

Translation



The following article by a Chinese state think tank praises the U.S. integration of the military and civilian industrial bases as a model for China. The article argues that China can learn much about "military-civil fusion" from U.S. legislation on this issue.

Title

Characteristics of, and Lessons from, the U.S. Legal System for Military-Civil Fusion
美国军民融合法律体系的特点及启示

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Source

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With defense budgets relatively reduced after the Cold War, the United States proposed the concept of "civil-military integration" (CMI; 军民一体化). In 1994, the Office of Technology Assessment of the U.S. Congress released a lengthy report, *Assessing the Potential for CMI*, marking the full-on start of the civil-military integration strategy. By the beginning of the 21st century, the Quadrennial Defense Review (2001) announced that the military and civilian technology and industrial base, which used to be separated, had been primarily integrated into one. Having achieved military-civil fusion (军民融合) in such a short time, the United States has a military-civil fusion legal framework that offers many examples we could learn from.

I. Composition of the U.S. Military-Civil Fusion Legal Framework

The United States does not have any dedicated military-civil fusion law. However, the Constitution has laid out general principles regarding military-civil fusion. Specific regulations are given in *National Defense Technology and Industrial Base, Defense Reinvestment, and Defense Conversion*, and in the *Federal Acquisition Reform Act*. More professional guidelines are given in the *Competition in Contracting Act* and the *Federal Technology Transfer Act*. Basic requirements for military-civil fusion are fleshed out through regulations such as the *Federal Acquisition Regulations*, Department of Defense orders, and implemented measures among the

armed service branches. It's fair to say that although without any dedicated military-civil fusion law, the United States has developed a comprehensive and rigorous legal framework for that very purpose.

(1) Laws

The U.S. Constitution laid out principles regarding the power architecture relevant to military-civil fusion, such as the president and Congress, as well as the balance between defense needs and the civilian economy. This is the fundamental basis for a military-civil fusion legal framework. For example, Article I, Section 8 of the Constitution stipulates that Congress shall have power to levy and collect taxes to provide for the common defense and general welfare of the United States, to declare war, to raise and support armies, to provide and maintain a navy, and to provide for calling forth the militia, and to make all laws which shall be necessary and proper for carrying into execution of the foregoing powers; Article II, Section 2, says that the president shall be commander in chief of the army and navy of the United States, and of the Militia.

Primary laws behind the United States' military-civil fusion initiative include *National Defense Technology and Industrial Base, Defense Reinvestment, and Defense Conversion*, the *Defense Production Act*, the *Federal Acquisition Reform Act (FARA)*, the *Weapon Systems Acquisition Reform Act*, the *Federal Acquisition Streamlining Act*, the *Defense Acquisition System*, the *Goldwater-Nichols Department of Defense Reorganization Act*, the *Defense Funding Act*, and the *National Defense Authorization Act (NDAA)*. The NDAA is an annually updated act, amended and released every year. Many requirements for military-civil fusion have been documented in versions of the NDAA since the 1990s.

Laws such as the *National Security Act*, the *Competition in Contracting Act*, the *Federal Technology Transfer Act*, the *Bayh-Dole Act*, the *Technology Transfer Commercialization Act*, and the *Small Business Act* defined military-civil fusion implementation from various angles.

(2) Laws and Regulations

Laws and regulations of the United States related to military-civil fusion include federal regulations, as well as regulations, orders, and other governing stipulations from the Department of Defense, the Department of Energy, the National Aeronautics and Space Administration (NASA), and the different branches of the U.S. Armed Forces.

For military procurement, the Department of Defense established the *Armed Services Procurement Regulations*, which is based on the *Armed Services Procurement Act*, and later in the 1980s merged with the *Government Acquisition Act* into the *Federal Acquisition Regulation (FAR)*. The FAR, together with the *Defense Federal Acquisition Regulation Supplement (DFARS)*, constitute the entirety of principles governing all federal acquisition activities. The Department of Defense issued procurement directives such as 5000.1, 5000.2, and 7045.7. Each armed force formulates its own detailed military acquisition plans, budgets, and review processes.

In terms of intellectual property rights management in national defense, a series of laws and regulations were developed based on the *Federal Technology Transfer Act*, the *Bayh-Dole Act*, and the *Federal Acquisition Regulations*, such as *Management of Intellectual Property Matters within the Department of Defense*, the *Department of Defense Financial Management*

Regulation, the International Traffic in Arms Regulations, and the U.S. Army's Intellectual Property Policies.

