Data Brief

U.S. and Chinese Military AI Purchases

An Assessment of Military Procurement Data between April and November 2020

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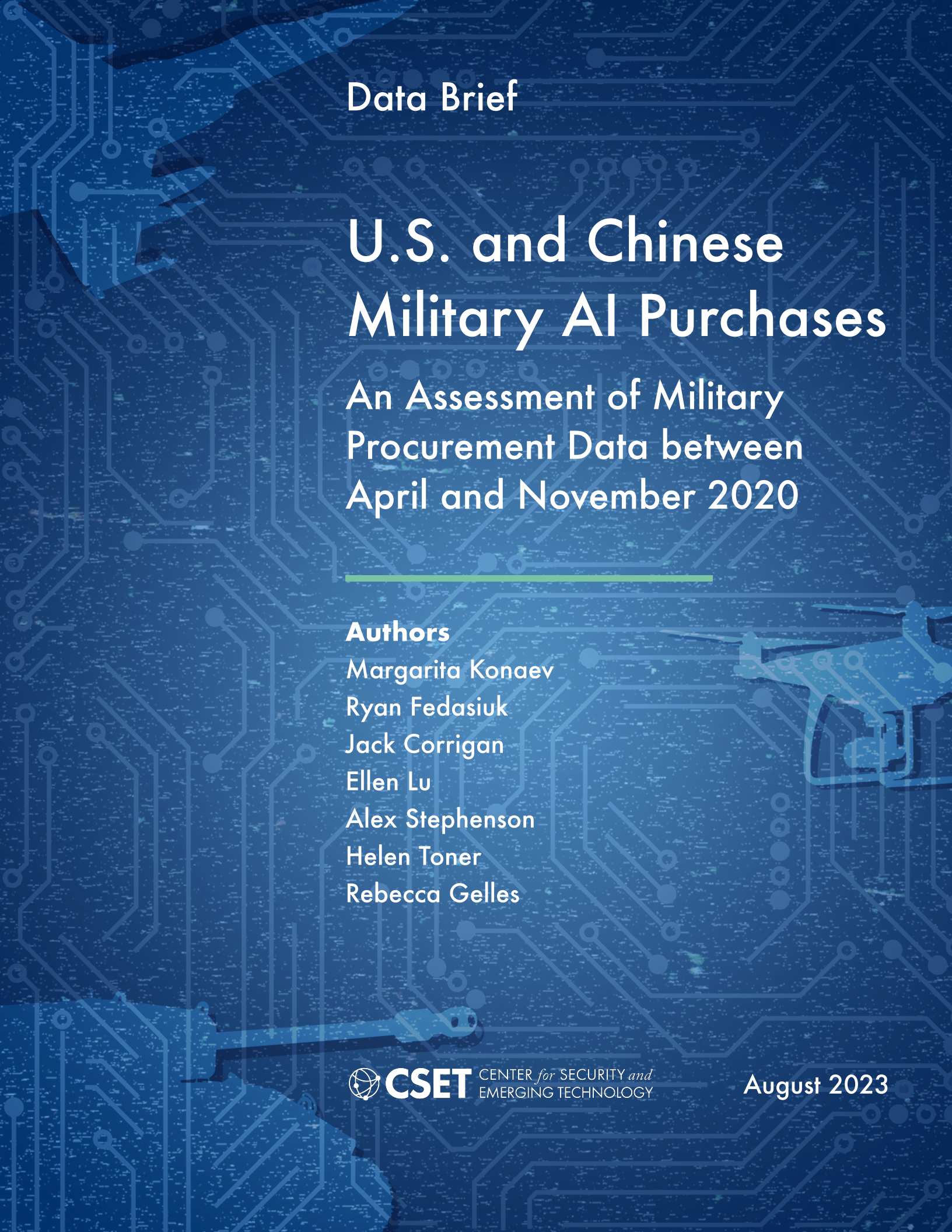

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Executive Summary

This report uses procurement records published by the Department of Defense (DOD) and the People's Liberation Army (PLA) between April and November of 2020 to assess, and, where appropriate, compare what each military is buying when it comes to artificial intelligence (AI). Specifically, it analyzes the U.S. and Chinese militaries' respective purchases of equipment, services, and research and development (R&D) activities in seven categories commonly identified as priority areas for military AI: intelligent and autonomous vehicles; intelligence, surveillance, and reconnaissance (ISR); predictive maintenance and logistics; information and electronic warfare; simulation and training; command and control (C2); and automatic target recognition (ATR). Our key findings include:

1. **Procurement data between April and November of 2020 indicates that U.S. and Chinese military forces are devoting comparable levels of attention to a similar suite of AI applications, particularly in regard to AI for intelligent and autonomous vehicles, as well as ISR tools**. Neither military appears to have made significant investments in procuring AI for command and control, though this may be a result of our data and research approach.

