China Accelerates Chip Design to Overcome Strategic Vulnerability

OE Watch Commentary: In the accompanying excerpted article, Hu Xiao, an associate researcher at the National University of Defense Technology (directly subordinate to the Central Military Commission, China's highest military body), notes the difficulty facing China in replacing its reliance on foreign microchips. According to Hu, microchips are a strategic commodity, and Chinese demand makes up 33 percent of the global market. Particularly as China attempts to move its industries up the value-chain, dominate in AI, and introduce Internet+ (internet of things) technologies, demand will only rise. However, reliance on imports of foreign chips introduces strategic vulnerabilities, and Hu is explicit in stating the dangers of lacking domestic chip-building capability.

China's goals are to first reduce their reliance on imported chips, and then eventually become an exporter, upon whom the rest of the world is itself reliant. A combination of licensing deals with chip-making giants, domestic innovation and outright copying are helping China slowly move toward these goals. Progress has been made allowing China to replace foreign-made chips in sensitive applications such as Beidou navigation system terminals and supercomputers.

However, Chinese scientists acknowledge that chip architecture design is very difficult, and the manufacturing itself has to be very precise. China's progress has been the result of a national effort. A series of state-directed economic and scientific development plans have made domestic chip design and manufacture a leading priority for China. Innovation is being encouraged through sponsoring of research and competitions. The ongoing trade war has led to tighter restrictions on technological transfers to China. Ironically, emerging Chinese dominance of IT sectors such 5G technology has lead other countries to seek alternatives. **End OE Watch Commentary (Wood)**

"Chips for use in China's indigenously-developed Beidou navigation system have already achieved large scale use."

Tianhe-2 in National Supercomputer Center in Guangzhou.
Source: By O01326 - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=45399546.

Source: "国防科技大学专家为您讲述：芯片研发究竟有多难 (National Defense Science University Expert Explains: How Hard is Microchip R&D," *China Military Online*, 21 December 2018. http://www.81.cn/jskj/2018-12/21/content_9384631.htm

Currently the global high-end chip market is almost occupied by advanced companies such as the United States and Europe. However, accelerating the research and development of domestically produced independent chips has always been the key development direction of the government, enterprises and research institutes. In recent years, China has made great progress in the field of integrated circuits, and percentage of chips that are domestically produced has risen continuously. The situation in which access to high-end chips are subject to others' control is gradually being broken.

Chips for use in China's indigenously -developed Beidou navigation system have already achieved large scale use. In the field of supercomputers, the world's number one "Shenwei Taihu Light" [神威太湖之光] *and "Tianhe No. 2"* [天河二号] *have all adopted domestic high-performance processors. Consumer electronics such as domestic mobile phones, Bluetooth speakers, and satellite receiver boxes have also begun to use a large number of domestic chips.*

On November 9th, the "2018 China Integrated Circuit Industry Promotion Conference" was held in Chongqing. 102 enterprises participated, displaying 154 products. The "Feiteng 2000+ High Performance General Purpose Microprocessor" and other 24 products were chosen as outstanding "China Microchip" [中国芯] *(domestically produced chip). Awarded products included digital switch chips, analog RF circuits, artificial intelligence chips, fingerprint sensors, industrial controls and consumer electronics.*

This progress is the result of national support and investments. In 2006, the State Council issued the "National Medium- and Long-Term Science and Technology Development Plan (2006-2020)". And in June 2014, the State Council approved the implementation of the "National Integrated Circuit Industry Development Promotion Outline", all of which included requirements for the development of this field.

With the support of the country and the breakthrough of a series of key core technologies, "China Microchip" is gradually reducing the distance with developed countries. "Made in China" [中国创造] *(national initiative) will eventually occupy the commanding heights of information system technology and China will truly take the lead in competition and development.*