

Defense Equipment and Technology Cooperation and Intellectual Property Strategy*

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Abstract

From an intellectual property (IP) angle, this paper reconsiders technical outputs related to defense equipment that are produced in various processes and forms. It then examines the management of such IP. First, this paper assesses IP management in the United States in the context of its pro-patent and innovation policies and analyzes the effectiveness of the Bayh-Dole system. Secondly, it considers the IP management issues facing the Japan Ministry of Defense. This paper concludes with recommendations for making effective use of IP for defense equipment and technology cooperation pertaining to: (1) clarifying the attribution of technical outputs produced from government contracts; (2) protecting undisclosed technical information (trade secrets) and promoting its usage; and (3) the handling of IP in international joint development and production projects.

Introduction

In postwar Japan, a country with no military arsenals, the Japan Ministry of Defense (MOD) develops defense equipment with the cooperation of the defense industry departments of the private sector. For many years, it was principally MOD and the Self-Defense Forces (SDF) that commissioned the production of defense equipment developed in Japan and deployed them.¹ All intellectual property (IP) arising from the development process, such as design drawing and test data, were considered to belong to the national government. Providing such IP to a third party did not present any issues to both the government and companies, even if detailed rights related to the use and disposition of the IP were not requested at the time of signing the contract. However, the

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¹ Ministry of Defense, "Strategy on Defense Production and Technological Bases," June 2014, <http://www.mod.go.jp/atla/soubiseisaku/soubiseisakuseisan/2606honbuneigo.pdf>.

establishment of the Three Principles on Transfer of Defense Equipment and Technology, which in turn has enabled the transfer of defense equipment and technologies from Japan to overseas,² merits a review of whether it is appropriate policy to continue with the present acquisition system of defense equipment, including the conventional system of research and development (R&D). In particular, the conventional approach to government contracts is becoming no longer adequate for addressing the rights of companies to use and dispose IP in scenarios such as international competitive biddings. If the Japanese government intends to promote defense equipment and technology cooperation, a proper review is needed of the attribution of outputs relating to the developed equipment, from the perspective of IP applications.

For example, in late November 2015, Japanese companies were permitted by the National Security Council of Japan to participate in Australia's selection process for its Future Submarine Program³ but ultimately lost the bid to a French company. According to press reports, the Japanese submarine, the initially projected winner based on overall capabilities, lost in the selection bid, due in part to Japan's lack of concrete proposals to Australian authorities regarding technology transfer and production transfer.⁴ Between Japan and India, a Joint Working Group (JWG) has been established for bilateral cooperation on equipment and technology related to the US-2 amphibian rescue aircraft, and discussions are under way.⁵ The Government of India encourages foreign companies to participate in India's defense industry; meanwhile, it demands that technology transfer or production transfer make up 30% or more of the added value as a trade-off for exporting foreign companies' defense equipment to India.⁶ At the very least, rights regarding the use and disposition of the IP developed by suppliers should be clarified as part of the added value for conducting technology transfer and production transfer.⁷

Based on the lessons learned from the challenges Japan faced in the negotiation process

² Cabinet Secretariat, "Three Principles on Transfer of Defense Equipment and Technology," April 1, 2014, <http://www.cas.go.jp/jp/gaiyou/jimu/pdf/bouei2.pdf>.

³ Ministry of Economy, Trade and Industry, "Boei Sobi no Kaigai Iten wo Mitome eru koto to shimashita: Goshu Shorai Sensuikan no Kyodo Kaihatsu Seisan wo Wagakuni ga jissshi suru koto to natta baai no Koseihin Nado no Goshu e no Iten ni tsuite [Approval of Overseas Transfer of Defense Equipment: The Transfer of Components and Technical Information to Australia in the Event that Japan Jointly Develops and Produces Australia's Future Submarines]," <http://www.meti.go.jp/press/2015/11/20151126003/20151126003.html>.

⁴ "Prime Minister, Minister for Defence - Joint media release - Future submarine program," Department of Defence of Australian Government, <https://www.minister.defence.gov.au/minister/marise-payne/media-releases/prime-minister-minister-defence-joint-media-release-future>; Colin Packham, Nobuhiro Kubo and Tim Kelly, "Go Sensuikan no Kyodo Kaihatsu Aite wa Futsu ni Gunbai, Nihon Yabureru [France Wins Contract to Jointly Develop Australian Submarine, Japan Loses]," *Reuters*, April 26, 2016, <http://jp.reuters.com/article/australia-submarines-pm-idJPKCN0XN067?sp=true>; and Tadashi Sano, *Sensuikan no Mekanizumu Kanzen Gaido* [Submarine Mechanism Complete Guide] (Tokyo: Shuwa System, 2016), p. 43.

⁵ Ministry of Defense, *Defense of Japan 2016*, p. 367.

⁶ Marie Izuyama, "Indo no Sobi Chotatsu: Kaite kara Tsukurite e? [India's Defense Procurement: From Buying to Making?]" *Boei Kenkyusho Kiyo* [NIDS Security Studies], vol. 18, no. 2 (February 2016), pp. 23-43.

⁷ Ministry of Defense, "Dai 5 kai Boei Sobi Gijutsu Iten ni kakaru Shokadai ni kansuru Kentokai Shiryo 2 [Fifth Meeting of the Study Committee on Issues of the Transfer of Defense Equipment and Technology, Reference 2]," <http://www.mod.go.jp/j/approach/agenda/meeting/sobi-gijutsuiten/sonota/sonota.html>; and Titli Basu, "Make in India and India-Japan Defence Cooperation," Japan-India Defense Study Workshop 2017 (February 8-9, Tokyo).

with Australia, India and Kingdom of Thailand,⁸ and by referring to the success cases of other countries, Japan needs to design a system of incentives to promote the attribution of rights to IP, its appropriate protection, and applications,⁹ in order to advance defense equipment and technology cooperation going forward.¹⁰

This paper presents an overview of IP management for maintaining international competitiveness as it pertains to IP management at MOD, with primary focus on the United States. It then examines and discusses the circumstances of IP management of defense equipment and its challenges. Lastly, it proposes measures for making effective use of IP for defense equipment and technology cooperation.

1. IP Application in the United States

(1) Pro-patent system and innovation promotion policy of the federal government

In the end of the 1970s, the U.S. economy suffered from stagflation and “twin deficits”—a significant budget deficit and current account deficit.¹¹ Consequently, concerns grew about a decline in the United States’ international competitiveness, and nonpartisan discussions unfolded at Congress and other forums on the desirable science and technology policy and patent system. The Patent and Trademark Law Amendments Act (Pub. L. 96-517, December 12, 1980)¹² enacted in 1980, the so-called Bayh-Dole system,¹³ was aimed at advancing practical uses of publicly-funded research outputs for the purpose of strengthening the international competitiveness of the United States.¹⁴ In addition, measures were promoted, such as the commercialization of inventions from public R&D programs, participation of small- and medium-sized enterprises (SMEs), and industry-university partnership (Small Business Innovation Research [SBIR] / Small Business Technology

⁸ Naohisa Hanzawa, “Boei Ofureko Hodan [Off-record Conversation on Defense],” *Sankei Shimbun*, November 9, 2017, <http://www.sankei.com/premium/print/171109/prm1711090006-c.html>; and Shinichi Akiyama, “<Mitsubishi Denki> Taigun no Nyusatsu ni Sanka Kokusan Boku Reedaa [Mitsubishi Electric to Participate in Thai Military Tender: Indigenous Air Defense Radar],” *Mainichi Shimbun*, February 11, 2018, <https://mainichi.jp/articles/20180225/k00/00m/020/179000c>.