II. Contents and Characteristics of the United States' Military-Civil Fusion Legal Framework

The fundamental principle of the United States' military-civil fusion legal framework is to sufficiently exercise the power of the market while strictly upholding national security. *Assessing the Potential for CMI* defines "CMI" as: "[Except for military-specific research and development], the process of merging the Defense Technology and Industrial Base (DTIB) and the larger Commercial Technology and Industrial Base (CTIB) into a unified National Technology and Industrial Base (NTIB). More specifically, in an integrated base, common technologies, processes, labor, equipment, material, and/or facilities would be used to meet both defense and commercial needs. "Therefore, the concept of CMI, as drawn by the United States, refers to a fusion of military and civilian technology bases, with the key components "civilian to military" and "military to civilian," and an objective of developing "technologies applicable to the military and civilian sectors."

(1) Expand the procurement of civilian products to advance the "civilian-to-military" process

Laws facilitating the "civilian to military" process primarily include versions of the NDAA since the 1990s, the FARA, and *National Defense Technology and Industrial Base, Defense Reinvestment, and Defense Conversion*.

The NDAA (1990) demanded that the Department of Defense define civilian product procurement regulations, and that it draft a simplified and unified contract for such procurements. The NDAA (1991) required the Department of Defense to explore the availability and applicability of non-research programs to satisfy particular requirements before signing contracts for defense-specific products. The NDAA (1993) required the Department of Defense to modify its acquisition policies in order to facilitate the fusion of the military and civilian technology and industrial bases. The general trend of NDAA revisions in recent years is expanding the scale of tax exemption in the procurement of civilian products. For example, Section 804 of the NDAA (2008) added a new tax-exemption policy for most commercial off-the-shelf (COTS) products.

By 1994, the Congress passed FARA, which is considered the most important acquisition act since the 1974 Armed Services Procurement Act and the 1984 Competition in Contracting Act, and a milestone in the history of U.S. military-civil fusion. FARA established detailed acquisition rules for the advancement of military-civil fusion, primarily: Substitute military standards with civilian ones where possible; procure commercial goods while practical; ease and simplify contract processing by raising the value cap from [USD] \$25,000 to \$100,000; encourage e-commerce; exercise commercial management on selected programs. Frank Kendall, the Department of Defense's Under Secretary of Defense for Acquisition, Technology, and Logistics signed off the Better Buying Power 3.0 (BBP 3.0) plan in 2014, proposing an acquisition system that is more open and modulated.

In 1992, Congress released *National Defense Technology and Industrial Base, Defense Reinvestment, and Defense Conversion*, calling for the breaking down of barriers created by

different technologies, standards, operation strategies, and production methods between the military and civilian worlds. Based on this regulation, the Secretary of Defense released a memorandum, *Specifications & Standards - A New Way of Doing Business*, advocating a “single process initiative” (SPI), limiting the usage of military specifications and standards. According to *National Defense Technology and Industrial Base, Defense Reinvestment, and Defense Conversion* and FARA, the Secretary of Defense cleaned up and reformed over 30,000 military standards of long standing. The proportion of civilian standards was raised from 25% to 95%.

The United States is highly aware of the importance of competition in the “civilian to military” process. Congress released the *Competition in Contracting Act* in 1984, requiring sufficient, open competition in the Department of Defense's acquisition. As required by the FARA, each administrative department must appoint a “competition advocate” in every procurement activity. DFARS, on the other hand, stipulates that the procurement of all key equipment must have competing prototypes from at least two contractors. Contractors that lose out in the competition will be compensated with awarded projects and/or funding. In May 2009, President Obama signed off the *Weapon Systems Acquisition Reform Act*, requiring enhanced, “system-based” competition.

(2) A clearly defined gain sharing principle for technology transfers to advance the “military-to-civilian” process

The Department of Defense commands approximately half of the federal government's technology funding. The commercialization of defense technology achievements (国防科技成果转化) is a key component of military-civil fusion.

Congress passed the Bayh-Dole Act in 1980, assigning the entire revenue from the commercialization of intellectual property backed by federal funding to contractors. The principle is “whoever developed the technology possesses ownership.” The federal government only has the right to utilize such technology free of charge. To protect the intellectual property rights of contractors, the Department of Defense allows contractors to flag intellectual property such as patents, confidential technologies, and software copyrights with limitations on third party usage while submitting lists of technology. The U.S. government entrusted the management of certain national laboratories to private companies, working toward the sharing of resources by providing technological intelligence and know-how owned by the Department of Defense, within the scope of state secrecy requirements. Congress passed the Technology Transfer Commercialization Act in 2020, offering guidelines on the commercialization of technologies originated from federal labs.

