

Background

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Export Controls and the Hard Case of China

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Abstract: *The People's Republic of China is a major U.S. trading partner and a potential antagonist. Thus, the United States has good reason to exercise some control over U.S. exports, particularly of sensitive technologies. However, current U.S. export controls are often counterproductive, failing to deny opponents and potential opponents access to sensitive U.S. technologies, while inhibiting cooperation with U.S. allies and placing U.S. companies at a competitive disadvantage in the world market. The Obama Administration's efforts to streamline the export control system have great merit, but need to focus on maintaining U.S. advantages, creating a nimble export control system that adjusts quickly to technological advances, and attaining a better understanding of the intricate connections between the military and civilian sectors of the Chinese economy.*

Each year, the United States exports billions of dollars in manufactured goods. Some of these items are explicitly military (e.g., fighter aircraft and tanks), while others are dual-use, including advanced materials, computer processors, and software.

It is clearly in the interests of the United States to maintain some degree of control over its exports, if only to safeguard security-related technologies and deny them to its potential adversaries, as well as to support other aims such as nonproliferation. However, the United States has an equally high interest in supporting a healthy U.S. economy and fostering international political links, which require sustaining a robust portfolio of exports.

Talking Points

- The Obama Administration is beginning much needed reforms of the U.S. export control system. This effort is to be applauded, but special care must be taken to account for the hard case of China.
- In the Chinese system the civilian and military industrial bases are extensively integrated, so exports to the civilian Chinese companies can benefit the Chinese military.
- The current U.S. export control system hinders industrial cooperation with allies and U.S. exports in general, while not necessarily preventing other states from gaining access to sensitive technologies and processes.
- The challenge is to protect American security interests while maximizing business opportunity for exporters.
- Effective reform of current export controls should include identifying key areas of U.S. advantage, frequent revisions of the controls, and attaining a better understanding of the Chinese military industrial complex. It is possible to engage in trade with China that benefits both countries while protecting U.S. national security.

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These two goals, while hardly irreconcilable, at times work at cross-purposes. This is especially true with the People's Republic of China (PRC). Indeed, China is arguably the crucial case for export controls because it is the most difficult state to address.

The PRC is both a major U.S. trading partner and a potential antagonist. The desire to limit PRC access to sensitive U.S. technologies therefore inevitably collides with the interest of engaging the PRC as a trading partner. The growing assertiveness of the Chinese People's Liberation Army (PLA), coupled with an expanding Chinese defense budget, has steadily improved the capabilities of the Chinese military. In the interests of hedging against the PRC as a near-peer competitor, the United States clearly has incentives to limit Chinese access to sensitive technologies.

In today's world, however, the rise of the global supply chain has complicated security calculations. Purely military technologies are becoming fewer, and dual-use technologies tend to dominate. Meanwhile, China has deliberately pursued a policy of "civil-military integration," trying to maximize the interplay between its military and civilian industrial bases. The problem is then to restrict Chinese access to truly critical technologies, while still reaping the benefits of free trade.

This is further complicated by the flawed system of U.S. export controls. Byzantine rules, fragmented oversight, and often outdated definitions hamper trade as much as they restrict access to sensitive technologies. As the Administration seeks to address these problems by overhauling the export control system, it should explicitly state the reasoning behind the export restrictions, require regular reevaluations of which goods are subject to export controls, and try to better understand the intricacies of China's military and civilian industrial complexes.

This study analyzes the U.S. export control system with special regard to the PRC. It first reviews some of the unique difficulties posed by the PRC and its military industrial complex because any

reform of export controls will need to take into account Chinese characteristics. It will then examine the current export control legislation and offer recommendations for reforming the current system.

The Need for Export Controls During the Cold War

Export controls became a matter of U.S. and allied foreign policy early in the Cold War. Confronted by a hostile Soviet Union, the Western nations agreed in 1949 to form the Coordinating Committee for Multilateral Export Controls (CoCOM) to limit Soviet access to Western technology. Although CoCOM was not backed by a formal treaty, the 17 members of CoCOM agreed to operate by "consensus," in which "any member...[had] a veto over the export by any other member of a controlled good or technology," as established by the CoCOM Secretariat.¹

While CoCOM was not always successful, it did help to establish certain baselines among Western and other allied nations as to what could be exported to the USSR and its allies and, equally important, what should not. However, its success was largely rooted in the common understanding of CoCOM members and the several cooperating states about the USSR's generally hostile nature and the need to cooperate to limit technology transfer.

The combination of a clear threat and Soviet autarky helped to create a consensus among the Western nations about the need to monitor exports carefully, lest the Soviets obtain key technologies.

The nature of the USSR and its policies facilitated this cooperation. The Soviet Union was an autarkic state, uninterested in establishing a significant economic relationship with the United States specifically or the West as a whole. Moreover, the USSR was fundamentally hostile to the Western democra-

1. CoCOM had 17 members: Australia, Belgium, Canada, Denmark, France, Germany, Greece, Holland, Italy, Japan, Luxembourg, Norway, Portugal, Spain, Turkey, the U.K., and the United States. Richard F. Grimmert, "Military Technology and Conventional Weapons Export Controls: The Wassenaar Arrangement," Congressional Research Service Report for Congress, September 29, 2006, p. 1, at <http://www.fas.org/sgp/crs/weapons/RS20517.pdf> (November 22, 2010).

cies. Consequently, even when trade relationships were established with the Soviets in the 1970s in areas such as grain, a high degree of wariness persisted, not only in Washington, but also in Bonn, London, Tokyo, and Paris.

