CNA

A biweekly newsletter on AI and autonomy developments in China

Kevin Pollpeter, April Herlevi, and Amanda Kerrigan

Welcome to the China AI and Autonomy Report, a biweekly newsletter published by CNA. Read in browser.

In this issue, PLA National University of Defense Technology professor Liang Xiaobo discusses the requirement for effective operations in the cognitive domain, and PLA Naval Command College professor Zhuang Congyong discusses the influence of "intelligentized warfare" on naval power. China's Southern Ocean Science and Engineering Laboratory claims to have developed the world's first unmanned surface vessel that can launch unmanned systems, while a PRC-UK team says it has developed an "aerial-aquatic robot" that can operate both under water and in the air. In a potential sign that the PRC government appears to be easing up on its crackdown on big tech, Vice Premier Liu He stated that the government needed to increase direct investment in the digital economy and support the listing of digital companies in capital markets at home and abroad. The city of Shanghai announced that it is providing more than US $9 billion in credit to support its AI industry during the city's COVID-19 lockdown.

THIS WEEK'S CONTENTS

MODERN WARFARE

COGNITIVE WARFARE

PLA National University of Defense Technology (NUDT) professor discusses requirements for effective cognitive domain operations. *China Military Online*, the PLA's official news and information portal, carried a lengthy [article](#) on cognitive warfare written by NUDT professor Liang Xiaobo.[1] Liang writes that cognitive warfare has become an important component of modern military conflict that involves a "complex collection" of public opinion warfare, psychological warfare, legal warfare, trade warfare, diplomatic warfare, technological warfare, and ideological warfare. Liang defines cognitive domain operations as the use of modern cognitive theory and science to conduct propaganda and psychological operations to influence beliefs, subvert confidence, and compete for thinking. Liang argues that the transition toward "intelligent warfare," described by PLA researchers as warfare that features the use of AI and autonomy, will bring about "profound changes" in tactics in which militaries will not only compete in the physical and information domains but also pay increasing attention to the cognitive domain.

Liang writes that online media is now the main medium for cognitive warfare. He argues that the large amount of data available online can reveal relationships between social groups, and their grievances that can be exploited for societal influence. According to Liang, the combined use of AI, big data, supercomputing, natural language processing, smart phones, and new generation network communications can exploit the large amount of online data to reveal connections between societal groups and beliefs that would normally not be discernible.

Liang argues that effective operations in the cognitive domain rely on a deep understanding of the target country, its culture, religious beliefs, and customs as well as its ethnic groups and the perceptions, misperceptions, and hostility that can exist between those ethnic groups. According to Liang, effective cognitive domain operations must combine this knowledge of the target country with the use of online multimedia to produce an effective message that can influence the target audience.

To effectively carry out operations in the cognitive domain, Liang argues that it is necessary that those conducting cognitive warfare operations be proficient in foreign languages, have cross-cultural communication skills, and can speak skillfully on international multimedia platforms. These personnel would be entrusted to reach out to target audiences, establish personal connections, and build a community that can, at critical moments, exert influence on their followers.

NAVAL WARFARE

PLA Naval Command College professor discusses six trends of naval power in era of "intelligentization." The *PLA Daily*, the official newspaper of the PLA, carried an [article](#) on the trends of naval power warfare during an era of "intelligentized warfare."[2] The article, written by Naval Command College professor Zhuang Congyong, argues that information technology and AI are turning traditional concepts of naval power proposed by American naval strategist Alfred Thayer Mahan "upside down." Although Zhuang does not appear to make a clear case for how information technology and AI are facilitating this change, he argues that the move toward intelligentization has resulted in six trends.

Trend 1: Naval power transitioning from being "restricted to war" to "shaping the structure" of the international system. According to Zhuang, while Mahan primarily took naval power in the context of winning wars, the American naval experience after World War II demonstrates that naval power can have a profound effect on the global balance of power. Consequently, emerging powers must seek ways to break the dominance of the traditional powers by shaping the international maritime environment. In this regard, only by seeking ways to establish naval superiority can an emerging power win future wars, protect their legitimate rights and interests, and maintain a stable and peaceful international environment.

Trend 2: Naval power transitioning from "controlling the sea with naval power" to "controlling the sea with multidomain power." According to the author, during Mahan's time, sea control was established through engagements between surface forces over localized areas. With the development of long-range missiles and aircraft, however, sea control will be achieved not only through the use of naval power but also through the use of land, sea, and air power.