As required by the 2009 NDAA, the spending and actual effect of funding assigned to technology transfer projects managed by the Department of Defense or armed forces must be reviewed, providing entities participating in such projects a clear standard for their legal rights.

(3) Strictly upholding national security bottom lines while sufficiently exercising the power of the market

In the development of military-civil fusion, the United States managed to tap into the free market. But also, national security is protected by enhancing security and confidentiality, providing the military with appropriate flexibility, prioritizing defense contracts, and preventing technologies from being leaked.

The United States has been rigorous in the security and confidentiality of civilian vendors of defense supplies. The *National Industry Security Regulation* and the *National Industry Security Program* laid out confidentiality procedures and confidentiality requirements for contracts signed with foreign entities. Companies with confidentiality obligations, including those in the defense industry, are required to appoint dedicated confidentiality officers. The U.S. Armed Forces emphasize security and confidentiality when signing acquisition contracts with companies.

While implementing the military-civil fusion strategy, the United States maintains an appropriate level of independent capability in its armed forces. Take equipment repair for example. While the bulk of repair services are assigned to contractors, as required by the 1998 NDAA, armed forces have to be capable of independently performing major repair services. The proportion of major repair services assigned to civilian companies shall not exceed 50%.

Military power, representing national security and interest, is prioritized against administrative and civilian powers. The NDAA stipulates that military contracts shall be prioritized in performance during warfare or national emergencies. According to the DFARS, for the acquisition of defense supplies such as aircraft, submarines, and missiles, the contract must be duly performed even if there is any dispute, which shall be resolved afterwards.

Through legislation, the United States prevents technologies from being transferred to potential enemies. The *Defense Funding Act* of 1993 strictly limited the export of weapons and high-tech products to Iran. The NDAA of 1999, 2005, and 2007 defined export restrictions to China.

(4) Rigorously developing technologies that are both military and civilian

In recent years, the Department of Defense has been prioritizing the development of technologies that are both military and civilian, with increased funding from Congress.

National Defense Technology and Industrial Base, Defense Reinvestment, and Defense Conversion of 1992 enacted a "Technology Reinvestment Project" (TRP), the primary objective of which is to facilitate the conversion of military technologies into civilian applications, and to develop dual-use technologies. The Department of Defense released a memorandum in 1995, entitled *Dual Use Technology: A Defense Strategy for Affordable, Leading-Edge Technology*. The memorandum identified three requirements: 1) Invest in the development of key dual-use technologies; 2) Transfer achievements in national defense scientific research to civilian departments for commercialization; 3) Adapt the resources of civilian departments for military use and thoroughly adhere to the "designed for dual use" guideline in the development of new military systems. Corresponding regulations are stipulated in the *National Security Science and Technology Strategy* of 1995, the *Defense Science and Technology Strategy* of 1996/1997/2000, and the NDAA of 1998. For example, the 1998 NDAA demanded that the military increase investment in dual-use technologies, and implement a "Dual-Use S&T Program."

In May 2003, the Department of Defense released the latest version of the Defense Acquisition System, i.e. DoD Directive 5000.1. The directive prioritizes the utilization of civilian technologies and the development of dual-use technologies. When setting operational capability requirements with users, units under the Department of Defense must adhere to the following priority hierarchy, ranked in descending order: 1) Acquire or improve domestic civilian

products, services, technologies, or develop dual-used technologies; 2) Expand acquisition or improve existing military systems developed by the United States or its allies; 3) Implement a development program with one or more allies; 4) Create a new project jointly developed by multiple armed service branches or government organs; 5) Create a new development project dedicated to one single armed service branch.

III. Insights

There are lessons we could learn from the creation and implementation of a legal framework for military-civil fusion by the United States. Examples include the definition of military-civil fusion, priorities in development, and administrative reforming.

(1) A clear definition of military-civil fusion

The U.S. has made a clear definition for military-civil fusion: the fusion of the national defense and civilian technology and industrial bases into one single unified national technology and industrial base. Three key components of the strategy are “civilian-to-military conversion,” “military-to-civilian conversion”, and developing “dual-use technologies.”

A clear definition is the prerequisite for advancing military-civil fusion with pooled resources and efforts. An infinitely expanded definition will not be practical. To advance military-civil fusion development, we must first clearly define the concept of military-civil fusion.