This combination of a clear threat and Soviet autarky helped to create a consensus among the Western nations about the need to monitor exports carefully, lest the Soviets obtain key technologies. Hence, CoCOM was created. CoCOM also helped to reduce fears that other states might gain financial advantages by breaking export controls to further sales. It essentially created a more level playing field among the major Western economic powers in selling technology to the USSR.

In the bilateral context, export controls succeeded because there was minimal U.S.–Soviet interaction in general commerce and trade. The USSR did not want to trade with the U.S., although it desired access to advanced technology, nor did it have much to offer the United States that could not be obtained from the global marketplace. Consequently, the U.S. incurred no real opportunity cost in restricting exports to the Soviets. The Soviet market for U.S. and Western goods was small, and U.S.–Soviet interactions were largely confined to the military and security realm. There was no real *political* downside in the United States to restricting trade with the USSR.

In short, export controls against the USSR imposed relatively few political and economic costs on the United States and its allies, while generating clear security benefits. In today's world, export controls exhibit a similar dynamic. Indeed, the Wassenaar Arrangement, established in 1996 as the successor to the CoCOM structure, focuses on states that are politically isolated and economically moribund, including Iran, Libya, North Korea, Syria, and Burma.²

China: A Different, Harder Case

The People's Republic of China represents a far more difficult proposition in export controls. First,

In 2009, U.S. exports to China totaled \$69.5 billion, and imports from China totaled \$296.4 billion.

the PRC is not the former Soviet Union. The PRC is not an implacable foe of the United States, consistently and broadly acting in ways to impede U.S. interests. Rather, Beijing is pursuing its own national interests, which often run counter to U.S. interests. At other times, they are congruent.

Furthermore, China is most certainly not an autarkic nation. The United States and China have significant economic interrelationships. In 2009, U.S. exports to China totaled \$69.5 billion, and imports from China totaled \$296.4 billion. Data for the first half of 2010 indicate that bilateral trade will be even greater than in 2009.³ This trade involves a variety of goods. Major U.S. exports to China include not only agricultural products, especially soybeans, but also electrical machinery, plastics, and aircraft.⁴ Meanwhile, the U.S. imports various types of machinery and electrical equipment from China and a wide range of consumer goods. Disparate elements in both countries therefore have an interest in sustaining economic ties.

These economic ties, coupled with the security antagonisms that are muted compared with past antagonisms with the USSR, have created a dynamic in which national security requirements and economic benefits are not necessarily aligned, unlike in the prior U.S. relationship with the Soviet Union. Indeed, substantial segments of the American population, including many consumers, would stand to lose if overall trade were restricted. Ending U.S. trade with the PRC is simply impossible without inflicting substantial economic costs on both sides.

Further complicating the situation are China's relationships with American allies. China has extensive economic ties with the U.K., Germany, France, and many other Western nations and poses less of a security challenge to them. Not surprisingly, China

2. *Ibid.*, p. 4.

3. U.S. Census Bureau, "Trade in Goods (Imports, Exports and Trade Balance) with China," November 10, 2010, at <http://www.census.gov/foreign-trade/balance/c5700.html> (November 22, 2010).

4. Office of the U.S. Trade Representative, "China," at <http://www.ustr.gov/countries-regions/china> (November 22, 2010).

is not one of the “countries of interest” in the Wassenaar Arrangement. Indeed, few states are likely to press for applying the agreement to the PRC in absence of a pressing threat from Beijing.⁵ “None of the participants in the [Wassenaar] process appears to favor the types of strong controls—and U.S. dominance—that existed under CoCOM.”⁶

This suggests that, unless carefully thought out, any U.S. attempt to impose unilateral export controls on the PRC would likely fail to prevent Beijing from obtaining comparable technologies from U.S. competitors, while costing American manufacturers jobs and sales. On the other hand, a clear set of controlled exports might allow the U.S. to present European and Japanese exporters with an opportunity to expand their participation in the U.S. defense market in exchange for tighter controls over the listed technologies and processes.

Regrettably, the structure of U.S.–PRC trade imposes certain vulnerabilities on the United States. Although some of the largest exports from the United States to China are commodities, such as cotton, malt, beer, and soybeans, the highest value exports include semiconductors and associated equipment (\$5.27 billion in 2009); aircraft, including engines, equipment, and parts (\$5.33 billion); and broadcasting equipment and instruments for electronic and electrical testing (\$1.18 billion).⁷ Much of this equipment, especially semiconductors and aircraft parts, is shipped to China for assembly into finished goods. They therefore hold distinct dual-use potential. Consequently, even as the U.S. is trading with the PRC, it is also potentially benefiting the PLA and therefore may be weakening U.S. national security.

Security Concerns with China. This situation is further exacerbated because of fundamental problems in the broader Sino–American relationship. While the PRC and the U.S. are not engaged in a

cold war, conflicting interests and growing mutual suspicion are leading to increasing unease on both sides about security issues. The perennial issue of arms sales to Taiwan highlights this unease.

The United States remains bound by the Taiwan Relations Act to provide Taiwan with the means to defend itself. On the other hand, Beijing views such sales to what it still calls a “renegade province” as illegitimate. More to the point, China refuses to commit itself to a peaceful resolution of the cross-strait issue. Until the Taiwan issue is resolved, there is an ongoing possibility the United States could be drawn into a conflict across the Taiwan Strait.