2. **Despite the fact that both the United States and China have relatively concentrated defense-industrial bases, each country's ecosystem of military AI suppliers (as reflected in the procurement records we reviewed), appears to be more distributed and composed of smaller vendors.** The 300 U.S. military AI contracts in our dataset are distributed among 249 unique vendors. Notably, only 36 vendors were awarded multiple contracts and just eight won three or more contracts. Most of the remaining vendors were small, bespoke defense companies. The 119 Chinese military AI contracts in our dataset were distributed across 102 unique vendors. Furthermore, universities accounted for a much larger share of AI contracts in China (14 percent) than the United States (3 percent).

Our research methodology, data, and overall analysis all have limitations. The aforementioned list of seven application areas for military AI development is far from exhaustive, and in fact, a significant number of procurement records could not be neatly categorized into these buckets. The procurement records themselves are also limited, providing a snapshot of military purchasing patterns during an extraordinary period of time when the COVID-19 pandemic disrupted supply chains and business

operations. The findings from this study may therefore not be generalizable to broader military AI procurement patterns. Also, any comparison made between U.S. and Chinese military AI purchases must account for their vastly different military bureaucracies, defense-industrial bases, and procurement systems, all of which inherently shape how each organization develops, obtains, and potentially uses emerging technologies such as AI going forward.

Even with these limitations, our study provides a unique perspective on military AI procurement as well as a rich set of concrete examples of U.S. and Chinese AI-enabled technologies and capabilities that are in relatively advanced stages of research and development or are already ready for deployment. The findings of this report, when combined with other types of data and analysis, could provide useful insights for U.S. defense planners as they think about technological competition with China and examine how AI is being integrated into core U.S. and Chinese military functions, doctrine, and operational concepts for future warfare.

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Introduction

While the U.S. and Chinese militaries appear to be making substantial investments in artificial intelligence, there is still much to learn about the types of technologies and capabilities each military seeks to develop, obtain, and potentially deploy on future battlefields.[1] Military procurement data—which contains information about contracts awarded to various entities (private companies, state-owned enterprises, academic institutions, etc.) for developing new military hardware; repairing, upgrading, or modernizing existing equipment; or for research and development activities—can provide some insight into how and where money is being spent. As such, this brief uses public procurement data to analyze the U.S. and Chinese militaries' purchases of services, equipment, and research and development activities in seven categories commonly identified as priority areas for military AI development: intelligent and autonomous vehicles; intelligence, surveillance, and reconnaissance; predictive maintenance and logistics; information and electronic warfare; simulation and training; command and control; and automatic target recognition.

The report begins with an overview of our methodology, dataset, and associated limitations. It then discusses U.S. and Chinese military investments in each of the seven aforementioned AI application areas and offers broad observations regarding each country's AI vendor pool.

This report's findings are constrained by the amount of public procurement records published by the armies, navies, and air forces of both countries. Many other organizations and service branches are purchasing AI-related capabilities, and these are not captured in our analysis. Likewise, many military projects related to AI applications are likely classified and therefore not observed in our analysis. Despite these limitations, our study offers a unique overview of AI technology investment areas that, when combined with other relevant data and analysis, could provide insights about priorities, plans, and trends in PLA and DOD AI procurement.

Methodology and Scope

This report compares the U.S. and Chinese militaries' efforts to integrate AI into their systems and missions by analyzing procurement records published by both militaries. While it is not possible to conduct an "apples-to-apples" comparison given major structural differences between the two militaries, this analysis attempts to compare AI purchases by considering a similar set of equipment procurement records published by three core U.S. and Chinese military service branches.[2] Specifically, we consider publicly available procurement contracts that were:

1. awarded by either the U.S. or Chinese Army/Ground Force, Navy, or Air Force;
2. published between April 2020 and November 2020; and
3. included any of the selected AI-related keywords in their titles (see Table 1).[3]

This initial query resulted in 602 U.S. contracts and 151 Chinese contracts. To validate whether these contracts were relevant to our analysis, we labeled each contract as being related to AI or not. For the 151 Chinese contracts in our dataset, one author and an AI research assistant, Elicit, labeled each contract, and initially agreed on a label 62 percent of the time.[4] Where labelers disagreed, the human labelers manually inspected each case and came to a mutual agreement, while human judgment always superseded that of the Elicit AI assistant. This review yielded 300 U.S. military AI contracts and 119 Chinese military AI contracts of comparable scope.