(2) The legal framework of military-civil fusion is a systems engineering project

The United States does not have any dedicated law for military-civil fusion. However, both vague and detailed provisions are made in various laws, regulations, and policies. The Constitution offers fundamental guidelines, while systematic terms are laid out regarding market entry, military acquisition, confidentiality, intellectual property rights, investments, and standards in a series of laws and statues such as *National Defense Technology and Industrial Base*, *Defense Reinvestment*, and *Defense Conversion* and FARA. The aforementioned laws and regulations provide specific orders, measures, and requirements.

The practice of the United States reveals that the legal framework of military-civil fusion is a systems engineering project, to be supported by coordinated efforts from every domain and every link, regulated by relevant policies. That calls for a comprehensive legal framework with new or amended legislation, supported by relevant regulations, policies, and plans.

(3) The concept of CMI covers three key components: “Civilian-to-military,” “military-to-civilian,” and developing “dual-use technologies”

To support the “civilian-to-military” part, the United States took an approach of streamlining acquisition, unifying civilian and military standards, and sufficiently disclosing information. For “military-to-civilian,” they chose to assign the economic return of technology transfer as an incentive for technology developers. The Office of Technology Transition (OTT) in the Department of Defense was created for this purpose. In the early stage, “military-to-civilian” conversion is chiefly concerned with transferring military technology to civilian departments for commercialization. This will gradually phase into the development of dual-use technologies.

The case of the United States proves that a military-civil fusion technology standards system primarily supported by civilian standards determines how easy it is for civilian products to enter the defense sector. Primary adverse factors hindering the process of civilian-to-military conversion are ambiguous distribution of economic returns from technology commercialization, and technology developers not having a firm grasp on commercialization and application. The commercialization and application of military technologies shall be encouraged if there is an abundant stockpile of existing military technologies. But for expansions of the technology base, the development of dual-use technologies is the better way to go.

(4) Encourage competition while upholding security bottom lines in the process of military-civil fusion

In the implementation of its military-civil fusion strategy, the United States highly emphasizes competition. Legislation such as the *Competition in Contracting Act*, the *Federal Acquisition Act*, and DFARS lay out provisions to encourage competition, such as compulsory competition between prototypes, and compensation for those who lose out in the competition.

For outsourced services, the U.S. Armed Forces demand an appropriate level of independent capability, prioritizing defense contracts. For international cooperation and exchange, the United States takes particular caution in terms of confidentiality to prevent potential rivals from acquiring its sensitive technologies.

Learning from the United States' lessons, in our own military-civil fusion process, we could consider encouraging prototype competition and compensating unsuccessful competitors in development projects, create an environment of fair competition in acquisition, and increasingly protect small- and medium-size enterprises. The ultimate objective of the military-civil fusion strategy is national defense. Therefore, national security must be recognized as the bottom line by precisely defining and strictly upholding confidentiality, restricting the export of advanced weapons and high-tech products, maintaining an appropriate level of independent capability among our armed forces, and prioritizing defense contracts.

(5) The management of the military-civil fusion legal framework

As shown in the case of the United States, a comprehensive legal framework must be implemented by specific entities. Coordinating organizations could be established to streamline certain domains. This architecture cannot be reversed, i.e. having a military-civil fusion strategy propelled by a coordinating organization alone, without any specific entity in charge of implementation.

The United States' legal framework is spearheaded by the Department of Defense, with coordination from military and government departments. The Department of Defense has been reformed for this very purpose. For example, the formation of the Defense Contract Management Agency (DCMA) and the OTT, adjustments made to the Defense Advanced Research Projects Agency (DARPA), and the establishing of coordinating organizations such as the "Single Process Initiative" executive committee.

The Department of Defense, together with relevant departments, has formed a series of coordinating organizations responsible for specific domains and matters. Some examples are the Nuclear Weapons Council (NWC) and the Aerospace Technology Committee (航空航天技术委员会) formed jointly with the Department of Energy (in charge of the nuclear weapons

industry) and NASA (in charge of aeronautics and astronautics), respectively. In 1993, the United States established the Defense Technology Realignment Committee (国防技术转轨委员会). The Committee, serving as the coordinating organization driving the realignment of defense technologies, is headed by the director of DARPA's Defense Sciences Office, with members drafted from the National Institute of Standards and Technology (NIST) under the Department of Commerce, the National Science Foundation (NSF), NASA, the Department of Energy, and the Department of Transportation.