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Nor is Taiwan the sole issue of concern. Chinese foreign policy toward many of its neighbors is increasingly assertive. Chinese naval forces have been exercising near the Senkaku islands, which both China and Japan claim. Meanwhile, Beijing has been expanding its capabilities in the South China Sea. More recently, advanced PLA Air Force fighters have been deployed along the Indian border, and Chinese troops are reportedly in Pakistani Kashmir.⁸ Many of China’s neighbors are also U.S. allies, and the threat these moves pose to core American interests, such as freedom of the seas, only increases friction between Washington and Beijing.

China’s increasingly muscular foreign policy is supported by an increasingly capable People’s Liberation Army. Displays of modern aircraft, warships, and armored vehicles highlight the PLA’s improvements—the product of nearly two decades of double-digit growth in the official Chinese mili-

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5. In this regard, increased Chinese cyber attacks and cyber espionage aimed at these nations will likely alienate them from the PRC and increase the potential that they would join in restricting PRC access to some of their technologies.
 6. Grimmett, “Military Technology and Conventional Weapons Export Controls,” p. 5.
 7. U.S. Census Bureau, “U.S. International Trade Statistics: Value of Exports, General Imports, and Imports by Country, by 6-digit NAICS, China (5700), through December 2009,” at http://censtats.census.gov/naic3_6/naics3_6.shtml (December 7, 2010).
 8. Dean Cheng and Lisa Curtis, “China’s Indian Provocations Part of Broader Trend,” Heritage Foundation *WebMemo* No. 3007, September 9, 2010, at <http://www.heritage.org/research/reports/2010/09/chinas-indian-provocations-part-of-broader-trend>.

tary budget.⁹ China's expanding economy has also provided the resources for supporting improvements in less visible capabilities, such as the command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) systems and platforms necessary to provide the PLA with the ability to fight "local wars under informatized conditions."

China has also rapidly increased its space capabilities. China's test of an anti-satellite weapon in 2007 and the recent rendezvous of two satellites hint at growing space warfare capabilities. Meanwhile, Beijing's growing ability to conduct information warfare, including computer network attack and cyber espionage, has aroused concern, especially after Google was hacked.¹⁰ Many of the technologies associated with these new systems are not purely military, but have legitimate commercial and civilian applications. Chinese access to advanced Western technology therefore continues to have both security and economic implications.

Civil–Military Integration: A Constant Chinese Policy Priority. The issue of growing Chinese military capability intersects with U.S. trade policy and the question of export controls because of the long-standing Chinese emphasis on integrating its military industry with the broader national economy. As the national economy grows and becomes more sophisticated, the Chinese have tried to ensure that the military technological and industrial base also benefits. In particular, Beijing has tried to minimize barriers to the flow of technology, training, and information between the military and broader civilian economies.

In general, the more integrated a given Chinese defense industrial sector is with Chinese civilian

and global production and with the research and development (R&D) chain, the more progress the military sector has made.¹¹ Thus, China's shipbuilding industry has benefited distinctly from access to foreign technical assistance, management techniques, and investment to the point that a U.S. Defense Department report suggests that China will soon be able to build its own aircraft carriers.¹² "Imported equipment, R&D expertise, improved management skills, and modern design methods have raised the level of capabilities of many of China's major shipyards."¹³

Nor is this a new interest. Ever since its founding, the People's Republic of China has pursued a policy of "combine the civilian and the military, combine peacetime and wartime" (*junmin jiehe, pingzhan jiehe*). Under Mao Zedong (1949–1976), this policy was aimed at providing the military with access to, if not control over, the entire national economy. Such a policy was essential because Mao was convinced that China faced the prospect of "early war, major war, nuclear war." To be prepared to fight and win the imminent war, the military required priority access to all of the nation's resources. Throughout Mao's rule, emphasis was therefore placed on military production and incorporating civilian production lines into military planning.¹⁴

Under Deng Xiaoping, Chinese priorities changed. Deng's policy of "Reform and Opening" downgraded the military in favor of producing goods for the broad Chinese population. Many state-owned enterprises, especially those oriented toward military production, were disbanded. In many cases, their physical plants were shifted to the cities, especially to the coasts. The top leadership pushed for conversion of China's military industrial

9. Dean Cheng, "The PLA on Parade: There's More Than What Meets the Eye," *The Wall Street Journal*, September 28, 2009.

10. William Jackson, "How Google Attacks Changed the Security Game," *Government Computer News*, September 1, 2010, at <http://gcn.com/articles/2010/09/06/interview-george-kurtz-mcafee-google-attacks.aspx> (November 22, 2010).

11. U.S. Department of Defense, "Military and Security Developments Involving the People's Republic of China," 2010, pp. 43–45.

12. *Ibid.*, pp. 2 and 48.

13. Evan S. Medeiros, Roger Cliff, Keith Crane, and James C. Mulvenon, *A New Direction for China's Defense Industry*, RAND Corporation, 2005, p. 140, at http://www.rand.org/pubs/monographs/2005/RAND_MG334.pdf (November 22, 2010).

