Silicon Twist: Managing the Chinese Military's Access to AI Chips

The Chinese military is placing orders for high-end semiconductors designed by U.S. companies and manufactured in Taiwan and South Korea that could be used to train artificial intelligence systems. CSET analyzed 66,000 purchase records published by Chinese military units and state-owned defense enterprises in 2020, and identified 24 public contracts to buy 97 individual "AI chips." These include high-end graphics processing units (GPUs), field-programmable gate arrays (FPGAs), and application-specific integrated circuits (ASICS) useful for training AI systems. Nearly all of them were designed by U.S. semiconductor companies, including Nvidia, Xilinx (now AMD), Intel, and Microsemi.

These previously unknown cases prove that the Chinese military uses intermediary suppliers to gain access to U.S.-designed AI chips to support their military modernization. This finding is consistent with previous CSET research, which found that China is reliant on foreign semiconductors and that Chinese leaders are concerned that this situation creates a strategic vulnerability and a limiting factor in China's military modernization.

Despite the United States' central role in the global semiconductor industry, efforts to curtail Chinese military access to AI Chips—such as limited crackdowns on Chinese military suppliers or even a nationwide AI chip embargo—have potentially serious limitations and could prove counterproductive to U.S. national and economic security interests. U.S. policymakers must balance absolute gains from trade and continued innovation in the semiconductor industry against the relative gains in Chinese military power afforded by access to AI chips.

The U.S. currently tries to achieve this balance by limiting Chinese military access through the application of several layers of U.S. export controls to certain types of semiconductors bound for China. Additionally, multilateral export controls frameworks apply varying degrees of control based on intended end-use. However, **this report finds that likely none of the identified 97 AI chips sold to the Chinese military would have required a license under the current U.S. export control system or that of any other government.** This is because:

- Waging targeted crackdowns on the Chinese military's intermediary chip suppliers is akin to playing "whack-a-mole" given the difficulty of tracking AI chips, and the variety of potential vendors. **Of the seven Chinese military vendors identified in this report, none were listed in U.S. end-user export control regimes.**

- The Chinese military often buys commercial off-the-shelf AI systems from Chinese academic institutions and private companies, which also buy U.S.-designed chips, and are not easily captured by U.S. restrictions on *military* end-users.

Effectively limiting Chinese military progress in AI and other cutting-edge technologies will require the U.S. government to adopt new and creative forms of export control which extend beyond the current focus on visible end-uses and end-users. Congress should authorize, and the Department of Commerce should craft, a multilateral export control system based on the physical and technical characteristics of technologies exported to China, including high-end semiconductors. As a part of this effort:

- The Department of Commerce should release the Emerging and Foundational Technologies List, mandated in the Export Control Reform Act of 2018. This list should include high-end semiconductors and other computing resources.

- New export controls should be enacted in conjunction with allies and partners, particularly Taiwan and South Korea, where most U.S.-designed semiconductors are manufactured.

This report provides a limited view into the Chinese military's access to AI chips. **The U.S. Government should better understand and track commercial connections to China's defense-industrial base through the collection and analysis of open-source, Chinese language information.** Previous CSET research has pointed to the need for a U.S. Government sponsored open-source Science and Technology analytic capability.

For more information:
- Download the report: https://cset.georgetown.edu/publication/silicon-twist
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