We then labeled each contract as belonging to one of the seven aforementioned application areas, while contracts that did not fit into any of these categories were labelled as "other."[5]

Table 1. Process Used to Identify AI-Related U.S. and Chinese Procurement Contracts

Step of Analysis	U.S. Contracts	Chinese Contracts
1. Accessing Comparable Procurement Record Datasets	CSET licensed access to public U.S. Army, Navy, and Air Force contracts compiled by Bloomberg Government (BGov) for FY2020.	CSET compiled information about 1,983 procurement records published by the PLA Ground Force, Navy, and Air Force in 2020.
2. Choosing Keywords to Query	CSET searched for contracts with titles that included any of the following AI-related keywords: Algorithm, Automatic, Automated, Autonomous, AI, Intelligent, Smart, Human-Machine, Human-Computer, Unmanned, Drone, UAV, Swarm, Predict, Artificial Intelligence, Computer Vision, Robot, Bot, Machine Learning.	CSET searched for contracts with titles that included any of the following AI-related keywords: 算法，自动，自动化，自治，人工智能，智能，人机，无人驾驶，无人机，蜂群，预测，人工智能，计算机视觉，机器人，机器学习，“AI.”
3. Assessing Query Results	602 procurement records included one or more of these AI-related keywords in their titles.	151 procurement records included one or more of these AI-related keywords in their titles.
4. Validating Contracts Related to AI	After manual inspection, 300 contracts actually appeared related to artificial intelligence.	After manual inspection, 119 contracts actually appeared related to artificial intelligence.

Our approach comes with a few noteworthy limitations. First, our method of classifying AI-related projects is subjective, and studies that employ a different set of AI-related keywords or use an alternative approach to identify and validate AI-related

procurement contracts may yield somewhat different results. Our classification of AI-related contracts into the seven categories of applications outlined above is also subjective, and there are numerous instances where we had to make a judgment call on a contract that could fit into more than one category; it is therefore possible that different classification choices would lead to somewhat different analytical results.

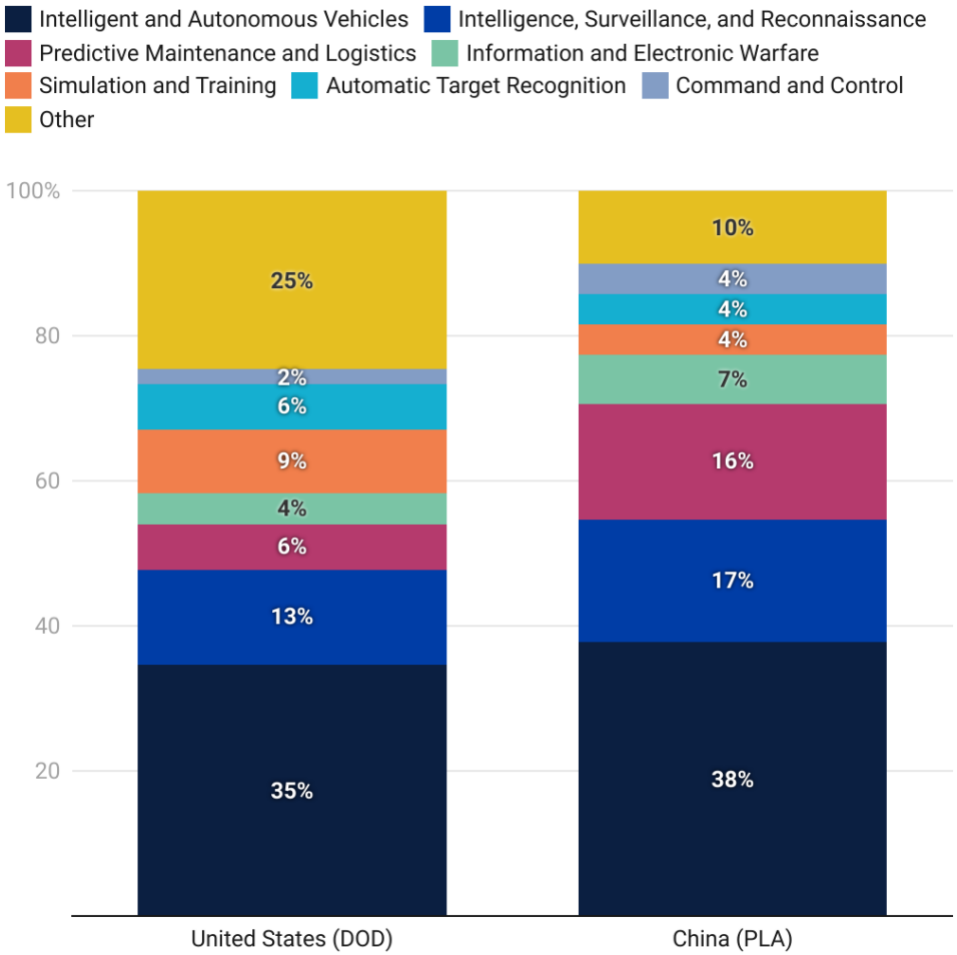
Second, in our effort to construct comparable sets of procurement records, we excluded a variety of U.S. and Chinese military entities that may be major developers or users of AI but do not have clear analogues in the other country (e.g., the PLA Strategic Support Force, the U.S. Defense Advanced Research Projects Agency). These omissions skew the results of our study and likely resulted in fewer records of purchases related to subjects like AI for cybersecurity and electronic warfare. Third, our findings are limited by the information the U.S. and Chinese militaries choose to publish about their respective procurement activities. Because of the sensitivity surrounding the technology, many AI projects are likely classified, and in both countries, the most expensive and consequential contracts are likely awarded through secret channels. Finally, AI is a fast-moving technology, and this snapshot of procurement data from 2020 grows more outdated each day.