14. Ling Shenying, Peng Aihua, and Zou Shimong, "Reflections and Considerations of the Development of Civil–Military Melded Development," *Zhongguo Junshi Kexue* (China military science), No. 1, 2009.

base and shifted resources away from military production to meeting growing civilian demand.¹⁵

Where Mao had modeled China's military industrial infrastructure after the Soviet Union's, Deng specifically rejected that model. While useful for industrializing a backward country, the Soviet approach did not necessarily promote technological development or innovation.¹⁶ To accommodate these shifting priorities, Deng modified Mao's guidance on the relationship between the military and civilian industrial bases. Deng's new 16-character phrase of "combine the civilian and the military, combine peacetime and wartime, give preference to military products, have the civilian support the military" (*junmin jiehe, pingzhan jiehe, junpin youxian, yi min yangjun*) has been considered the "guiding thought" (*zhidao sixiang*) for China's military industrial development ever since.¹⁷

Under this guiding thought, the Chinese leadership has avoided the Soviet pitfall of excessively emphasizing the military to the exclusion of the civilian economy. Indeed, under Deng, there was some concern that military industry officials were focused too much on making money and not enough on manufacturing military equipment.¹⁸

Jiang Zemin, Deng's successor, sustained and deepened Deng's policy of making civilian economic and technological development the first priority, while promoting civil-military integration. Like his predecessor, Jiang modified the guidance for civil-military integration by creating the phrase "combine the military and the civilian, combine peacetime and wartime, embed the military within the civilian" (*junmin jiehe, pingzhan jiehe, yujun yumin*). This new guidance firmly subordinated military industrial production and modernization to the larger effort of improving the national economy.

Jiang is said to have specifically rejected the idea of favoring the military sector over the civilian sector.¹⁹ At the same time, the Chinese leadership recognized that military modernization could not be deferred indefinitely. Under Jiang, there was therefore a push to spread the benefits of the expanding and increasingly technologically sophisticated Chinese economy to the PLA.

The Chinese leadership has avoided the Soviet pitfall of excessively emphasizing the military to the exclusion of the civilian economy.

The result was a further extension of civil-military integration. One aspect of this was coordinating military and civilian development, thereby reducing redundancies, but also increasing synergies between the two sectors. In particular, greater import was placed on nurturing more dual-use technologies and fostering a freer flow of information between the military and civilian sectors. Military research and development would be embedded in the overall national infrastructure, lending its expertise where applicable while drawing on the full range of national resources. Meanwhile, civilian developments would be coordinated with military requirements, so that the entire economy would potentially be available in the event of conflict.²⁰

By the time that Hu Jintao became Party General Secretary and President of the PRC in 2002, these efforts at expanding civil-military integration had been underway for more than a decade. Hu has sought to build on these efforts in achieving the aim of "rich nation, strong army" (*fuguo qiangjun*). Recognizing the increasingly linked nature of high technology in particular, Hu emphasized increas-

15. For more extensive discussion, see Barry Naughton, *Growing Out of the Plan: Chinese Economic Reform 1978–1993* (New York: Cambridge University Press, 1996), passim.

16. Ling *et al.*, "Reflections and Considerations of the Development of Civil-Military Melded Development."

17. "Build a Complete Civil-Military Joined, Military Embedded in the Civilian Military Equipment Research, Development, and Production System," *Jiefangjun Bao* (PLA daily), February 23, 2008, at http://www.chinamil.com.cn/site1/xwpdxw/2008-02/23/content_1135060.htm (November 22, 2010).

18. Ling *et al.*, "Reflections and Considerations of the Development of Civil-Military Melded Development."

19. *Ibid.*

20. *Ibid.*

ing the interplay between military and civilian, leading to “melded development” (*ronghe fazhan*) of the military and larger civilian technological and industrial bases.

Interactions with China’s commercial industry, depending on how and with which entities those interactions occur, have the potential to benefit the Chinese military.

This melding extends beyond simply having military production lines producing civilian goods or incorporating civilian technology into military systems. The goal is for civilian and commercial authorities to incorporate military requirements into their products and processes, while military designers exploit commercial products and processes in their own output. As one author suggests, the goal is synchronized innovation between the military and civilian/commercial worlds.²¹ Ultimately, this “organic” integration and melding would effectively make potentially the entire Chinese economy available for military production without skewing it away from civil and commercial ends in peacetime.²²

Civil–Military Integration: A Variety of Means.

Clearly, the top Chinese leadership has consistently supported civil–military integration for much of the past 30 years, although with different emphases. Chinese policies have both mirrored this support and evolved alongside the changes. Such an extended policy of civil–military integration means that the military industrial base is embedded within the larger civilian economy and that many policies promoting this integration are embedded in the core

of China’s economy. Therefore, interactions with China’s commercial industry, depending on how and with which entities those interactions occur, have the potential to benefit the Chinese military.

Several Chinese efforts highlight the different ways in which Beijing has pushed civil–military integration.

Research into Basic Dual-Use Technologies. One element has been the promotion of basic research in areas that have both military and civilian benefits. The National High-Technology Research and Development Plan (*guojia gao jishu yanjiu fazhan jihua*) or Plan 863 is a key program that arose under Deng Xiaoping and that continues to affect Chinese military industrial efforts. Plan 863 was the first major Chinese initiative aimed at fostering science and technology. It was begun in March 1986²³ and has served as a key blueprint for major Chinese R&D efforts into general science and technology, especially high technology.

Although Plan 863 is not a military initiative, the fields emphasized under its aegis are dual-use in nature. For example, aerospace systems can serve both military and civilian ends. Similarly, new materials can be employed in a variety of commercial products as well as in modern warships, combat aircraft, and armored fighting vehicles.

Nor are just the outputs of Plan 863 dual-use. While aimed at improving the overall level of Chinese high technology, the program incorporates scientists and engineers from the military industrial complex “to ensure that defense requirements are taken into consideration and to identify and gain access to any technologies that may be useful for military applications.”²⁴ As such, Plan 863 embod-

21. Hu Guangzhen, “Melded Civil–Military Development: Vital Strategic Thoughts Regarding the Planning of National Defense and Economic and Social Development,” *Zhongguo Junshi Kexue*, No. 1, 2009.