Trend 3: Naval power transitioning from "surface ships" to "naval platforms." According to the author, during Mahan's time, countries demonstrated their naval power through battleships and their large guns. During World War II, however, aircraft carriers replaced battleships as the most important capital ship. Naval warfare then began to be characterized by multiple types of platforms used in groups, such as aircraft carrier strike groups and destroyer battle groups. In the future, naval warfare will be characterized more by the use of space and unmanned systems operating in support of naval platforms.

Trend 4: Naval power transitioning from operations on the "ocean surface" to "three-dimensional" operations. According to the author, in the past, threats to naval vessels came mainly from the surface of the ocean. Naval warfare now involves operations not only in the maritime domain but also in the outer space, air, subsurface, deep sea, electromagnetic, and cognitive domains.

Trend 5: Naval power transitioning from "decisive naval engagements" to "destruction at sea." According to the author, during Mahan's time, naval power sought to engage in battles of annihilation. Future naval warfare, however, will focus on paralyzing adversary systems through precision strikes and by attacking strategic channels and enemy bases, and by seizing key maritime areas.

Trend 6: Naval power transitioning from "wartime control" to "peacetime building." According to the author, during Mahan's time, naval power was thought of mostly in the context of wartime operations. However, the increasing importance of the oceans means that naval operations must focus on peacetime activities that can set the stage for wartime victory. These include the peacetime prepositioning of naval forces, the use of naval deterrence, controlling sea lines of communications, and maritime security governance.

RESEARCH AND DEVELOPMENT

PRC laboratory reportedly launches world's first unmanned ship capable of launching unmanned systems. The *S&T Daily*, an official PRC newspaper overseen by the PRC's Ministry of Science and Technology, [reports](#) that on May 18 the [Southern Ocean Science and Engineering Guangdong Provincial Laboratory (Zhuhai),](#) operated by Sun Yat-Sen University, launched an unmanned surface vessel capable of launching unmanned systems.[3] Reportedly the first of its kind, the *Zhuhai Yun* is 88.5 meters long, 14.0 meters wide, and 6.1 meters deep, with a draft of 3.7 meters. It displaces 2,000 tons, has a maximum speed of 18 knots, and can carry dozens of air, surface, and submersible unmanned systems. The article claims the ship will increase the collection of ocean data and improve the efficiency and level of ocean observation.

Images of the *Zhu Hai Yun*. Sources: Long Yuemei, "The World's First Intelligent Unmanned System Carrier is Launched" (全球首艘智能型无人系统母船下水), *S&T Daily*, May 18, 2022, http://www.stdaily.com/index/kejixinwen/202205/09a3a9c6065b499caa34da2d4411a1d9.shtml and the Southern Ocean Science and Engineering Guangdong Provincial Laboratory (Zhuhai) website, https://www.sml-zhuhai.cn/.

PRC and UK team build "aerial-aquatic robot." *Science Robotics*, a peer-reviewed journal of the American Association for the Advancement of Science, published an article by a team of scientists from the Beijing University of Aeronautics and Astronautics and Imperial College London who have developed a drone that can operate underwater and in the air and can attach itself to marine creatures, such as whales and sharks.[4] The drone can reportedly switch from submersible to flight mode in 0.35 seconds and can attach itself to "challenging surfaces" in the water and air while the target object is moving.

NATIONAL POLICY

In a potential sign of easing the crackdown on China's Big Tech companies, top Chinese Communist Party (CCP) officials expressed support for the digital economy and cutting-edge technologies. According to PRC official state media outlet Xinhua, on May 17, the Chinese People's Political Consultative Conference (CPPCC) National Committee held a consultation session on the digital economy.[5] Although not mentioned in official readouts, it is likely that, in addition to top CCP officials, several Big Tech executives attended the meeting as CPPCC members, including Baidu chairman Robin Li, NetEase founder William Ding Lei, and Xiaomi founder Lei Jun.[6]

At the meeting, the CCP's fourth-highest ranking member, Wang Yang, urged continued efforts to boost the development of the digital economy. Vice Premier and Politburo member Liu He, who is also in charge of the body responsible for the overall planning and coordination of China's AI development strategy, advocated the development of cutting-edge technology and the inclusion of platform businesses in major national science and technology innovation projects.[7] Liu further stated that the government needed to

increase direct investment in the digital economy and support the listing of digital companies in the capital markets at home and abroad—a remark that contrasts with previous regulatory activities that saw the delisting of ride-hailing platform Didi Global, Inc. from the New York Stock Exchange last year.[8]