⁹ Ministry of Finance, “Zaisei Seido Bunkakai (Heisei 29 nen 10 gatsu 31 nichi) Shiryō 3 [Fiscal System Subcommittee Meeting (October 31, 2017) Reference 3],” p. 20, http://www.mof.go.jp/about_mof/councils/fiscal_system_council/sub-of_fiscal_system/proceedings/material/zaiseia291031.html.

¹⁰ According to press reports, MOD is considering the export of the FPS-3 air surveillance and traffic control radar to Republic of the Philippines. “Firipin ni Boukuu Reedaa [Exporting Air Surveillance Radar to Republic of the Philippines],” *Nihon Keizai Shimbun*, December 8, 2018, <https://www.nikkei.com/article/DGKKZO38682730X01C18A2EA3000/>.

¹¹ Ojiro Omura, *Okane no Nagare de Saguru Gendai Kenryokushi* [History of Modern Power Examined from Flow of Money] (Tokyo: Kadokawa, 2016), pp. 172-183.

¹² Mikang Hong, “Beikoku Bai Dooru ho 28 nen no Kozai: Arata na Sangaku Renkei Moderu no Mosaku mo [Pros and Cons of 28 Years of the U.S. Bayh-Dole Act: Exploring a New Industry-Academia Partnership Model],” *Sangakukan Renkei Jaanaru* [Journal of Industry-Academia-Government Collaboration] (January 2009), p. 1, https://sangakukan.jp/journal/journal_contents/2009/01/articles/0901-02/0901-02_article.html.

¹³ A system of attributing the IP rights pertaining to the R&D commissioned with government funding to the contracting company in order to increase industry competitiveness.

¹⁴ Eiichi Yamaguchi, *Inobeeshon wa naze Todaetaka: Kagaku Gijutsu Rikkoku Nihon no Kiki* [Why Did Innovation Cease? Crisis Facing the Science and Technology-Oriented Country of Japan] (Tokyo, Chikuma Shobo, 2016), pp. 58-104; and Hiroyuki Matsumura, “Beikoku ni okeru Gunmin Ryoyo Gijutsu Kaihatsu Purojekuto no Bunseki: Nashonaru Inobeeshon Shisutemu no Shiten kara [Analysis of Military-Civilian Technology Development Projects in the United States: From the Perspective of National Innovation System],” *Report Papers from the 65th Annual Meeting of the Japan Society of International Economics*, October 14-15, 2006 (Nagoya), https://www.jsie.jp/Annual_Meeting/2006f_Nagoya_Univ/jsie9bb.pdf.

Transfer [STTR]).¹⁵ In 1985, the President’s Commission on Industrial Competitiveness submitted the “Young Report”¹⁶ to President Ronald Reagan, a report intended for restoring the international competitiveness of the U.S. economy. The report recommended de-industrialization and shifting to a knowledge-based society, and urged the government to implement a so-called pro-patent policy as a key tool to this end. As a result, the U.S. science and technology policy and patent system largely shifted gears from banning monopoly to protecting and applying IP rights. Furthermore, institutional supports were provided for the promotion of the information and communications technology (IT) industry, the biotechnology industry, and other industries that would drive the U.S. economy.¹⁷

There has been continued support for this basic strategy, i.e., making use of science and technology research outputs as IP and maintaining competitiveness through technology innovation. Two decades after the “Young Report” in 2004, the “Palmisano Report”¹⁸—a compilation of requests regarding the government’s innovation promotion—was unveiled. The report makes policy recommendations in the three areas of “talent,” “investment,” and “infrastructure.” Meanwhile, the government has maintained economic growth and international competitiveness through such measures as the National Innovation Initiative (NII). While it is difficult to quantitatively assess the effects of the U.S. pro-patent and innovation promotion policies, it can be observed that IP applications have risen in the United States, with the technology trade balance increasing by an average of 7% between 1970 and the submission

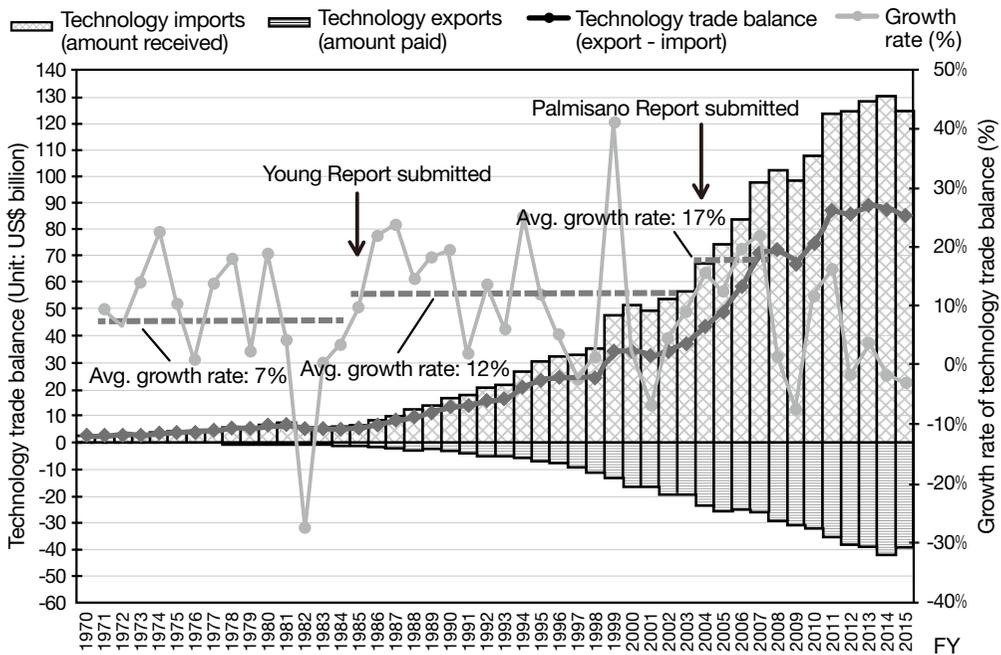


Figure 1 U.S. technology trade balance

Source: This figure was created using data based on the World Bank’s database.

¹⁵ Ibid.

¹⁶ President’s Commission on Industrial Competitiveness, *Global Competition: The New Reality*, Vol. 1 (1985).

¹⁷ Ikuya Yoshida, “Inobeeshon to Kagaku Gijutsu [Innovation and Science Technology],” *Technical Report of Mizuho Information & Research Institute, Inc.*, vol. 1, no. 1 (December 2007), pp. 1-10.