Our analysis of U.S. and Chinese procurement records should not be considered comprehensive or generalizable. Given the limitations outlined above, it is not analytically sound to compare the absolute number or value of U.S. and Chinese contracts presented in this study. Rather, we attempt to characterize in rough terms the priorities of the U.S. and Chinese armies, navies, and air forces within the context of the aforementioned seven AI application areas. Despite its limitations, our analysis still provides a useful insight into the opaque field of military procurement.

AI Purchases by Application

Our review of procurement records published by the U.S. and Chinese armies, navies, and air forces between April and November of 2020 found the AI procurement patterns of the U.S. and Chinese armed forces were generally similar, as shown in Figure 1. Both militaries appear to be most focused on acquiring intelligent and autonomous vehicles and AI applications for ISR. We also found certain differences in U.S. and Chinese military AI procurement, but we have low confidence in their generalizability to the broader procurement data and refrain from offering substantive explanations for these divergences. We discuss each application area in greater detail throughout this section.

Figure 1. Distribution of Awarded AI Contracts, April–November 2020



Source: Bloomberg Government and CSET corpus of PLA procurement activity (see Appendix for more information).

Intelligent and Autonomous Vehicles

Of the public AI contracts in our dataset, intelligent and autonomous vehicles comprise approximately 38 percent of contracts awarded by the Chinese Ground Force, Navy, and Air Force, and about 35 percent of contracts awarded by the U.S. Army, Navy, and Air Force. Most intelligent and autonomous vehicle purchases by both militaries were for aerial systems (see Appendix for more information). Over the past decade, the U.S. and Chinese militaries have both made strides in developing and experimenting with uncrewed, semi- and fully autonomous systems in different domains. Based on the contracts we've reviewed, the U.S. and Chinese militaries appear to be interested in purchasing similar kinds of intelligent unmanned systems, especially in the air and maritime domains.

In the air, both countries are investing in intelligent and autonomous drones, including remotely piloted microdrones and larger aircraft that tend to have greater reach and persistence capabilities as well as the potential to carry larger payloads. Our dataset suggests both the U.S. and Chinese militaries have started to use microdrones for surveillance and combat support, but the role of artificial intelligence or autonomous navigation is not clear.[6] Procurement records indicate the U.S. Navy sought to purchase and upgrade large unmanned aerial vehicles (UAVs), such as the MQ8-C Fire Scout,[7] and the PLA Ground Force has purchased a variety of four-, six-, and eight-rotor UAVs of varying sizes, as well as autopilot systems from different Chinese defense companies.[8]

Autonomous vehicles could also play an important role in U.S. and Chinese maritime operations, including undersea surveillance, coastal patrols, and anti-submarine warfare. For surface-sea operations, our procurement data indicates that the U.S. Navy has awarded companies like L3 Harris and Leidos contracts to develop medium and large platforms capable of autonomous navigation, building off of the USS *Sea Hunter* trials in 2017.[9] Meanwhile, previous reporting shows that in 2019, the China Shipbuilding Industry Corporation began sea trials for a similar unmanned surface vessel (USV) called JARI, which is outfitted with a 30-mm cannon, surface-to-air missiles, and torpedo launchers.[10]

The U.S. and Chinese militaries also seem to be interested in developing the capability to deploy coordinated drone swarms. Five DOD contracts and two PLA contracts within the intelligent and autonomous vehicles category explicitly mention swarming. These contracts reference the use of drone swarms in both the air and maritime

domains. For instance, our dataset showed the U.S. Army awarded a contract to Aquabotix for five SwarmDiver hybrid unmanned surface vessel/unmanned underwater vehicles (USV/UUVs). Weighing just four pounds each, the devices can reportedly dive to 150 feet, and may be used for harbor monitoring and plume tracking.[11] Similarly, we found the PLA awarded a contract to Aerospace Shenzhou Aircraft for a UAV Swarm Target Construction project. Previous reports suggest that other Chinese defense companies have likewise tested swarms that included several dozen USVs, which could prove useful in detecting U.S. and allied submarines.[12]

Intelligence, Surveillance, and Reconnaissance

In recent years, both the U.S. and Chinese militaries have made significant investments in developing, testing, and ultimately fielding AI-enabled ISR systems and capabilities. Roughly 17 percent of the Chinese contracts and 13 percent of the U.S. contracts in our dataset appear to be related to ISR applications. Between April and November of 2020, our dataset shows that in China, the majority of ISR contracts were awarded by the PLA Navy, while the air force accounted for most ISR contracts in the United States. Due to their sensitivity, ISR contracts are likely being awarded through classified channels and therefore may be underrepresented in our data and analysis.

