CENTRE FOR JOINT WARFARE STUDIES

CENJOWS

CHINESE AI WEAPONS

1. **"AI Weapons" in China's Military Modernization.** The Chinese military and China's defense industry have been pursuing significant investments in robotics, swarming, and other applications of artificial intelligence (AI) and machine learning (ML). Thus far, advances in weapons systems described or advertised as "autonomous" or "intelligentised" have built upon existing strengths in the research and development of unmanned systems and missile technology. It is difficult to evaluate the sophistication of these emerging capabilities but there are indicators of progress in weapons systems that may possess a range of levels of autonomy.

2. **Current Capabilities.** While there is currently no direct evidence that the PLA has formally fielded a weapons system fully consistent with the definition of "AI weapon," a number of systems are analogous or comparable in their functionality:-

(a) The Chinese defense industry's attempts to make cruise and ballistic missiles more "intelligent" build upon work on automatic target recognition that predates the recent concern with autonomous weapons.

(b) The Chinese military has reportedly converted older models of tanks to operate via remote control or with some degree of autonomy.

(c) There are also reports that variants of aircraft have been modified to be operated via remote control or potentially autonomously, perhaps to overwhelm air defenses in a potential invasion scenario against Taiwan.

(d) The PLAN has tested and operated a range of undersea gliders and unmanned underwater vehicle (UUVs) for scientific or military missions, including the HN-1 glider used in exercises in the South China Sea in 2018.

3. Often, limited technical information is available, rendering the disclosure of capabilities and signaling -- including the potential for misdirection or disinformation – important to evaluate carefully.

4. **Future Trends in Research and Development.** These advances in PLA capabilities are taking shape through the efforts of Chinese military research institutes, the Chinese defense industry, and the emerging ecosystem of commercial enterprises supporting military-civil fusion. For instance:-

(a) The Key Laboratory of Precision Guidance and Automatic Target Recognition at the PLA's National University of Defense Technology researches a ***range of automatic target recognition techniques***.

(b) The available technical literature also points to interest in ***applying neural networks to the guidance of hypersonic glide vehicles***, enabling adaptive control and greater autonomy.

(c) For new directions in research, the Tianjin Binhai Artificial Intelligence Military-Civil Fusion Center was established in partnership with the PLA's Academy of Military Science, and pursues developments in autonomy and the capacity for coordination of unmanned systems, such as in undersea drones.

(d) Future Chinese aerospace capabilities will be enabled and enhanced by research currently underway within the major state-owned defense conglomerates. Starting in 2015, the China Aerospace Science and Industry Corporation (CASIC) 3rd Academy 35thResearch Institute began ***pursuing breakthroughs in core technologies including target detection and recognition techniques based on deep learning and deep neural network compression, and smart sensors, combining data from multiple radars***. Notably, in 2016, this CASIC team organized an innovation competition for "AI-Based Radar Target Classification and Recognition," the Chinese defense industry's first major event of this kind; it involved companies and universities with AI research proficiency applying that expertise to finding intelligent processing solutions for targeting. According to a senior missile designer from CASIC, ***"our future cruise missiles will have a very high level of AI and autonomy," such that commanders will be able "to control them in a real-time manner, or to use a fire-and-forget mode, or even to add more tasks to in-flight missiles."*** Future missiles might have increasingly sophisticated capabilities in sensing, decision making, and implementation —even potentially gaining a degree of "cognition" and continual learning capability. ***Significantly, the PLA's development of hypersonic weapons systems has also incorporated advances in techniques for greater autonomy and adaptive control.***

(e) Advances in military robotics and autonomy may augment Chinese naval capabilities. During a September 2018 defense exhibition, a subsidiary of the China Shipbuilding Industry Corporation (CSIC) revealed: -

(i) ***"JARI," a multi-purpose unmanned surface vessel reportedly designed for use by the PLAN and also intended for export as a warship***.

(ii) CSIC has also displayed the ***"Sea Iguana" (or Marine Lizard), an unmanned surface vehicle (USV) that could be leveraged in support of future amphibious operations.***

5. Reportedly, the PLAN and Chinese defense industry are also developing ***AI-enabled submarines to advance Chinese capabilities in undersea warfare,*** through a classified military program disclosed in English language reporting, ***the 912 Project***. While fully autonomous submarines appear to remain a long-term objective, the introduction of AI/ML techniques for target detection and decision support — including improving acoustic signal processing — could prove more feasible in the meantime.

6. Beyond state-owned defense conglomerates, a growing number of new contenders are pursuing advances in unmanned and autonomous weapons systems, from companies, such as Yunzhou Tech, to leading universities, including the Beijing Institute of Technology.

https://www.brookings.edu/wp-content/uploads/2020/04/FP_20200427_ai_weapons_kania_v2.pdf
https://www.ashtreeanalytics.com/posts/chinese-shipbuilder-launches-amphibious-sea-iguana-unmanned-surface-vehicle