¹⁸ Council on Competitiveness, *Innovate America: Thriving in a World of Challenge and Change* (2004).

of the “Young Report,” 12% until the submission of the “Palmisano Report,” and 17% until 2007, the year before the global financial crisis, as shown in Figure 1.¹⁹

(2) Attribution of IP rights at the U.S. Department of Defense

This section provides an overview of the handling of IP related to government procurement at the U.S. Department of Defense (DoD).²⁰

Since shortly after World War II, the U.S. DoD has consistently maintained the “contractor ownership” principle of awarding patents to contractors and has sought to achieve spin-offs from military technology.²¹ This was because of the “secrecy order” system²² of U.S. patent law. Namely, the U.S. government is able to issue a secrecy order for military technology it does not want disclosed, which prevented its disclosure until DoD lifted the order. This enabled the U.S. government to manage military technology uniformly, even if its right to a patent was awarded to a contractor. After the Bayh-Dole system was introduced, the Federal Acquisition Regulation (FAR), applicable to all departments and agencies, and its supplement, the Defense Federal Acquisition Regulation Supplement (DFARS), made clear that IP rights are awarded to U.S. contractors in contracts signed with U.S. DoD.

Of the IP emerging out of government contracts, patent rights and copyrights are recognized under the Bayh-Dole system. Copyrights are further classified into “rights in technical data” (Table 1), i.e., undisclosed recorded information of a scientific or technical nature, and “rights in computer software and computer software documentation” (Figure 2) comprised of computer programs, source code, algorithms, processes, flow charts, and related material. Under the Bayh-Dole system, attribution of IP rights to contractors still guaranteed that the government has free use rights and other rights to the IP. As for patent rights, the government has non-negotiable non-exclusive licensing rights to the invention, and the contractor can choose to have or not have right of ownership. If the contractor chooses to have right of ownership, they would assume commercialization responsibilities.

¹⁹ David Teece, *The Transfer and Licensing of Know-How and Intellectual Property* (Hackensack: World Scientific, 2008).

²⁰ The Society of Japanese Aerospace Companies, “Seifu Keiyaku ni okeru Chiteki Zaisan no Gaikan: Obei Shokoku to Nihon tonon Hikaku [Overview of Intellectual Property in Government Contracts: Comparison between the U.S./European Countries and Japan],” August 2015.

²¹ Takahiro Mitsuse, “Beikoku Sangyo Kyosoryoku Seisaku ni okeru Bai Dooru Ho no Ichi [Positioning of the Bayh-Dole Act in U.S. Industry Competitiveness Policy],” *Amerika Keizaishi Kenkyu* [Journal of American Economic History], no. 8 (October 2009), pp. 19-38.

²² Yukio Aminaka, “Beikoku ni okeru Ekonomikku Sekyuriti to Himitsu Tokkyo [Economic Security and Secret Patents in the United States],” *Joho Shori Gakkai Hokoku* [Report of the Information Processing Society of Japan], vol. 2012-DPS-152 no. 18 (October 2012), pp. 1-6.

Table 1 Limits on the handling of technical data imposed on the government

	Unlimited rights of the government	Limited rights of the government	U.S. government purpose rights
Category of rights possessed by the government	(1) Rights to use, modify, reproduce, perform, display, or disclose technical data in whole or in part, for any purpose whatsoever. The government may also license others to do so. (2) Basis provision: DFARS 257.227-7013(a) (15)	(1) Rights to use, modify, reproduce, perform, display, or disclose technical data in whole or in part, “within the government” (2) The government may not, without the written permission of the party asserting limited rights, release or disclose the technical data outside the government, use the technical data for manufacture, or authorize the technical data to be used by another party.	(1) Rights to use, modify, reproduce, perform, display, or disclose technical data in whole or in part, “within the government” without restriction, or rights to disclose technical data outside the government for U.S. government purposes, for a five-year period (2) When the five-year period expires, the government will have unlimited rights to technical data.
Funding terms in the contract	1. If the government can acquire unlimited rights (1) Item developed exclusively with government funds (2) If data is contained in the technical manual* furnished by the contractor *Includes repair, maintenance, and operation manuals. (3) Basis provision: DFARS 227-7103-5(a), etc. 2. Contractors or subcontractors (owners) can use it in the same manner, or can authorize others to use it.	1. If the government can have rights with restrictions (1) Item developed exclusively with private funds→The government is only granted restricted performance right. (2) Basis provision: DFARS 227-7103-5(c), etc. 2. Exception (1) If the data is needed for emergency repair and overhaul (2) If the data will be disclosed or released to foreign governments from which the government will benefit, etc.	1. If the government can have government purpose rights (1) Item developed with both private and government funds (2) Basis provision: DFARS 227-7103-5(b), etc.

Source: Prepared with some additions and revisions based on The Society of Japanese Aerospace Companies, “Seifu Keiyaku ni okeru Chiteki Zaisan no Gaikan: Obei Shokoku to Nihon tonu Hikaku [Overview of Intellectual Property in Government Contracts: Comparison between the U.S./European Countries and Japan]” (August 2015).

With regard to “rights in technical data,” as shown in Table 1, the government acquires either “unlimited rights,” “limited rights,” or “government purpose rights” depending on the amount of government funding. With respect to “rights in computer software and computer software documentation,” the government acquires either “unlimited rights,” “restricted rights,” “government purpose rights,” “specifically negotiated license rights,” or “commercial purpose rights” depending on the amount of government funding.

As regards the application of patents in U.S. DoD contracts, during the Cold War, both the government and companies wanted a stable system of weapons development and production. During this period, the outputs of government contracts were attributed to contractors, as a result advanced defense technologies were spun off into consumer products. The positioning of defense technology changed following the Cold War. For example, in the U.S. Defense Science Board’s (DSB) 1999 report, it was anticipated that in parallel with globalization, the U.S. defense industry would be reconstituting itself into a more international and integrated industry, would be increasingly supplying to and from other countries, and would be utilizing more civilian technology

for defense production.²³

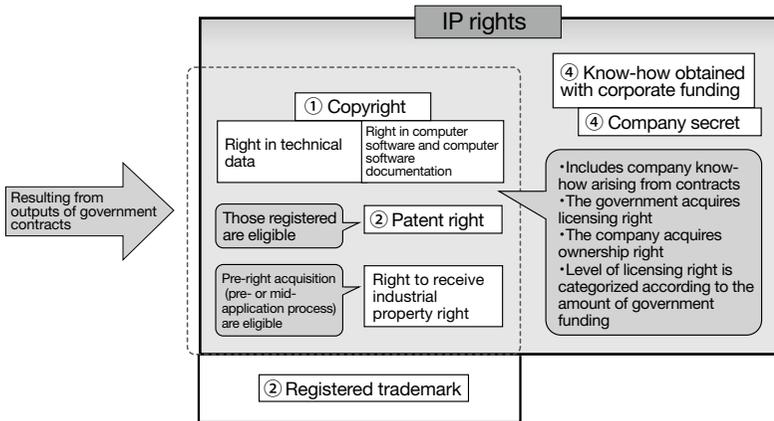


Figure 2 Handling of IP emerging out of government contracts in the United States

Source: Prepared based on The Society of Japanese Aerospace Companies, “Seifu Keiyaku ni okeru Chiteki Zaisan no Gaikan: Obei Shokoku to Nihon tonon Hikaku [Overview of Intellectual Property in Government Contracts: Comparison between the U.S./European Countries and Japan]” (August 2015).