Some sources have viewed these comments as a signal that China will ease its crackdown on Big Tech that began in 2020 in order to help China's economy recover from pandemic lockdowns.[9] Others have remained skeptical of a true shift in the PRC's policies toward Big Tech, citing Xi Jinping's remarks during an April Politburo meeting emphasizing oversight and anti-corruption efforts, such as cracking down on companies that "use power to seek profit" and investigating "disorderly expansion of capital and platform monopolies."[10] In addition, crackdown activities have continued in 2022, including new measures that affect profitability of food delivery platforms and a new campaign targeting corporate use of algorithms.[11]

LOCAL POLICY

Local governments announce the establishment of more AI computing centers. Three new AI computing centers have been established, which is consistent with announcements earlier this year to create national data center clusters (as discussed in Newsletter 10). In our last issue, the Chengdu Intelligent Computing Center was discussed (Newsletter 15), and now Zhejiang, Jiangsu, and Shandong Provinces have also announced their own computing centers:

- *Hangzhou AI Computing Center:* Zhejiang Province established its first computing center on May 20.[12] It will serve scientific research, industry, and government clients and will focus on public service applications, innovation incubation, industrial development applications, and talent training platforms. The center's goal is to take advantage of industry partners to improve applications for medical care, smart finance, intelligent manufacturing, and smart transportation. The center will use the Huawei Atlas 900 AI cluster and claims that it will eventually have a computing power of 100 petaflops (100,000,000,000,000,000) floating point operations per second, a measure of computing speed.

- *Yannan High-Tech Zone Digital Economy Intelligent Computing Center:* On May 23, Jiangsu Province announced that Kunlun Core Technology and Baidu Smart Cloud will be key partners in the computing center to be established within the Yannan High-Tech Zone.[13] Kunlun Core Technology is an AI chip company that spun off from the Baidu Smart Chip business in April 2021.[14] The Yannan High-Tech Zone's computing center will feature Baidu's AI computing architecture as its core. The goal is for the center to link with other AI centers in the Yangtze River Delta.

- *Qingdao AI Computing Center:* According to local government officials in Laoshan District, construction began on the Qingdao AI computing center in Shandong Province on May 15.[15] The vice chairman of the Qingdao Chinese People's Political Consultative Conference and Laoshan District Committee secretary remarked that AI, virtual reality, microelectronics, and big data cloud computing have already been an area of focus for the district, thus the computing center will further enhance Qingdao's AI industry.[16]

Shanghai provides financial support to struggling AI industry. On May 25, the Shanghai Artificial Intelligence Industry Association held a [signing event](#) to mark the extension of a 65 billion yuan (~US $9.7 billion) line of credit to the city's AI industry.[17] Under the slogan of "One Heart to Fight the Epidemic and Help Enterprises," the line of credit is intended to support the AI industry recover from Shanghai's extensive COVID-19 lockdown. The line of credit was organized by the Shanghai municipal government with credit provided by China CITIC Bank, the Shanghai Branch of the Industrial and Commercial Bank of China, Bank of China, Shanghai Pudong Development Bank, and Industrial Bank.

INDUSTRY

Baidu's Apollo Go approved to expand driverless car testing. Pandaily, a Beijing-based provider of technology news, [reports](#) that the city of Beijing has permitted Baidu's ride-hailing service platform, Apollo Go, to expand its fleet of driverless vehicles from 10 to 20 and will be allowed to add 20 more vehicles in the near future.[18] Baidu has also increased the number of passenger boarding points to nearly 300. In April, the Beijing city government granted Baidu and Pony.ai China's first-ever permits for driverless cars (see [Newsletter 14](#)). The vehicles are allowed to operate only in the Beijing High-level Automated Driving Demonstration Area, a 60-square kilometer area of the city.

INTERNATIONAL COOPERATION

Alibaba Cloud opens a data center for AI and machine learning in Frankfurt, Germany.[19] According to an industry publication, [Data Center Knowledge](#), Alibaba Cloud, a subsidiary of the PRC e-commerce giant Alibaba and the world's third-largest public cloud provider by market share, has opened its third data center in Germany.[20] The data center offers storage, network, and database services, with the data residing in Germany. The Alibaba press release noted that Alibaba Cloud offers "highly secure, scalable, robust and sustainable cloud infrastructure" and "now boasts a network of 84 availability zones in 27 regions across the globe." The data center will be in compliance with German rules for cloud-based data security known as C5, which stands for [Cloud Computing Compliance Controls Catalog](#).[21]

NOTES

[1] Liang Xiaobo, "Cognitive Domain Operations Are the New Main Battlefield of Language Confrontation" (认知域作战是语言对抗新的主战场), *China Military Online*，May 17，2022, http://www.81.cn/ll/2022-05/17/content_10155640.htm.