22. *Ibid.*

23. The program initially supported 15 projects in seven high-tech fields: biology, aerospace, information technology, lasers, automation, energy resources, and new materials. In 1996, marine technology was added to the program. Material drawn from *Guojia Gao Jishu Yanjiu Fazhan Jihua* 863, in FBIS–CHI, July 21, 2000, and Xinhuanet, “What Is Plan 863?” China.com.cn, February 15, 2001, at <http://www.china.com.cn/chinese/2001/Feb/20835.htm> (December 7, 2010). For further discussion of the creation of Plan 863, see Evan Feigenbaum, *China’s Techno-Warriors: National Security and Strategic Competition from the Nuclear to the Information Age* (Stanford, Calif.: Stanford University Press, 2003), esp. pp. 141–143.

24. Tai Ming Cheung, *Fortifying China: The Struggle to Build a Modern Defense Economy* (Ithaca, N.Y.: Cornell University Press, 2009), pp. 80–81.

ies the idea of fostering linkages and the free flow of information and talent between the civilian and defense industrial bases.

Applying Civilian/Commercial Technologies to Military Systems. Civil–military integration in the Chinese context also involves the cross application of technologies at the factory floor and design levels. China’s shipbuilding industry, which manufactures both commercial vessels and modern warships, has benefited from access to foreign methods and techniques.

Similarly, the FC-1 fighter aircraft has reportedly benefited from computer-aided design/computer-aided manufacturing (CAD/CAM) technologies.²⁵ Application of commercial technologies not only can accelerate research, development, and production, but also reduce risk. Civilian technology, especially in information technology (IT), often matures faster and is produced on a larger scale, allowing the kinks to be worked out on the commercial side.

While some of this involves the porting of civilian and commercial technologies to military products, another aspect is “the use of civilian entities to conduct military work because they are more capable than the military.”²⁶ This is of particular note in information technology. As a RAND study notes, most major Chinese IT and electronics companies are commercial businesses. That is, they are companies pursuing sales both nationally and internationally that are not under PLA direction.

For many of these companies, their primary tie to the Chinese military is as a supplier of military electronics and equipment. However, some companies have long-standing institutional links, such as ties or access to the PLA’s numbered research insti-

tutes.²⁷ Such ties effectively subsidize these companies’ research, while probably giving military R&D access to commercial best practices and cutting-edge research. Particularly in IT, commercial advances are likely to outpace military R&D.

Commercial Subsidiaries of Military Industries. Another aspect of civil–military integration has been the development of commercial subsidiaries within the larger Chinese arms industry.²⁸ Such subsidiaries help to provide China’s military industry with access to foreign partners and customers interested in both military and nonmilitary goods. At the same time, they potentially provide that same industry with access to foreign technologies through those same partners and customers.

The long-standing Chinese civil–military integration efforts coupled with the opacity of many Chinese organizations suggests that blocking the flow of sensitive technology to specific Chinese entities will be extremely difficult.

One example is China Great Wall Industry Corporation (CGWIC). CGWIC is part of the China Aerospace Science and Technology Corporation (CASC), a state-owned enterprise that is one of the two main components of China’s space-industrial complex. CASC has close links to the Chinese military—one of the main customers for many of its products.

Established in 1980, CGWIC is the “sole commercial organization authorized by the Chinese government to provide satellites, commercial launch services, and to carry out international space cooperation.” According to the company’s Web site, it

25. *Ibid.*, p. 200.

26. Medeiros *et al.*, *A New Direction for China’s Defense Industry*, p. 207.

27. *Ibid.*, p. 206, and James Mulvenon, *Soldiers of Fortune* (Armonk, NY: M.E. Sharpe Publishers, 2001), pp. 186–191. Examples include China Electronic Technology Group and Zhongxing Telecommunications Equipment Co. James Mulvenon and Rebecca Samm Tyroler-Cooper, “China’s Defense Industry on the Path of Reform,” U.S.–China Economic and Security Review Commission, October 2009, pp. 24 and 36, at http://www.uscc.gov/researchpapers/2009/DGI%20Report%20on%20PRC%20Defense%20Industry%20--%20Final%20Version%20_with%20USCC%20seal%2002Nov2009%20_2_.pdf (November 22, 2010).

28. Note that this section is discussing subsidiaries of state-owned enterprises, and not companies run by the PLA itself. Indeed, since 1999, the PLA has divested itself of most of its businesses, aside from those in the telecommunications field. Mulvenon, *Soldiers of Fortune*.

can not only arrange the export of satellites and provide commercial launch services, but also provide project financing, project insurance, and technical training for related support personnel. CGWIC is also involved in a host of non-space areas, including information and electronic systems, petroleum and petrochemicals, and green energy.²⁹

Such measures will likely be redoubled, given President Hu Jintao's emphasis on melding military research, development, and production systems. The long-standing Chinese civil-military integration efforts coupled with the opacity of many Chinese organizations suggests that blocking the flow of sensitive technology to specific Chinese entities will be extremely difficult.