In fact, through universities and research institutes, the end of the Cold War witnessed a rapid expansion in the use and development of technologies originating from R&D programs of defense technology, such as semiconductors, the internet, and global positioning system (GPS). This, in turn, has made U.S. information and communication industries more internationally competitive.²⁴ Technological breakthroughs were made at speeds far outpacing defense purpose R&D programs, and diverse applied technologies were developed. As a result, efforts are under way to spin on their outputs into defense technologies again, under the leadership of the Defense Advanced Research Projects Agency (DARPA).²⁵ Such schemes require institutional arrangements premised on the integration of government and private funding in DoD government contracts. The DoD divides IP rights between the public and private sectors based on the amount of government funding, and provides incentives to incorporate private funding.²⁶ Based on examples of pro-patent policies, including the U.S. Bayh-Dole system, this policy has also been introduced in European countries and Australia as a means to increase industry competitiveness. As the boundaries between civilian and defense technologies become increasingly blurred, these countries appear to be succeeding in the acceleration of the spin-off and spin-on cycle.²⁷ While it is difficult to assess the impact of state-led innovation policies, including the U.S. Bayh-Dole system, the World Intellectual Property

²³ Heigo Sato, “Guroobaruka suru Boei Sangyo to Yushutsu Kanri [Globalizing Defense Industry and Export Control],” in Kazuto Suzuki, *Gijutsu, Kankyo, Enerugii no Rendo Risuku* [Chain of Risks: Technology, Environment and Energy] (Tokyo: Iwanami Shoten, 2015), pp. 165-202.

²⁴ Ibid.

²⁵ Center for Research and Development Strategy, Japan Science and Technology Agency, “Beikoku DARPA (Kokubo Koto Kenkyu Keikakukyoku) no Gaiyo (ver.2) [Overview of U.S. DARPA (Defense Advanced Research Projects Agency)],” September 2014, <https://www.jst.go.jp/crds/report/report06/US20140901.html>.

²⁶ Yamaguchi, “*Inobeeshon wa naze Todaetaka: Kagaku Gijutsu Rikkoku Nihon no Kiki*,” pp. 58-104.

²⁷ Haruaki Deguchi, *Nihon no Mirai wo Kangaeyo* [A Look at the Future of Japan] (Tokyo: CrossMedia Publishing, 2015), pp. 290-336.

Report 2015 released by the World Intellectual Property Organization (WIPO) carries out case studies of airplanes, antibiotics, and semiconductors and concludes that state-led major innovation policies undertaken in Europe and the United States were effective.²⁸

(3) IP management related to technical data in U.S. government contracts

With regard to rights in technical data, as shown in Table 1, the government may not disclose technical data that has been obtained with 100% private funding outside the government, without the consent of the contracting company, even if the disclosure was for the purpose of producing the relevant product. Accordingly, government contract programs have contract arrangements that enable companies to invest their own funds in R&D without having to worry about IP right infringements.

The system of territorial law forms the foundation of IP rights with each country having different legal systems. Rights in technical data protected by copyright in the United States are not protected by the Copyright Act of Japan and instead are protected by industrial property right in a broad sense under “trade secret” in the Unfair Competition Prevention Act. The Young Report mentioned earlier states that, in order to restore the international competitiveness of the United States, it needs to strengthen the protection of IP rights, which has been unduly limited due to antitrust laws. The Report recommends: “The U.S. Government must improve the protection that U.S. intellectual property laws provide to U.S. technology. The Government must also work aggressively in the international community to ensure that intellectual property rights are adequately protected abroad.” Subsequently, the United States actively protected its production technologies as undisclosed technical information. The United States noted that Japan makes little contribution to basic research and attacked Japan, arguing that it was free riding on technology; meanwhile, production technologies owned by industries were targeted.²⁹ Against this backdrop, FAR and DFARS allow the United States to issue special clauses that give unlimited rights to all technical data obtained to the U.S. government when it enters into a contract with a company from a country other than the United States and Canada, irrespective of the funding source.

Regarding the handling of IP related to global joint development and production programs often conducted in the United States and Europe in recent years, FAR (Part 27.302(b)(1)) states that the U.S. government may claim government ownership of IP rights, without authorizing ownership to a contractor that is a non-U.S. company. Similarly, DFARS Clause 252.227-7032 (Rights in technical data and computer software (foreign)) provides that, “The United States Government

²⁸ World Intellectual Property Organization (WIPO), “Chapter 2 Historical Breakthrough Innovations,” in *World Intellectual Property Report 2015*, pp. 49-93, <http://www.wipo.int/publications/en/details.jsp?id=3995&plang=EN>.

²⁹ Yutaka Kawamura, “Kokusai Hikaku ni yoru Kagaku Gijutsu Seisakushi no Kosatsu: Kyochogata Kagaku Gijutsu Seisaku to Gunmin Ryoyo Gijutsu to iu Futatsu no Shitenkara [Examination of the History of Science and Technology Policies by International Comparison: From the Two Perspectives of Cooperative-Type Science and Technology Policy and Military-Civil Dual-Use Technologies],” *Ritsumeikan Keieigaku* [Riteumeikan Business Review], vol. 52, no. 2-3 (November 2013), pp. 111-134; and Kenji Hanawa, “Waga Kuni Kigyo no Chiteki Zaisan Yuko Katsuyo ni mukete: Kigyonai no Hichukaku Gijutsu to Kankyo Gijutsu no Katsuyo wo Chushin ni [Towards the Effective Use of Intellectual Property of Japanese Companies: Utilizing Non-Core Technologies and Environmental Technologies within Companies],” *Nihon Seisaku Toushi Ginko Chosa* [Development Bank of Japan Survey], no. 84 (July 14, 2005), pp. 12-14, <http://www.dbj.jp/reportshift/report/research/index.html>; and James Fallows, “Containing Japan,” *The Atlantic*, May 1989 Issue, <https://www.theatlantic.com/magazine/archive/1989/05/containing-japan/376337/>.

may duplicate, use, and disclose in any manner for any purposes whatsoever, including delivery to other governments for the furtherance of mutual defense of the United States Government and other governments, all technical data including reports, drawings and blueprints, and all computer software, specified to be delivered by the Contractor to the United States Government under this contract,” such that the contract is advantageous to the U.S. government and offers favorable treatment to U.S. companies.