Within the confines of the AI-related contracts we traced, both countries' militaries seem to be placing orders for similar types of AI-enabled ISR systems and tools. For instance, geospatial imagery analysis appears to be a top priority. Our dataset showed the U.S. Air Force Research Lab struck a $2.2 million deal with Descartes Labs to build a multisource data fusion system reportedly capable of analyzing satellite imagery in real time.[13] According to the company's website, the platform is able to process more than a petabyte of information each day—the equivalent of nearly 3.4 years of high-definition video.[14] Our analysis found the PLA has made investments in similar systems, awarding contracts to equip satellites with image collection, polarized surface detection, and multisource data fusion tools powered by machine learning applications.[15]

The U.S. military has also sought to enhance the sensing capabilities of its unmanned systems. In November 2020, the Joint Artificial Intelligence Center (JAIC) partnered with General Atomics Technologies to outfit the MQ-9 Reaper—one of the most widely used military drones—with an array of sensors to enable object recognition and intelligence sharing.[16] Once operational, the systems would analyze and triage

geospatial data to reduce the amount of information that operators must manually review.[17] The $93.3 million deal was the second-largest U.S. contract in our dataset.

The U.S. and Chinese militaries have also both invested in AI-based ISR capabilities designed to support air defense. Our dataset showed the PLA awarded contracts for a "drone aircraft detector" developed by Hebei Xintu Technology Company, a drone manufacturer that also conducts R&D related to "intelligent detection, monitoring, and control systems."[18] U.S. defense contractors like Anduril have similarly developed AI-based counter–unmanned aerial systems (UAS) technology, which appears in several contracts in our dataset.[19] Beyond counter-UAS systems, in June 2020, the U.S. Army awarded multiple contracts for computer vision software that identifies threatening objects and potential combatants in surveillance footage, as well as a contract to develop AI tools to identify and classify objects within the Army Integrated Air and Missile Defense system.[20]

Predictive Maintenance and Logistics

Over the past decade, the U.S. and Chinese militaries have both developed and reportedly implemented AI-enabled solutions for a range of logistical challenges from preventive and predictive maintenance to supply chain management. Among the contracts in our data set, 6 percent of U.S. contracts and 16 percent of Chinese contracts appeared related to this broad category of predictive maintenance and logistics. Our dataset notably excludes the U.S. Defense Logistics Agency and the PLA's Joint Logistics Support Force (JLSF), which could account for the relatively low number of logistics contracts captured in our analysis.

Military systems and weapons—including aircraft, ships, tanks, and missiles—require significant preventive and corrective maintenance to ensure operational readiness, especially when deployed in harsh environments. Both the United States and China are investing in systems that use predictive analytics to forecast component failures before they occur. For example, ATA Engineering won a $1.7 million U.S. Air Force contract to develop a tool set for predicting component response in intercontinental ballistic missile (ICBM) reentry systems. Our dataset showed China's Naval Aviation University contracted JiashengTest Engineering (JECO; 北京嘉盛智检科技有限公司) to develop an intelligent handheld system for eddy circuit testing—a method of detecting difficult-to-observe flaws on aircraft surfaces. Similarly, JECO was awarded a contract to produce "automatic testing equipment" for an aviation division of the PLA.

The militaries of both countries are also developing intelligent supply chain solutions. For instance, Mitek Analytics supplies the U.S. Air Force with an AI system that observes and monitors supply chain processes based on previously collected data. The system, according to the manufacturer, automatically estimates the likelihood of potential disruptions and evaluates the effectiveness of alternative solutions. Mitek estimated that these analytics have saved the air force $270 million in repair parts alone.[21] While our dataset did not include this particular contract, it did show a $750,000 contract in which Mitek would develop a similar predictive analytics system for the air force's missile fleet.

The PLA, meanwhile, has awarded multiple contracts for the development of "intelligent" warehouses, which are meant to optimize logistics operations and reduce the demand for human labor. Our dataset shows that PLA Unit 92919 awarded a contract to China Shipbuilding Industry Corporation to develop an automated material procurement and supply warehouse. In another bid, Chongqing Jialing Special Equipment Company (重庆嘉陵特种装备有限公司) won a contract for an intelligent packing and organizing logistics system.

Information and Electronic Warfare

While public reporting indicates that information and electronic warfare are important priorities for both the United States and China, a relatively small portion of both countries' publicly awarded military AI contracts appear related to electronic warfare (4 percent of U.S. contracts and 7 percent of Chinese contracts). Meanwhile, our analysis uncovered no contracts related to the use of AI in information warfare. The relatively low numbers seen here may be an artifact of our data collection and methodology, as our analysis excludes the PLA Strategic Support Force, U.S. combatant commands, and components of the intelligence community that are more likely to be involved with electronic warfare and information operations. Still, the few publicly available contracts in our dataset provide some insight into the types of AI-enabled systems and capabilities both the U.S. and Chinese militaries are seeking to develop and purchase when it comes to electromagnetic spectrum operations.