Difficulties with U.S. Export Controls. Further complicating the export control situation with the PRC are American issues. For much of the Cold War, controlling exports to the PRC was not a pressing concern. Prior to President Richard Nixon's visit to China in 1972, there was no real prospect of U.S. exports to China. The PRC was even more hostile and closed to the United States than the USSR. Even after relations were revived, export controls were not a major issue because the West and the PRC were closely aligned in facing down the Soviet Union. Moreover, China was apparently not interested in military expansion at the time and instead was reducing its military. Limiting Chinese access to technology was subordinated to the higher priority of containing the USSR. Instead, the U.S. and other Western countries actively sought to export arms and military-related technology to the PRC, including artillery-locating radars and anti-submarine torpedoes.³⁰

However, interest in sustaining cooperation and technology transfer to the PRC evaporated with the Tiananmen massacre in 1989. U.S. exports of high technology to China were curtailed, and major cooperative defense programs were allowed to lapse. Then, with the collapse of the USSR and the rapid acceleration of China's economy, the interest in export controls reemerged with a vengeance. In

The current U.S. export control regime is out of date and out of step with technological realities.

the 1990s, China was uneasily viewed as a potential near-peer competitor. By the new millennium, it became clear that the PRC was not following the Japanese path of being a mostly peaceful nation with limited military ambitions. China's efforts to keep its decision-making processes as opaque as possible reinforced this perception.

China's growing military capabilities, coupled with its substantial diplomatic and economic clout, have revived concerns about technology transfer to the PRC. Export controls are seen as an essential means of limiting PRC access to cutting-edge technologies.

The Current U.S. Export Control System. Regrettably, the current U.S. export control regime is out of date and out of step with technological realities. Few U.S. allies are likely to join a strict regime aimed at denying China all access to advanced technology. This is crucial because many European and Asian states now have technological capabilities comparable to the U.S. in important fields. Without broad agreement on an export control regime, unilateral American efforts will affect only American exports, without actually curtailing Chinese access to many forms of high technology.

Even in areas in which the U.S. is dominant, the U.S. export control structure is deeply flawed. In contrast with China's efforts to create an integrated civil-military defense industrial base, the U.S. export control regime is highly fragmented. The two major elements of the current regime are the Munitions List, under the jurisdiction of the U.S. State Department and governed by the International Traffic in Arms Regulations (ITAR), and the Commerce Control List (CCL), under the jurisdiction of the U.S. Department of Commerce and governed by the Export Administration Regulations. American industry seeking to export high-tech items are therefore confronted by two different lists, administered by

29. China Great Wall Industry Corporation, "About Us," at <http://www.cgwic.com/about> (November 22, 2010).

30. Bates Gill and Taeho Kim, *China's Arms Acquisitions from Abroad: A Quest for "Superb and Secret Weapons"* (New York: Oxford University Press, 1995), p. 42.

two different bureaucracies, each with its own licensing rules, reporting requirements, and oversight authorities.

International Trade in Arms Regulations. ITAR governs exports of a range of specialized, military-use goods labeled “defense articles.” The regulations were established under the Arms Export Control Act of 1976 and the State Department’s Directorate of Defense Trade Controls is responsible for enforcement.

In general, these regulations focus more on national security than on maximizing exports or commercial concerns. Not surprisingly, ITAR-controlled items are subject to stringent scrutiny before permission is granted to export.

Some items covered by ITAR are expected, such as actual weapons systems and classified information associated with various defense articles. However, ITAR also applies to all subsystems and even individual parts that were designed or modified for military use. For example, legislation that placed satellites and their subsystems under ITAR effectively make every nut and bolt subject to the Munitions List.

In addition, ITAR applies to technical data on defense articles, including information on the design, development, production, manufacturing, and assembly of defense articles. ITAR also applies to information on their operation, repair, testing, maintenance, and modification, including software. This makes any change to software a potential ITAR issue that requires review.

Moreover, the Munitions List restricts the transfer of technical data on defense articles by any third party or to any third party:

[V]irtually any technical data related in any way to a defence article is ITAR-controlled. If an Australian entity receives such data, it

must control it in strict compliance with ITAR, which includes a prohibition on “re-export” unless expressly approved by the Directorate.³¹

The export of any item of equipment or subcomponent, piece of data, and/or service may require separate approval by the directorate prior to export. Nor does “export” in this context refer only to the transfer of physical items outside one’s borders. It also applies to the transfer of information, such as by e-mail.

Export Administration Regulations. Export Administration Regulations (EAR) govern the export and re-export of commodities, software, and technology that have both military and commercial or civilian applications. In most instances, they also cover commercial items that are not of immediate military utility.³² The Department of Commerce’s Bureau of Industry and Security (BIS) is responsible for enforcing EAR.

The legal authority for EAR was originally based on the Export Administration Act of 1979, which expired in 2001. Since then, export controls over dual-use items have been extended each year by executive order.

Under EAR, as with ITAR, exporters are expected to determine whether their products require a license prior to exporting them. With EAR, that determination is based on a number of factors, “including the item to be exported and the country of ultimate destination.”³³ Even though exporters are being compelled to determine whether their goods are subject to export controls, the BIS itself cannot determine whether its export control system is actually limiting foreign access to high technology. BIS lacks metrics for assessing the effectiveness of its controls, and its watch lists are often incomplete in listing parties of interest.³⁴

31. Roland L. Trope and Monique Witt, “Allies at Sixes and Sevens: Sticky Issues in Australian–US Defence Trade Controls,” *Security Challenges*, Vol. 3, No. 2 (June 2007), at <http://www.securitychallenges.org.au/ArticlePages/vol3no2TropeandWitt.html> (November 22, 2010).
32. U.S. Department of Commerce, Bureau of Industry and Security, “Introduction to Commerce Department Export Controls,” at <http://www.bis.doc.gov/licensing/exportingbasics.htm> (November 22, 2010).
33. U.S. Government Accountability Office, “Export Controls: Improvement to Commerce’s Dual-Use Export Controls Needed to Ensure Protection of U.S. Interests in the Post-9/11 Environment,” GAO–06–638, June 2006, p. 1.