2. IP Management in Japan and the Challenges of the Ministry of Defense

(1) Legal positioning of industrial property rights within IP rights

In 2004, Kawasaki Heavy Industries provided technology to China’s Ministry of Railways for a high-speed rail line project. This case is now seen as an example of failure to protect IP, the source of a company’s competitiveness, in China.³⁰ Based on such lessons learned about overseas technology and production transfers, Japan must urgently develop IP protection measures in order to prevent unintended outflow of IP related to defense technologies.³¹

In Article 2 of the Intellectual Property Basic Act (Act No. 122 of 2002), IP in Japan is defined as: “inventions, devices, new varieties of plants, designs, works and other property that is produced through creative activities by human beings (including discovered or solved laws of nature or natural phenomena that are industrially applicable), trademarks, trade names and other marks that are used to indicate goods or services in business activities, and trade secrets and other technical or business information that is useful for business activities.” Such kind of IP may be categorized into two types. The first type is spiritual creative activities by human beings in the realm of industry or culture. The second type includes identification markers in industry activities.³² IP relating to defense equipment constitutes the first type. They are primarily patent rights, utility model rights, design rights, trade secrets, which belong to industrial property rights, or rights related to the outputs of creative activities for industry development, as well as copyrights that protect written/verbal works, diagrammatic works, and other works such as computer programs.

Industrial property rights in a narrow sense that are highly competitive in nature, such as patent rights, utility model rights, and design rights, recognize absolute exclusive monopoly rights in industry activities. As they thus have a considerable direct impact on the development of a national economy, the system of territorial law applies as a general rule.³³ This means that industrial property rights registered in Japan have rights only in Japan. Copyrights, on the other hand, only recognize relative exclusive monopoly rights. As they thus involve less conflicts of national interests, territoriality has been eased for both the establishment and the force of copyrights under the Berne Convention and Universal Copyright Convention. In other words, any member country of

³⁰ Norihiko Shirouzu, “Train Makers Rail Against China’s High-Speed Designs,” *The Wall Street Journal*, November 17, 2010, <https://www.wsj.com/articles/SB10001424052748704814204575507353221141616>.

³¹ Eugene B. Skolnikoff, *The Elusive Transformation: Science, Technology, and the Evolution of International Politics*, trans. Taizo Yakushiji and Kiyofuku Chuma (Tokyo: NTT Publishing, 1995), pp. 132-253.

³² Nobuo Monya, *Chiteki Zaisankenho Gairon (Dai 3 Ban)* [Introduction to Intellectual Property Rights Legislation (3rd Edition)] (Tokyo: Yuhikaku Publishing, 2012), p. 1.

³³ Hiroyuki Nishiguchi, “Gaikoku Tokkyoken no Hogo to Zokuchishugi [Protection of Foreign Patent Rights and Territoriality],” *Heian Jogakuin Daigaku Kenkyu Nenpo* [Heian Jogakuin University Journal], no. 7 (March 2007), pp. 1-3.

the conventions may enjoy and exercise the rights related to copyrights.³⁴ In implementing defense equipment and technology cooperation, it is necessary to give consideration to such differences in territoriality over industrial property rights for which rights have been developed only in Japan and take steps to ensure that the IP of Japan's equipment and technologies are protected appropriately in partner countries.

(2) Mechanisms for IP management at defense-related companies

Based on the Basic Act on Science and Technology enacted in 1995, Japan initiated supports for basic research, and both companies and the government increased R&D spending.³⁵ In March 2003, the Intellectual Property Strategy Headquarters was established in the Cabinet Office with a view to protecting technology as IP. Every year, the Intellectual Property Strategy Headquarters formulates Japan's IP strategy in the form of the Intellectual Property Strategic Program.³⁶

In 2003, following the establishment of the Intellectual Property Strategy Headquarters, the Ministry of Economy, Trade and Industry (METI) formulated the Guidelines on the Acquisition and Management of Intellectual Property. It requests the business community, which accounts for roughly 80% of Japan's R&D spending, to set out in their business strategies that IP is a source of the competitiveness of companies and to incorporate this concept into their business activities. The Guidelines asks that the business community develop a trinity of business strategy, R&D strategy, and IP strategy as one of the elements for maximizing profitability and corporate value.³⁷ In Japan, however, notwithstanding the fact that the defense business and consumer business departments coexist in the same company, the defense business department in the company has its own IP management system. This is done to meet rules on confidentiality and information security of procurement contracts with MOD. For this reason, the defense business department has been left out of the trinity business strategy.

In the process of developing and mass-producing defense equipment, information equivalent to special defense secrets may be involved in the case of license production of equipment held by

³⁴ Monya, *Chiteki Zaisankenho Gairon (Dai 3 Ban)*, pp. 375-391.

³⁵ Ministry of Education, Culture, Sports, Science and Technology, *White Paper on Science and Technology 2015*, pp. 75-113, http://www.mext.go.jp/b_menu/hakusho/html/hpaa201501/detail/1359576.htm; Kiyotaka Naoe, "Gijutsukan no Yuragi to Gijutsu wo meguru Rinri [Wavering of Technological Outlook and Ethics of Technology]," *Iwanami Koza Gendai 2 Posuto Reisen Jidai no Kagaku / Gijutsu* [Iwanami Course on Contemporary World (2): Science and Technology of the Post-Cold War Era] (Tokyo: Iwanami, 2017), pp. 39-66; and Skolnikoff, *The Elusive Transformation: Science, Technology, and the Evolution of International Politics*, pp. 20-23. The Japanese term "kagaku gijutsu (science technology)" was created in 1941 during World War II and has come into wide usage since then. In this paper, "science" and "technology" are treated as separate matters. The definitions used for "science" and "technology" are those in *The Elusive Transformation: Science, Technology, and the Evolution of International Politics* authored by Skolnikoff, an international political scientist specializing in science and technology policy.

³⁶ Takashi Kugai, "Chiteki Zaisan Senryaku no Hyoka to Kongo no Hoko: Arata na Chizai Seisaku no Kaishi wo [Assessment and Future Direction of the Intellectual Property Strategy: Commencement of New Intellectual Property Policy]," RIETI Policy Discussion Paper Series 10-P-006 (August 2010), pp. 4-6.

³⁷ Kenichiro Senoo, *Gijutsuryoku de Kateru Nihon ga Naze Jigyo de Makerunoka: Kakkiteki na Shinseihin ga Zanzai suru Riyuu* [Why Japan, a Country with Superior Technical Capabilities, Loses in Business: Reasons Why Groundbreaking New Products Fail] (Tokyo: Diamond, 2009), pp. iii-xx; and Japan Patent Office, "Senryakuteki na Chitekizaisan no Kanri ni mukete: Gijutsu Keieiryoku wo Takameru tameni <Chizai Senryaku Jireishu> [Towards the Strategic Management of Intellectual Property: For Increasing Technical Management Ability <Collection of Examples of Intellectual Property Strategy>]," April 2007, pp. 1-3, https://www.jpo.go.jp/torikumi/hiroba/chiteki_keieiryoku.htm.

the U.S. Forces, or information equivalent to specially designated secrets or MOD secrets may be involved in the case of equipment developed in Japan. In special clauses of contracts, MOD stipulates rigorous confidentiality requirements for such secrets. Both the Directive on Protection of Special Defense Secrets and the Directive on Confidentiality were enacted in 1958. They request physical and personnel measures to maintain confidentiality by physically separating the defense business and consumer business departments, including company employees.³⁸ Furthermore, since 2004, MOD has established criteria regarding information security management for documents, drawings, and properties for cases where they do not constitute secrets but could still hinder the execution of operations if they become known recklessly to non-MOD personnel or personnel not involved in the work. In such manner, MOD has requirements in its contracts with defense-related companies stipulating that measures are taken to ensure information security.³⁹ In order to meet such confidentiality and information security requirements of MOD, defense business departments often have their own IP management systems that are not part of the company-wide systems for managing technical information that constitute IP.