In the field of electronic warfare, both the United States and China are hoping to improve their respective radar identification, signal classification, and direction-finding capabilities through the use of AI. Our dataset showed the U.S. Air Force purchased an OmniSIG sensor from a software company called DeepSig. The sensor is designed to detect and classify signals using machine learning techniques.[22] Similarly, the U.S.

Army awarded Vadum a contract to develop a context-aware machine learning signal classifier to recognize signals and interference in the context of its Next Generation Combat Vehicle platforms.[23] The Chinese military has emphasized comparable capabilities—our dataset shows the PLA Ground Force awarded a contract to the Civil Aviation University of China to develop an AI-enabled radar target detection system.

Simulation and Training

While there are still significant obstacles to deploying AI in real-world combat situations, progress in AI for simulation and training can potentially help mitigate some of these concerns.[24] Our procurement data shows that systems related to these areas represented 4 percent of Chinese military AI contracts and around 9 percent of U.S. military AI contracts. While U.S. contracts were relatively evenly distributed between service branches, the PLA Ground Force was responsible for the majority of Chinese contracts in this category.

AI-related simulation and training contracts covered a variety of applications, ranging from drone warfare simulation tools to more generalized software training platforms. Our dataset showed the Chinese drone manufacturer Keweitai (科卫泰) successfully bid to provide a training system for intelligence processing, presumably referring to intelligence collected via UAVs. Another company, Zhongke Hengyunsoft (中科恒运), won a contract with the PLA Ground Force to provide a simulation system for multi-drone swarming. Zhongke Hengyunsoft, which describes itself as a "military-civil fusion enterprise," offers a whole category of "military simulation" products, with virtual reality options ranging from simulated tactical training to modules focused on the use of portable ground-to-air missiles.[25]

U.S. military contracts for AI-related simulation and training covered a wide range of applications. For example, the Utah-based Sarcos Group received funding to develop a simulation-based toolbox with which the company could train its "Upper Extremity Exoskeleton" (i.e., human-controlled robotic arms) to carry out tasks of interest to the U.S. Air Force.[26] This kind of simulated training is common for robotics applications of machine learning. The U.S. Army also awarded a contract to enhance the effectiveness of medical training by enabling "patient simulators" (e.g., mannequins or on-screen simulated patients) to interact using natural language. If successful, this project would leverage recent advances in natural language processing—a major subfield of AI research—to create more realistic training experiences for medical personnel.[27]

Command and Control

While both the U.S. military and the PLA have identified the use of AI tools to enhance command and control as a key priority in various official documents, C2 applications were rare among the public contracts considered in this study. Our categorization put C2-related services at around 2 percent (six contracts) of U.S. service branches' contracts, and around 4 percent (five contracts) of China's. The majority of these contracts were for decision support technology. For instance, one U.S. contract in our dataset showed Booz Allen Hamilton providing "algorithm-derived decision support," while another focused on rapid decision-making in disaster response. On the Chinese side, several contracts were similarly ambiguous, such as a "smart management system," while others were clearer, such as a battalion and company command decision-making model awarded to the AI company 4Paradigm.[28]

Of course, the procurement data used in this study provides only a small window into military AI purchases and initiatives. Some AI-related C2 projects are detailed in other open-source materials, and it is likely that others are being pursued in classified settings. Previous CSET work described C2-relevant activities by Chinese companies in the categories of knowledge mapping, decision support, weapon target assignment, and combat tasking.[29]

Automatic Target Recognition

Automatic Target Recognition technology is not new—many weapon systems today rely on a preconceived library of signatures or images to aid in target recognition and weapon-to-target assignment. Advances in AI, however, could potentially enhance the robustness, precision, and effectiveness of ATR systems. Of the public contacts in our dataset, AI-related ATR applications comprised 6 percent of U.S. military contracts and 4 percent of Chinese military contracts. While this could again be an artifact of our data or research approach, it is also possible that the United States is more inclined to openly publish contracts related to this subject than China.

Our dataset showed the U.S. military awarded a $1.5 million contract to Opto-Knowledge Systems for an ATR system capable of detecting, classifying, recognizing, and identifying potential targets within the engagement range of small caliber weapons. According to the contract, this system will also have automatic aim-point selection capabilities. The PLA, meanwhile, awarded Harbin Engineering University a contract to develop a maritime target recognition system and corresponding database

for the PLA Naval Aviation University. Our dataset also showed the PLA Ground Force contracted with Xian Chuangkepai Information Technology Company (西安创客派信息科技有限公司) for a target and background clustering algorithm, which could more easily distinguish targets in noisy environments.