[2] Zhuang Congyong, "Study the Military, Study War, Study Combat: Analysis of the Development of Sea Power in the Intelligent Era" (研究军事、研究战争、研究打仗|浅析智能时代制海权发展走向), *PLA Daily*, May 19, 2022, http://www.81.cn/yw/2022-05/19/content_10156194.htm.

[3] Long Yuemei, "The World's First Intelligent Unmanned System Carrier Is Launched" (全球首艘智能型无人系统母船下水), *S&T Daily*, May 18, 2022, http://www.stdaily.com/index/kejixinwen/202205/09a3a9c6065b499caa34da2d4411a1d9.shtml.

[4] Lei Li et al., "Aerial-Aquatic Robots Capable of Crossing the Air-Water Boundary and Hitchhiking on Surfaces," *Science Robotics*, May 18, 2022, https://www.science.org/doi/10.1126/scirobotics.abm6695.

[5] China's Top Political Advisor Stresses Development of Digital Economy, Xinhua, May 17, 2022, https://english.news.cn/20220517/4deee96881ea41e79a8fbda46c60b916/c.html.

[6] Tracy Qu, "China's Top Political Advisory Body Hosts Special Symposium to Help Digital Economy in Sign of Easing Crackdown," *South China Morning Post*, May 17, 2022, https://www.scmp.com/tech/big-tech/article/3178017/chinas-top-political-advisory-body-hosts-special-symposium-help.

[7] China's New Generation AI Development Plan (AIDP) designated the National Science and Technology Structural Reform and Innovation Systems Construction Leading Small Group (LSG) as having leadership of overall planning and coordination of the AIDP. The current head of that LSG is Liu He. See section 6.1 in Graham Webster, Rogier Creemers, Paul Triolo, and Elsa Kania, "Full Translation: China's 'New Generation Artificial Intelligence Development Plan,'" New America, Aug. 1, 2017, https://d1y8sb8igg2f8e.cloudfront.net/documents/translation-fulltext-8.1.17.pdf; "Notice of the General Office of the State Council on Adjusting the Members of the National Science and Technology Structural Reform and Innovation System Construction Leading Small Group" (国务院办公厅关于调整国家科技体制改革和创新体系建设领导小组组成人员的通知), www.gov.cn, Sept. 7, 2018, http://www.gov.cn/zhengce/content/2018-09/07/content_5319966.htm.

[8] "China's Top Political Advisor Stresses Development of Digital Economy," Xinhua, May 17, 2022, https://english.news.cn/20220517/4deee96881ea41e79a8fbda46c60b916/c.html; "China Asks Didi to Delist From U.S. on Security Fears," Bloomberg, Nov. 25, 2021, https://www.bloomberg.com/news/articles/2021-11-26/china-is-said-to-ask-didi-to-delist-from-u-s-on-security-fears.

[9] Tracy Qu, "China's Top Political Advisory Body Hosts Special Symposium to Help Digital Economy in Sign of Easing Crackdown," *South China Morning Post*, May 17, 2022, https://www.scmp.com/tech/big-tech/article/3178017/chinas-top-political-advisory-body-hosts-special-symposium-help; "In Just One Year, Beijing's Crackdown Has Changed Corporate China Forever," Bloomberg, Nov. 2, 2021, https://www.bloomberg.com/graphics/2021-china-tech-crackdown-one-year/.

[10] Bill Bishop, "Politburo on Capital; Mass Testing; Beijing Outbreak; Blinken Speech on US-China; Jack Ma," Sinocism, May 3, 2022, https://sinocism.com/p/politburo-on-capital-mass-testing?token=eyJ1c2VyX2lkIjo4NjE2MzUsIl8iOiJiOW85UCIsImlhdCI6MTY1MzUyNzgyMiwiZXhwIjoxNjUzNTMxNDIyLCJpc3MiOiJwdWItMiIsInN1YiI6InBvc3QtcmVhY3Rpb24ifQ.9MFsItbTG72hsimOwji251KLMLl8jfH2z656zqqYGMQ&s=r; "During the Thirty-eighth Collective Study of the Political Bureau of the Central Committee, Xi Jinping Emphasized Regulating and Guiding the Healthy Development of My Country's Capital in Accordance with the Law, and Giving Gull Play to the Positive Role of Capital as an Important Factor of Production (习近平在中央政治局第三十八次集体学习时强调依法规范和引导我国资本健康发展 发挥资本作为重要生产要素的积极作用), CCTV, Apr. 30, 2022, https://tv.cctv.com/2022/04/30/VIDEhPfOb1nReFYUmWvoo9Ek220430.shtml?spm=C22822.Pjr2sqVbhVeD.E5V3X3yOpIOa.15.