(3) Mechanisms for IP management at MOD and introduction of Japanese-style Bayh-Dole system IP of MOD and SDF consists of: IP arising from creative activities conducted by personnel in the course of performing their duties; and IP arising out of R&D activities, such as study, analysis, design, and manufacturing, as well as testing and quality assurance activities, such as evaluation, commissioned under contract by MOD and SDF to companies and research bodies of national research and development agencies. With regard to inventions made by personnel, patents, utility models, and designs (hereinafter “patents, etc.”) are recognized as personnel inventions in accordance with the Directive on Personnel Inventions (Defense Agency Directive No. 46, November 12, 1964). MOD inherits the rights to patents, etc. from the personnel who made the invention and files an application to the Japan Patent Office. Works made by personnel constitute works made in the course of performing their duties pursuant to Article 15 of the Copyright Act (Act No. 48 of 1970), and MOD has authorship rights to the works.

IP arising from contracts is considered national government assets pursuant to the provision of the introductory clause of Article 2 of the National Government Asset Act (Act No. 73 of 1948) and Item 5 of said article, and therefore, the national government has the IP rights. In addition, pursuant to the provision of Article 9 of the Public Finance Act (Act No. 34 of 1947), national government assets may not be transferred or lent without appropriate remuneration. In the case of IP arising from government contracts, all Japanese ministries and agencies, not limited to MOD, had been transferred the right to claim IP from the contracting company. The national government had filed IP applications, and they were turned into rights. Then, in the United States, as a result of the enactment into law of the Bayh-Dole system in 1980, IP that had been protected as national government assets, including military assets, were actively opened up to the private sector and usage of IP was promoted. Based on the view that this contributed to the United States’ recovery

³⁸ Ministry of Defense, “Directive on Protection of Special Defense Secrets” and “Directive on Confidentiality,” http://www.clearing.mod.go.jp/kunrei_web/.

³⁹ Ministry of Defense, “Boei Kanren Kigyo ni okeru Joho Sekyuriti Kakuho ni tsuite [Ensuring Information Security at Defense-related Companies],” <http://www.mod.go.jp/j/approach/others/security/security.html>.

of international competitiveness,⁴⁰ Japan decided to introduce its own Bayh-Dole system⁴¹ in 1999 pursuant to the Act on Special Measures Concerning Revitalization of Industry.

MOD amended the Directive on the Handling of Rights to Patent, etc. Pertaining to Research Outsourcing Contracts and Experimental Contracts (Defense Agency Directive No. 49, October 15, 1973) in 2002 and introduced a Japanese-style Bayh-Dole system, limited to research outsourcing contracts and experimental research contracts.⁴² Meanwhile, of the five categories of contracts handled by MOD (buy-sale contract, production contract, service contract, research outsourcing contract, and experimental research contract⁴³), mass-produced equipment and the building of vessels are considered production contracts and are not covered by the Japanese-style Bayh-Dole system, along with the maintenance, repair, and enhancement of equipment, which are considered service contracts. In contracts in which works of computer programming are delivered under services or production, it remains the case that such works are transferred to MOD pursuant to the Special Provision Clause on Computer Program Copyrights.

The objectives of IP management at MOD have slowly expanded with the introduction of some aspects of the Japanese-style Bayh-Dole system, as shown in Figure 3. It is thought that MOD managed IP as part of its science and technology policy between 1964, when the Directive on Personnel Inventions⁴⁴ was established, and 2002, when the Bayh-Dole system was introduced. During this period, IP could have been licensed to third parties for an appropriate fee pursuant to the provision of Article 9 of the Public Finance Act. However, there are no such case. After the Japanese-style Bayh-Dole system was introduced, IP management was added to Japan's industrial technology policy in light of the purpose of the law's enactment.⁴⁵ Public R&D entities, including MOD, are continuously sought to make effective use of IP obtained as an outcome of R&D. For example, the Intellectual Property Strategic Program 2015 requests that the government study how

⁴⁰ Ministry of Economy, Trade and Industry, "'Nihonban Bai Dooru' ni tsuite (Sangyo Katsuryoku Saisei Tokubetsu Sochiho Dai 30 Jo) [About the Japanese-style Bayh-Dole System (Article 30 of the Act on Special Measures Concerning Revitalization of Industry)]," http://www.meti.go.jp/policy/innovation_policy/bayh-dole.pdf.

⁴¹ The Japanese-style Bayh-Dole system was introduced in 1999 pursuant to the Act on Special Measures Concerning Revitalization of Industry. Since 2007, it has been made into permanent law as Article 19 of the Industrial Technology Enhancement Act, which expanded the scope of eligible IP. By the revision in 2011, a clause was added which requires the consent of the national government for the transfer of patent rights, etc. attributable to contractors.

⁴² Based on the "Resolution of the House of Councillors on the FY1970 Financial Statement (July 1973)" stating that "the industrial property rights arising from R&D which is conducted under research commissioned to private companies by the Defense Agency will be attributed to the national government," the right to receive industrial property rights from contracting companies was transferred to the Defense Agency and applications for rights were filed using Defense Agency funds and rights were attained in this manner until the Bayh-Dole system was introduced.

⁴³ Acquisition, Technology and Logistics Agency, "Soubihin no Chotatsu Seido nado ni Kansuru Joho [Information on System of Equipment Procurement]," <http://www.mod.go.jp/atla/souhon/contract/index.html>.

⁴⁴ Ministry of Defense, "Directive on the Handling of Rights to Patent, etc. Pertaining to Research Outsourcing Contracts and Experimental Contracts," http://www.clearing.mod.go.jp/kunrei_web/.

⁴⁵ Science and technology policy here refers to the measures for promoting science and technology within the scope of the jurisdiction of the Department of Technology Strategy of the Acquisition, Technology and Logistics Agency (ATLA). On the other hand, industrial technology policy has in mind measures pertaining to the defense industry base for providing (i.e., "acquiring") equipment, etc. to the SDF through R&D, procurement, supply, and management, which are under the jurisdiction of the Department of Equipment Policy of ATLA. In short, the Bayh-Dole system is a policy to increase the competitiveness of industrial technologies, and the Departments of Technology Strategy and Equipment Policy must work closely across their departments in order for this system to be implemented efficiently and effectively at MOD.