In short, corporations are forced to comply with a system that may not actually prevent hostile states from obtaining access to sensitive dual-use items.

The Impact of Current Export Controls on U.S. Industry

The complex and confusing system of U.S. export controls may not actually restrict access of foreign countries, including the PRC, to sensitive military and dual-use technologies. Some items will likely slip through the cracks, especially given the vagaries of precisely which list and sanctions apply to which technologies:

Some sanctions and embargoes only apply to items on State's U.S. Munitions List and not to those on the Commerce Control List. For example, Commerce-controlled items may be exported to China while arms exports to China are generally prohibited.³⁵

Meanwhile, the State Department and the Commerce Department do not necessarily share information with each other, even in cases of violations of their respective regulations. As a result, violators of one set of rules are not automatically subjected to increased scrutiny under the other set.³⁶

In some cases, it is unclear whether the restricted technologies are meaningful. A commonly cited problem with both the Munitions Control List and the Commerce Control List is that the prohibitions are rarely reviewed. The CCL, for example, has not been revised in over 15 years.³⁷ This is especially important for information technology. In light of Moore's Law, which observes that the density of transistors on a chip roughly doubles every 24 months, IT becomes much more capable within a matter of two or three years. Unless regularly reviewed, export restrictions on specific IT equipment rapidly fall behind the state of the technology.

Meanwhile, these same regulations often complicate cooperation with allies. For example, the U.K. and Australia have at times found themselves subjected to export control policies, even on joint projects, which have been approved by both the U.S. government and the U.K. or Australian government. One assessment observed, "ITAR compliance obligations will become a significant obstacle to effective Australian and U.S. military interoperation."³⁸ The recently ratified U.S.–U.K. and U.S.–Australia treaties on defense trade cooperation, which allows the transfer of certain defense items and services between Americans and authorized U.K. or Australian citizens without export licenses or ITAR controls are essential first steps in correcting this problem.

The complex and confusing system of U.S. export controls may not actually restrict access of foreign countries, including the PRC, to sensitive military and dual-use technologies.

In other cases, erstwhile allies seek to exploit U.S. export controls to expand their own market share. Thales, a French aerospace manufacturer, has produced a number of "ITAR-free" systems that incorporate no U.S. components and can therefore be exported freely, including to the PRC. The company manufactured Sinosat-6B for the PRC and the W3C telecommunications satellites to this specification.³⁹ For the W3C satellites, it allowed Eutelsat to use Chinese launchers to place the satellite in orbit, ironically arranged through China Great Wall Industry Corporation. Meanwhile, Thales is also advertising helicopter air data units to the same ITAR-free specifications.⁴⁰

These deficiencies in the American export control regime do not deny the PRC or other states access to

34. For example, see *ibid.*, p. 8.

35. Ann Calvaresi Barr, "Export Controls: State and Commerce Have Not Taken Basic Steps to Better Ensure U.S. Interests Are Protected," statement before the Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia, Committee on Homeland Security and Governmental Affairs, U.S. Senate, April 24, 2008, p. 5.

36. U.S. Government Accountability Office, "Export Controls," p. 3.

37. National Defense Industries Association, "Export Control Review Principles and Recommendations," January 13, 2010, at http://www.ndia.org/Advocacy/LegislativeandFederalIssuesUpdate/Documents/xconrecosfinal_110.doc (December 7, 2010).

38. Trope and Witt, "Allies at Sixes and Sevens."

advanced technology, but they do deny American companies potential clients and market shares.

Proposed Changes to the Export Control System

The Obama Administration has proposed a number of changes to streamline the export control system,⁴¹ including:

- A single control list that distinguishes in tiers the sensitivity of items and technologies,
- A single licensing policy to be applied across agencies,
- A new center to better coordinate the various agencies, and
- A single IT system to share information among the relevant agencies.⁴²

Some of these proposals have a great deal of merit. In particular, there is a clear need to improve coordination and information sharing among the various agencies and departments charged with enforcing export controls. Improving information flow will not only help to seal some of the cracks in the current system, but also almost certainly reduce redundancies and increase efficiency in enforcement.

However, these efforts should be undertaken regardless of the Chinese issue. These are predominantly internal concerns that affect exports to U.S. allies as much as they affect exports to the PRC.

What is far more problematic is whether a new agency will necessarily help to achieve the same ends. Creating a new, tiered control list and a licensing policy to enforce the list is intended to differentiate critical from non-critical technologies and trusted partners from less close customers, but how

dual-use technologies will be treated in the licensing process remains to be seen, especially given the growing importance of software and IT in modern weapons and warfighting. Moreover, the proposed fix gives little indication of how exporters are expected to safeguard potentially militarily useful technologies when dealing with the integrated Chinese industrial complex. Indeed, none of the proposed fixes directly addresses the conundrum of trading with the PRC while hedging against further improvements in the PLA.

What the U.S. Should Do

Any U.S. export control effort must protect U.S. interests while maximizing business opportunity for exporters. The export controls must specifically be able to address the challenges posed by China's long-standing interest in civil-military integration and the PLA modernization effort.

Several steps seem essential.