Other Contracts

Nearly 25 percent of the AI contracts awarded by the U.S. military and 10 percent of the contracts awarded by the Chinese military did not map neatly into our taxonomy of seven application areas. In most cases, this was because the description of a given contract was too broad or generic to be classified confidently. We did, however, notice that U.S. service branches awarded some one-off contracts that were related to medical applications and scientific advancement and discovery, while these particular subjects did not show up as clearly among PLA-awarded contracts.

Profiling Selected U.S. and Chinese Military AI Suppliers

The institutions that research, develop, and provide technology are critical to how the U.S. and Chinese militaries adopt AI. There are, of course, significant differences between the U.S. and Chinese defense industrial bases, which trace back in large part to the different economic systems and relations between the government and the market. While our data provides only a limited look into the entities that provide the U.S. and Chinese militaries with AI-related products and capabilities, there are nonetheless a number of noteworthy insights we outline below.

Key U.S. Military AI Suppliers

Although the U.S. defense industry is generally considered to be consolidated among a handful of "defense primes," its AI vendor ecosystem appears relatively distributed: the 300 contracts in our dataset are distributed among 249 unique vendors.[30] Notably, only 36 vendors were awarded multiple contracts and just eight won three or more contracts (see Table 2). Many of the remaining 213 contracts were awarded to small, bespoke vendors that did not seem to be affiliated with the major defense primes or commercial "big tech" companies like Google, Amazon, and Microsoft. Included among them are high-profile defense startups like Shield AI and Rebellion Defense, as well as an array of lesser-known software and robotics startups.

Table 2. U.S. Military AI Vendors with More than Three Contracts

Vendor	Number of Contracts
General Atomics Technologies	5
Lockheed Martin	5
Physical Sciences	5
Northrop Grumman	4
ACV Auctions	3
ATA Engineering	3
EM Oil Transport	3
SRI International	3

Source: Bloomberg Government.

While established defense firms like General Atomics, Lockheed Martin, and Northrop Grumman top the list of vendors, they are not nearly as dominant in AI as in other areas of military technology, such as aircraft, ships, or armored vehicles. A wide array of companies have begun developing AI tools that are either directly applicable or can be adapted for military use in recent years, but only a handful of firms are in the business of selling military vehicles, weapons systems, and other military hardware.

Key Chinese Military AI Suppliers

Based on our data, the Chinese defense AI ecosystem appears to be similarly distributed, with the PLA sourcing AI systems from a broad range of vendors. The 119 contracts in our dataset were awarded to 102 unique vendors. Notably, only two companies were awarded three or more contracts: Hebei Xintu Technology (河北新途科技有限公司) and Shenzhen Zhongke Haixin Technology (深圳市中科海信科技有限公司), a subsidiary of HiSense (海信). Additionally, only 13 vendors were awarded two or more contracts (for a total of 29 contracts), meaning the remaining 89 contracts were awarded to single, unique vendors (see Table 3).* This observed trend in our data could partly be explained by examining the Xi administration's push to diversify the PLA's vendors; according to a 2018 article in *PLA Daily*, more than one thousand private companies had received a research and production license as of 2016, a 127 percent increase since the end of the eleventh five-year plan in 2010.[31]

* One contract did not include any vendor information.

Table 3. Chinese Military AI Vendors with Multiple Contracts

Vendor (Chinese)	Vendor (English)	Number of Contracts
河北新途科技有限公司	Hebei Xintu Technology	4
深圳市中科海信科技有限公司	Shenzhen Zhongke Haixin Technology	3
石家庄铁道大学	Shijiazhuang Tiedao University	2
湖南苍树航天科技有限公司	Hunan Cangshu Aerospace Technology	2
深圳市科卫泰实业发展有限公司	Shenzhen Keweitai Enterprise Development	2
哈尔滨工程大学	Harbin Engineering University	2
北京腾越飞扬科技有限公司	Beijing Flyond Technology	2
北京理工大学	Beijing Institute of Technology	2
北京华翼星空科技有限公司	Beijing Huayi Star Technology	2
亿海蓝（北京）数据技术股份公司	Elane	2
中科恒运股份有限公司	Zhongke Hengyunsoft	2
中天飞龙（西安）智能科技有限责任公司	Zhongtian Flying Loong (Xi'an) Intelligent Technology	2
上海交通大学	Shanghai Jiao Tong University	2

Source: CSET Corpus of PLA procurement activity.

We refrained from differentiating between Chinese AI vendors based on their ownership model—state-owned enterprises versus private firms—because parsing these extremely complex corporate structures fell beyond the scope of this report.

However, we were able to attribute 17 of the Chinese military AI contracts in our dataset to universities. In fact, two of China's "Seven Sons of National Defense"—a group of universities directly administered by the Ministry of Industry and Information Technology—were among the top ten PLA AI vendors in our dataset. Prior CSET research has indicated that these seven universities play a unique role in China's defense industrial base, and have close connections to state-owned defense enterprises.[32] Another recent study found that China uses joint ventures between universities and the defense ecosystem to leverage faculty for defense work.[33] Meanwhile, only nine U.S. military AI contracts were awarded to universities; this could partly be explained by the fact that much of the money that DOD spends on research at universities comes from DOD's basic research budget rather than procurement funds.