IP should be managed in the national government’s R&D projects and take necessary measures, while consulting METI’s Guidelines for Intellectual Property Management in Government-commissioned Research and Development.⁴⁶



Figure 3 Objectives of IP management at MOD

Source: Prepared by the author based on “Directive on Personnel Inventions,” “Directive on the Handling of Rights to Patent, etc. Pertaining to Research Outsourcing Contracts and Experimental Contracts,” “Fiscal System Subcommittee Meeting (October 20, 2016) Reference 3,” among other sources.

At MOD, a considerable number of patents have been approved under the Japanese-style Bayh-Dole system since 2002. While the private sector has 100% of the rights in many of these cases, some patents are the result of joint application by the public and private sectors. In very few cases, patents which the public and private sectors jointly applied for have been licensed to third parties.⁴⁷ As regards patents to which the private sector has 100% of the rights, investigation and reporting of the patent’s use are not required in the clauses of the contract as a condition for attributing the rights to the private sector prescribed in Article 3, Item 3 of the Directive on the Handling of Rights to Patent, etc. Pertaining to Research Outsourcing Contracts and Experimental

⁴⁶ Intellectual Property Strategy Headquarters, “Intellectual Property Strategic Program 2015,” p. 50; and Board of Audit of Japan, “Kaku Fusho nado ni okeru Kenkyu Kaihatsu Jigyo no Jisshi Jokyo nado ni tsuite [Implementation Status of the R&D Projects of Ministries],” March 2017, http://www.jbaudit.go.jp/pr/kensa/result/29/pdf/290329_zenbun_2.pdf. With regard to IP of the public sector, universities have the second highest R&D spending after companies. After universities were granted independent corporation status under the National University Corporation Act, they can manage and make use of IP at their independent decision. For more information, see National Institute of Science and Technology Policy, Ministry of Education, Culture, Sports, Science and Technology, *Japanese Science and Technology Indicators 2016*; and Gakuji Ito, “Daigaku ni okeru Chiteki Zaisan no Soshutsu, Kanri, Katsuyo ni mukete: Monbu Kagakusho no Torikumi [Towards the Creation, Management, and Use of Intellectual Property at Universities: The Initiatives of MEXT],” *Nihon Chizai Gakkaiishi* [The Journal of Intellectual Property Association of Japan], vol. 2, no. 1 (2005).

⁴⁷ Based on statistical data obtained from the Japan Platform for Patent Information (<https://www.jplatpat.inpit.go.jp/web/all/top/BTmTopPage>) of the Japan Patent Office and other sources; Ministry of Finance, “Zaisei Seido Bunkakai (Heisei 29 nen 10 gatsu 20 nichi) Shiryo 3 [Fiscal System Subcommittee Meeting (October 20, 2016) Reference 3],” http://www.mof.go.jp/about_mof/councils/fiscal_system_council/sub-of_fiscal_system/proceedings/material/zaiseia281020.html.

Contracts. Consequently, MOD does not have knowledge of the situation of patent applications and usage.⁴⁸

In the Bayh-Dole system, the national government may request, as a clause in the contract, the right to intervene to consent to compulsory licensing to a third party when it is deemed that the contractor to which rights were attributed is not making proper efforts towards the commercialization of the technology. Thus, in the course of implementing defense equipment and technology cooperation, IP management including the Bayh-Dole system is expected not only to increase the competitiveness of individual companies. It is expected to also help maintain technical competitiveness of the entire industry by making use of IP arising from government funding and allowing MOD to consent to licensing to other companies, even if there are companies that withdraw from the defense sector.

(4) MOD’s challenges in managing IP

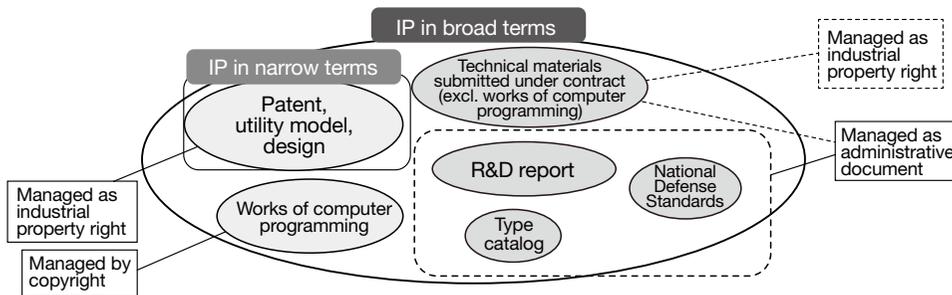


Figure 4 IP management at MOD

Source: Prepared by the author based on “Directive on Personnel Inventions,” “MOD Regulations on Administrative Document Management” “Special Clauses of Research Outsourcing Contract,” among other sources.

At MOD, IP is managed as shown in Figure 4, based on the provisions of laws concerning IP, MOD directives, and contract clauses. MOD’s IP can be broadly divided into “IP in narrow terms,” “works of computer programming,” and “technical materials submitted under contract.” For example, R&D report, type catalog, and the National Defense Standards are positioned as derivative works of “technical materials.” Bearing in mind future implementation of defense equipment and technology cooperation with third parties, a number of challenges remain in each category of IP.

i. IP in narrow terms

The “Directive on Personnel Inventions” and “Directive on the Handling of Rights to Patent, etc. Pertaining to Research Outsourcing Contracts and Experimental Contracts” require that rights to patent, utility model, and design of the industrial property rights be transferred from the inventor, who is a personnel, to MOD. If there is a co-inventor from the private sector (company), rights are attained in the form of joint application by the public (government) and private sectors. In the case of research outsourcing contracts and experimental research contracts, the share of rights owing

⁴⁸ Acquisition, Technology and Logistics Agency, “Soubihin no Chotatsu Seido nado ni Kansuru Joho.”

to the intellectual contribution made by the private sector is retained by the company to which the inventor belongs. If the inventor is with MOD, patent, etc. to which rights have been attained become national government assets and are registered in the Government Asset Register pursuant to Article 1, Paragraph 11 of the Guide on the Government Asset Register (Zairi No. 1859, May 24, 2001). The price registered in the register is the acquisition price, such as the purchase price, or estimate price, and therefore, the costs up to the acquisition of rights are usually recorded.⁴⁹

Meanwhile, in recent years, due to financial constraints, there has been a tendency to experimentally produce, under experimental research contracts, only portions of the equipment that have high technical risks in the R&D phase. As a result, even in the phase of mass production to be conducted under production or service contracts for which intellectual contribution was not anticipated, IP has arisen related to production technologies having high industrial use value. As production and service contracts are not covered by the Bayh-Dole system, IP arising from such contracts should be attributed to the national government. However, clauses of production and service contracts do not contain any provisions regarding the handling of technical outputs. For this reason, MOD is unaware of what IP has arisen, leaving room for complete lack of management of IP.

