implementation methods, it is necessary to take the information network as the basis and support, the perception unit as the "touch point", the network grid as the "neural network", and link it to the special cognitive processing institutions established in each sub-domain through the perception chain. Each sub-domain then integrates to form a full-domain situational awareness system, thereby forming full-dimensional, no-dead-angle, and no-gap full coverage; from the perspective of the working principle, in view of the many types, wide distribution, large number of perceived targets and the implicit characteristics of cognition, use a variety of forces and means, multi-level linkage, full response, and full-source collection to obtain full-domain, full-time, and all-round target data, and then conduct multi-domain verification, true elimination, and analysis and processing of the perception-level target data to form a preliminary understanding of the target characteristics; from the perspective of guarantee requirements, the perception information network should ensure the smooth flow of data throughout the network in accordance with standardization requirements, while being compatible with the general functions of command and decision-making, forming a multi-network superimposed information network system. With the support of the information network system, we can focus on the cognitive needs of users at all levels and of all types, give full play to the advantages of the information network's full coverage, dynamic interconnection and direct access to the end, promote the close coupling of the "perception chain", "fusion chain" and "action chain", and implement personalized, precise and intelligent support and guarantee.

**Global cognitive fusion is the key hub**

"Seeing clearly" does not mean "seeing through". With global cognitive perception, global cognitive fusion is also needed. This means collecting, comparing, verifying, analyzing, judging and integrating the information of global perception, which is the unity of the process and result of cognitive fusion. In cognitive confrontation, massive and complex cognitive information is like a fog, some of which are useful, some are useless, some are true and some are false. In this cognitive space full of "fog of war" and "uncertainty", only through cognitive fusion can a comprehensive, timely and accurate judgment of the situation be formed, and then the global perception advantage can be transformed into decision-making advantage and action advantage. It can be said that global cognitive fusion is the key to achieving coordination and consistency in global cognitive warfare. Looking back at the entire process of the US military's search for Bin Laden, from using all reconnaissance and perception means, to digging out and discovering Bin Laden's messenger "Kuwait", to finding out his real name, to finally integrating various cognitive information to confirm Bin Laden with a high probability, and providing decision support for the "Spear of Poseidon" operation, it is a process of continuously integrating all cognitive information based on global perception. The integration of cognitive information plays a decisive role in promoting the deepening of cognition and maintaining cognitive advantages. In the future, cognitive warfare will become increasingly complex and fierce. It will become easier to "see clearly" but more and more difficult to "see through". How to strengthen the integration of all-domain cognition to cope with real challenges is very important for achieving decision-making advantages.

Global cognitive fusion requires an "open architecture" to connect the information islands of global cognition. The wider the cognitive domain, the more accurate the cognition. The essence of global cognitive fusion is all-source fusion. In reality, the same sensor data is fused, the characteristics of various targets are fused, and the domains are coupled to form cognitive fusion. From data fusion, information fusion to cognitive fusion, the diversification of fusion content and the differentiation of fusion needs require an "open architecture" to achieve barrier-free flow of basic information, trends, situations, audio and video, and target information in each domain; and to break through the barriers of global fusion by using big data. Cognitive fusion is not only about the verification of the attributes of similar and single-domain targets and the synthesis of battlefield dynamics. It is more important to mine and analyze cross-domain and heterogeneous cognitive information from the database to form a comprehensive judgment. The use of big data and other related technologies can realize the analysis and collation of unstructured information such as text, video, and voice calls, and form comprehensive and holistic cognitive fusion results from massive, multi-source, and heterogeneous data. The "From Data to Decision" project and "XDATA" plan advocated by foreign militaries focus on the use of big data technology to promote cognitive advantages, and break the cognitive bottleneck of comprehensive analysis through intelligent development. Fusion intelligence can effectively improve the understanding and thinking ability in the process of cognitive fusion. Global intelligent fusion can, to a certain extent, get rid of the dependence on human fusion rules and experience, and eliminate the ambiguity, fragmentation and one-sidedness of human cognition under certain conditions.

**Global cognitive attack and defense is an essential requirement**

Any war cannot be separated from offense and defense, and the same is true for global cognitive warfare. Whether it is the implementation of "deterrent," "deceptive," and "punitive" military operations in the military field, or the implementation of "influence-type combat operations" in non-military fields such as information, economy, politics, society, and culture, it is to exert influence on people's psychology, spirit, beliefs, thoughts, and other cognitions in the cognitive space, and carry out various cognitive offensive and defensive activities such as influence and counter-influence, infiltration and counter-infiltration, destruction and counter-destruction, control and counter-control. This can be understood from the two aspects of cognitive global defense and global offense.

Global cognitive protection is to strengthen one's own cognitive security in the whole domain and at all times, and build a solid cognitive defense line. To do a good job in global cognitive protection, it is necessary to use cognitive detection in the whole domain, check the defense and denial of one's own cognition, actively resist the cognitive attack of the opponent, and protect one's own cognitive weaknesses from the opponent's attack. Stick to one's own cognition, use information and various cognitive platforms and various means to fully publicize one's own values ​​and just positions, resonate with the people's inner values, gain the recognition of the people, stimulate the people's resistance to the enemy's cognitive offensive, unify the will, gather the people's hearts, inspire morale, and unite the vast interest groups at home and abroad to fight the enemy together. Strengthen cognitive protection, reduce the detection rate, monitoring rate, and confirmation rate of enemy reconnaissance perception within the scope of global cognition, strengthen the protection means and concealment measures for important cognitive fields, reduce the perceptibility of one's own information, economy, politics, society, etc. related to security, strengthen protection control, and strengthen relevant confidentiality and control means. Implement cognitive shielding, by adding cognitive fog, around strategic intentions, take camouflage actions to hide one's true intentions, hide the truth and show the false, to enhance the security of one's own cognition. For example, constantly adjust the deployment of military forces and conduct regular deterrent exercises to deny the opponent's reconnaissance and harassment and disrupt the opponent's perception and judgment.

Global cognitive offense is to control, interfere with, and influence the enemy's cognition to achieve cognitive advantages over the enemy and realize one's own goals and intentions. Global cognitive offense has the characteristics of a large range and all fields, requiring cognitive offense to be launched simultaneously in multiple fields, multiple dimensions, and multiple time periods to form an overall synergy and achieve the best results. Strengthen cognitive penetration, through reconnaissance of the opponent's cognitive situation, decision-making habits, thinking patterns, etc., targeted actions such as creating a situation, changing the atmosphere, and stimulating the psychological state, to divide and disintegrate the overall unity of the opponent's domestic cognition, and affect the opponent's determination, intentions, and command decisions. Disrupt the cognitive process, interfere with and interrupt the enemy's cognitive cycle and link smoothness. If necessary, offensive actions in the physical and information domains can be used to destroy certain key nodes, disrupt and affect the enemy commander's cognitive judgment, and delay the opponent's reaction and response. Implement cognitive dominance, and carry out military, economic, cultural, diplomatic, and public opinion actions against the enemy in a step-by-step and systematic manner according to the needs of the confrontation. Use offensive actions in the physical, information, and cognitive domains to demonstrate hard power, show one's will and determination, and change the opponent's original cognition to form effective control.