Conclusion

With the United States and China investing billions into research, development, and adoption of military AI, this report offers a unique, albeit limited, look into what the U.S. Department of Defense and China's People's Liberation Army are actually buying when it comes to AI-enabled technologies and capabilities. Using public procurement data, we analyzed U.S. and Chinese militaries' respective purchases in seven categories commonly identified as priority areas for military AI development: intelligent and autonomous vehicles; intelligence, surveillance, and reconnaissance; predictive maintenance and logistics; information and electronic warfare; simulation and training; command and control; and automatic target recognition.

Based on our assessment of the 300 AI-relevant U.S. military contracts and 119 Chinese military contracts published between April and November of 2020, both militaries have shown similar levels of interest in sourcing AI for intelligent and autonomous vehicles as well as for intelligence, surveillance, and reconnaissance. While this finding may seem unremarkable in and of itself, it could serve as a useful insight for U.S. defense planners as they think about technological competition with China and track the evolution of Chinese military doctrine and operational concepts. Our analysis also finds that despite their expressed interest in AI-enhanced decision-making, neither military appears to have made significant investments in AI for command and control, though this observation may be a result of our data and research approach. Additionally, our brief examination of the companies and institutions set to deliver AI capabilities to the U.S. military and the PLA suggests that despite both countries' relatively concentrated defense-industrial bases, their AI vendor ecosystems appear to be more decentralized and composed of smaller vendors.

The AI-related military contracts we analyzed in this report provide only a snapshot of military procurement patterns. The time period we examine, between April and November of 2020, is arguably an aberration, with the COVID-19 pandemic upending supply chains and business operations around the world. The list of seven military AI application areas we used to classify these contracts is also far from comprehensive—a significant number of procurement records in each country could not be neatly categorized. Moreover, this analysis focuses only on AI procurement within each country's army, navy, and air force, while other military entities may be purchasing additional or different types of AI. Our analysis is also limited by the fact that we rely only on publicly available information; it is likely that confidential contracts and records constitute a large share of overall military AI procurement and a review of this

classified material may yield different conclusions about priority areas for both militaries. However, even with these limitations, our study provides a unique perspective on broad trends in AI procurement patterns, which, when triangulated with other types of data and analysis, may offer insights into how each military envisions using AI on the battlefield.

While the United States and China are investing heavily in AI, the countries still face major barriers to integrating the technology across their respective defense ecosystems. For instance, challenges related to data management and AI workforce development may hinder AI adoption across both the DOD and PLA.[34] Without effectively addressing these and other technical and bureaucratic hurdles, both militaries may struggle to deploy and scale AI across their weapons, systems, and processes.

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Appendix

Tables A1 and A2 show how U.S. and Chinese military AI contracts were distributed across application areas and service branches (army, navy, air force).

Table A1. Number of AI Contracts Awarded by the U.S. Army, Navy, and Air Force

	Army	Navy	Air Force	Total	Share of Total
Intelligent and Autonomous Vehicles	35	36	33	104	35%
Intelligence, Surveillance, and Reconnaissance	11	3	25	39	13%
Predictive Maintenance and Logistics	3	3	13	19	6%
Information and Electronic Warfare	2	1	10	13	4%
Simulation and Training	11	2	13	26	9%
Automatic Target Recognition	9	0	10	19	6%
Command and Control	0	0	6	6	2%
Other	23	10	41	74	25%
Total	94	55	151	300	100%

Source: Bloomberg Government.

Table A2. Number of AI Contracts Awarded by the Chinese Ground Force, Navy, and Air Force

	Ground Force	Navy	Air Force	Total	Share of Total
Intelligent and Autonomous Vehicles	25	16	4	45	38%
Intelligence, Surveillance, and Reconnaissance	7	12	1	20	17%
Predictive Maintenance and Logistics	10	7	2	19	16%
Information and Electronic Warfare	3	3	2	8	7%
Simulation and Training	4	1	0	5	4%
Auomatic Target Recognition	3	2	0	5	4%
Command and Control	2	2	1	5	4%
Other	4	8	0	12	10%
Total	58	51	10	119	100%

Source: CSET corpus of PLA procurement activity.

Endnotes

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[2] These include differences in organizational structures; classification; budgeting, purchasing authorization, and procurement processes; and technology funding and maturation processes, to name a few.

[3] We used the same set of keywords to query procurement records in English and Chinese. In English, we added three variants not found in Chinese: "bot" as shorthand for "robot"; "UAV," which is not abbreviated in Chinese, but covered by the word "drone" (无人机); and "smart," which English speakers sometimes use to refer to weapons, but which is typically covered by the word "intelligent" (智能) in Chinese.

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