Determining What Matters. A military adage teaches that he who seeks to defend everything defends nothing. While the U.S. continues to be a major technological innovator, it is neither the sole source nor even the best source in many cases. Consequently, U.S. policymakers need to recognize that the U.S. cannot deny China or almost any other nation access to more advanced technology. However, the American advantage is often not only an issue of hardware, but also an issue of skills, such as project management, systems integration, and systems engineering. Indeed, the 1990s Loral and Hughes aerospace export cases, which precipitated the shift of satellite exports to the U.S. Munitions List, centered in part on the possibility that "the PRC may have transferred the lessons learned from

39. Peter B. de Selding, "China Launches New Communications Satellite," *Space News*, July 6, 2007, at http://www.space.com/missionlaunches/070706_chinasat6b_Inch.html (November 22, 2010), and "Eutelsat Shifts W3B Satellite from Chinese to European Launcher," *Space News*, February 18, 2010, at http://www.spacenews.com/satellite_telecom/2010-02-18-eutelsat-shifts-w3b-from-chinese-european-rocket.html (November 22, 2010).

40. Thales Group, "ADU3200: Helicopter Air Data Unit," July 8, 2008, at <http://www.thalesgroup.com/Workarea/DownloadAsset.aspx?id=8909&LangType=2057> (November 22, 2010).

41. Baker Spring, "Obama Administration's Ambitious Export Control Reform Plan," Heritage Foundation WebMemo No. 3019, September 20, 2010, at <http://www.heritage.org/research/reports/2010/09/the-obama-administrations-ambitious-export-control-reform-plan>.

42. James L. Jones, "Export Controls for the 21st Century," *The Wall Street Journal*, August 30, 2010, at <http://online.wsj.com/article/SB10001424052748703959704575454313481209990.html> (November 22, 2010).

this launch failure investigation to its ballistic missile programs.”⁴³

For American export controls to be effective, the U.S. must determine which sectors, industries, technologies, and techniques the U.S. dominates and then focus the revised export controls on those areas. As the Administration pushes to streamline the export control system, it should clearly state its reasoning for subjecting certain technologies, systems, and processes to export controls. This will, in turn, help manufacturers and designers to understand better what is and is not likely to be restricted. It will also allow regulators to apply export controls more consistently and effectively.

However, neither government nor industry should view such measures as somehow guaranteeing long-term U.S. dominance. Rather, the controls are a means of retarding foreign access, including Chinese access. Real, sustained dominance requires real, sustained innovation and investment.

Keeping Pace with Advances. To this end, export controls must be dynamic, reflecting changes in technologies and techniques. The lists of controlled technologies should constantly evolve, as befits a world of constant technological advances. For export controls to remain relevant and applicable to the most recent developments in technologies and techniques, the lists of controlled items must be regularly reviewed, adding new items as needed and removing old restrictions as they become obsolete or counterproductive.⁴⁴

This suggests that most restrictions should include sunset provisions and that the control lists should be revisited on a regular basis. While a handful of technologies are so sensitive that they may not require such provisions (e.g., nuclear weapon technology), these will likely be the exception. By contrast, information technology will likely evolve rapidly, arguing for regular reappraisal of which technologies should be restricted.

The Administration’s plan to consolidate the two lists of controlled technologies into one will help in this regard, but how this will be implemented remains to be seen. The Administration needs to take a consistent approach in formulating the rules for the single list so that technologies and processes can be removed from the control list as they become widely available in the commercial sector, often because American competitors are already exporting them.

Understanding China’s Military Industrial Complex. One of the challenges of interacting with China is the opacity of its structures and organizations. The interrelationship between the military and civilian industrial bases—which entities are associated or linked to other entities—is poorly understood. Consequently, business relations with Chinese companies are fraught with risk. A systematic effort to gather and make available more detailed information on the organization and structure of China’s military-industrial complex would benefit both U.S. industry and the government. This effort should pay special attention to businesses that are linked to the military’s network of research institutions. Only with this information can U.S. businesses engage Chinese corporations, while minimizing the risk of revealing key technologies and procedures.

Moreover, such information would be invaluable for other purposes, such as imposing sanctions and monitoring technology and weapons transfers to pariah states. Many Chinese companies, including state-owned enterprises, interact with unsavory regimes, such as those in Sudan and Burma, but they often do so through a variety of fronts and subsidiaries. Sanction regimes can only hope to affect commercial interactions by identifying these various relationships and, ultimately, the decision makers.

This suggests a need to expand the budget for the defense and intelligence communities to undertake longer-term studies of both the Chinese military-

43. *U.S. National Security and Military/Commercial Concerns with the People’s Republic of China*, H. Rep. 105–851, 105th Cong., 2nd Sess., Chap. 5, p. 3, at <http://www.access.gpo.gov/congress/house/hr105851/index.html> (November 22, 2010).

44. Some technologies, especially those associated with weapons of mass destruction, will likely remain on any such list permanently, with or without regular reviews.

industrial complex and its extensive ties to China's enormous commercial sector. In the face of a retrenching defense budget, it would be penny-wise, but pound-foolish, to reduce such longer-term analyses that are essential for both commercial and security purposes.

Conclusion

There is a broad-based consensus that the current export control system is not simply flawed, but broken. The Administration has chosen to address a

daunting task, and President Obama is to be credited for this effort. It remains to be seen just how the Administration will reconcile streamlining and simplifying the myriad regulations and bureaucracies with maintaining the ability to limit the flow of advanced military technologies to the PRC, especially given the structure of the Chinese military industrial complex.

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