[11] Jeanny Yu, "China's New Crackdown Shows $1.5 Trillion Tech Rout Not Over Yet," Feb. 18, 2022, Bloomberg, https://www.bloomberg.com/news/articles/2022-02-19/china-s-new-crackdown-shows-1-5-trillion-tech-rout-not-over-yet; Zheping Huang, "China Targets Big Tech's Algorithms as Crackdown Persists," Apr. 7, 2022, Bloomberg, https://www.bloomberg.com/news/articles/2022-04-08/china-targets-tech-giants-for-abusing-online-content-algorithms.

[12] "Hangzhou AI Computer Center Officially Launched" (杭州人工智能计算中心正式上线), May 22, 2022, https://zj.ifeng.com/c/8GAbDp4s2Gj.

[13] "Kunlun Core Technology Joins Hands with Yannan High-Tech Zone, Baidu Intelligent Cloud to Promote Intelligent Computing Center Project Construction" (昆仑芯科技牵手盐南高新区、百度智能云，全力推进智算中心项目建设), Caibao Wang, May 23, 2022, https://i.ifeng.com/c/8GCTrRciQIm.

14 Kunlun Core Technology, "About Us,"
https://www.kunlunxin.com.cn/%e5%85%ac%e5%8f%b8%e4%bb%8b%e7%bb%8d.

15 Laoshan District Government Online, "Qingdao AI Computing Center Official Begins Construction in Laoshan District" (青岛人工智能计算中心正式在崂山区开工建设), May 16, 2022,
http://cmsqs.qingdao.gov.cn:9007/n206250/n18207792/n18207879/n18207880/n18207883/220518092636240461.html.

16 "Shandong Province's AI Computing Center Settles in Qingdao" (山东首个人工智能计算中心落户青岛), May 16, 2022, https://qd.ifeng.com/c/8G3trgbL009.

17 "China CITIC Bank Shanghai Branch Participated in the Signing Event for the Resumption of Work and Production of Artificial Intelligence Enterprises In Shanghai" (中信银行上海分行参加上海市人工智能企业复工复产专场签约活动), *China Daily*, May 26, 2022,
http://ex.chinadaily.com.cn/exchange/partners/82/rss/channel/cn/columns/sz8srm/stories/WS628f474ea3101c3ee7ad7668.html.

18 "Baidu Expands Fleet of Driverless Autonomous Vehicles in Beijing," *Pandaily*, May 23, 2022,
https://pandaily.com/baidu-expands-fleet-of-driverless-autonomous-vehicles-in-beijing/.

19 Ben Wodecki, "Alibaba Opens AI-Focused Data Center in Germany," Data Center Knowledge, May 19, 2022,
https://www.datacenterknowledge.com/cloud/alibaba-opens-ai-focused-data-center-germany#menu.

20 Alibaba Cloud, "Alibaba Cloud Launches Third Datacentre in Germany," May 17, 2022,
https://www.alibabacloud.com/press-room/alibaba-cloud-launches-third-datacentre-in-germany?spm=a3c0i.8288105.9593763490.15.4a336a37mt9ZZf.

21 German Federal Office for Information Security, *Cloud Computing Compliance Controls Catalogue (C5): Criteria to Assess the Information Security of Cloud Services*, n.d.,
https://www.bsi.bund.de/SharedDocs/Downloads/EN/BSI/Publications/CloudComputing/ComplianceControlsCatalogue-Cloud_Computing-C5.pdf?__blob=publicationFile&v=3.

This work was performed under Federal Government Contract No. N00014-16-D-5003.

DISTRIBUTION STATEMENT A. Cleared for Public Release.

Public Release   6/2/2022

This document contains the best opinion of CNA at the time of issue. The views, opinions, and findings contained in this report should not be construed as representing the official position of the Department of the Navy.

CNA is a nonprofit research and analysis organization dedicated to the safety and security of the nation. It operates the Center for Naval Analyses—the only federally funded research and development center serving the Department of the Navy—as well as the Institute for Public Research. CNA is dedicated to developing actionable solutions to complex problems of national importance.

DNL-2022-U-031619-Final11   Subscribe/Unsubscribe at chinaai@cna.org