Article 39 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) protects information, know-how, and experience gained from technical and trade activities as trade secrets and guarantees rights holders a favorable position in competitive activities. In Japan, the former Unfair Competition Prevention Act (Act No. 14 of 1934) was amended in 1990, and trade secrets began to be protected as IP. Unlike other industrial property rights, trade secrets can be protected by not disclosing them. Know-how, etc. pertaining to production technology arising in the above mass production phase are generally not disclosed and are of a nature that should be managed as trade secrets. Nevertheless, MOD does not have a system for contractors to file trade secrets, and furthermore, no system of rules currently exists for the protection of trade secrets.

ii. Works of computer programming

In cases where works of computer programming have been delivered or submitted, their copyrights are transferred to the public sector and moral rights of authors are not exercised pursuant to the Special Provision Clause on Computer Program Copyrights. The Air Material Command Headquarters of the Air Self-Defense Force takes similar measures pursuant to its “General Common Specifications for Computer Programs.” Copyrights are attributed to the public sector as a measure to prevent so-called vendor lock-in and secure an equitable competitive environment in contracts.⁵⁰ With regard to such programs where copyrights are attributed to the public sector, there would be no obligation or incentive for the private sector, i.e., developers, to set aside engineers to maintain and manage source codes unless continuous contracts for maintenance management and development are concluded. For this reason, even if the public sector attempts to reutilize the program in similar projects, its know-how and other information are already lost and the program

⁴⁹ Ministry of Finance, “Kokuyu Zaisan Daicho nado Toriatsukai Yoryo ni tsuite [Guide on the Government Asset Register],” https://www.mof.go.jp/about_mof/act/kokuji_tsuutatsu/tsuutatsu/TU-20010524-1859-14.pdf.

⁵⁰ Japan Electronics and Information Technology Industries Association, “Joho Shisutemu Seifu Chotatsu ni Kansuru Teigen (Dai 2 Ban) [Recommendations on Information System Government Procurement (Version 2)],” April 15, 2008, p. 26, <http://home.jeita.or.jp/is/committee/solution/guideline/080415ITservice/index.html>.

cannot be adequately utilized. It is noted that a new program must then be developed, resulting in higher costs than anticipated. Under the Special Provision Clause on Computer Program Copyrights and other provisions, it is logically possible to reserve know-how, routine, subroutine, and module that are utilized in common (hereinafter “know-how, etc.”) for the private sector. However, it is technically difficult to identify which aspects are reserved, and the private sector thus fears the loss of copyrights, including know-how, etc. that it had from before. There is thus the risk that the private sector will start providing only obsolete technology. On the other hand, with regard to programs where copyrights are attributed to the private sector, developers utilize the programs in other consumer businesses, and therefore, conduct development investments at their own expense, including expansion of functions and version upgrades. This allows the public sector to also utilize the outputs free of charge. Nonetheless, under the existing system, copyrights are transferred to the public sector, and moral rights of authors are not exercised. The contracts hence do not enable the enjoyment of the above advantages.

iii. Technical materials submitted under contract

Technical materials include relevant test reports, basic design statement, detailed design statement, blueprint, product testing guidelines, and product testing outcome report. Parts of test reports may contain raw data. The R&D arm of the Acquisition, Technology and Logistics Agency (ATLA) adopts the policy of protecting technical materials with copyrights.⁵¹ On the contrary, there is the opinion that blueprints and raw data are not recognized as works⁵² and caution must be paid. One solution is to protect blueprints and raw data by not disclosing them under the requirements of trade secrets. However, MOD currently does not have a system of rules in place for the protection of trade secrets.

Technical materials submitted under contract may be treated as goods in production contracts for the mass production of equipment, or in service contracts for the maintenance, repair, and enhancement of equipment. Attention needs to be paid that while right of ownership to the goods is transferred to the public sector at the time of delivery, copyright is attributed to the private sector, i.e., the author (author of the work or corporation, etc. to which the author belongs). If the private sector holds the copyright, it is necessary to obtain the consent of the author for the reproduction, distribution, and disclosure of the technical materials.

3. For Defense Equipment and Technology Cooperation that Leverages IP

A 2015 report⁵³ compiled by the Study Committee on Issues of the Transfer of Defense Equipment and Technology⁵⁴ notes that one of the challenges for the future is to identify mechanisms for

⁵¹ Acquisition, Technology and Logistics Agency, “M&S Guidelines,” October 2015, http://www.clearing.mod.go.jp/kunrei_data/j_fd/2015/jz20151001_00039_000.pdf.

⁵² Tadao Mine, “Sekkeizu no Hogo [Protection of Design Drawings],” in *Patento* [Patents] (January 2006), pp. 27-30; Yuzo Miyama, *Chosakukenho Shosetsu: Hanrei de Yomu 14 Sho Dai 10 Ban* [Detailed Explanation of Copyright Law: Precedents, Chapter 14, Version 10] (Tokyo: Keiso Shobo, 2016), pp. 70-75.

⁵³ “Boei Sobi Gijutsu Iten ni kakaru Shokadai ni kansuru Kentokai Hokokusho [Report of the Study Committee on Issues of the Transfer of Defense Equipment and Technology],” September 30, 2015, <http://www.mod.go.jp/j/press/news/2015/09/30c.html>.

⁵⁴ An advisory council chaired by Dr. Takashi Shiraishi, then President of GRIPS (now Chancellor of the Prefectural University of Kumamoto), which met seven times between December 2014 and August 2015.

disclosing operational and technical information for the transfer of defense equipment and technology. To address this challenge, the report advises: (i) designing a usage fee scheme for technical materials held by the national government; (ii) clarifying the attribution of IP; and (iii) developing an appropriate framework or system for providing and receiving highly confidential information in the case of international joint development and production.⁵⁵ This section discusses the issues of IP management facing MOD and presents tentative proposals to address these issues, while referring to the schemes of other countries.

(1) Attribution of technical outputs obtained from government contracts

i. Expanding the scope of the Bayh-Dole system

Four of the five types of contracts handled by MOD (buy-sale contract, production contract, service contract, research outsourcing contract, and experimental research contract), excluding the buy-sale contract, have an R&D outsourcing component. In particular, configuration management contracts, which are service contracts concluded close to completing the development of equipment or technology, or mass production contracts, which are production contracts, may lead to technical outputs that are sufficiently patentable. To reiterate, patents arising from production and service contracts are attributed to the national government pursuant to Article 2 of the National Government Asset Act. Under the Patent Act and other laws, however, patents are attributed to contracting companies, unless otherwise stated in contract clauses. Thus, under the existing system of IP rules, including contract clauses, the attribution may not be clear for some technical outputs.

When defense equipment and technology contain IP whose attribution is obscure, it is not obvious who has the authority to negotiate the applications of IP, and the scope that can be negotiated becomes unclear. For this reason, such defense equipment and technology cannot be eligible for cooperation. In the future, it will be first and foremost necessary to clarify the rights held by MOD and contracting companies, respectively, so that MOD/SDF and third parties in and outside of Japan may come to the negotiating table and negotiate on defense equipment and technology cooperation projects.

Since IP are managed by the owners of assets, whatever they may be, a department that manages their IP will be necessary if it will be attributed to the national government. The MOD's FY2016 budget was approximately 4.9 trillion yen, of which costs might produce IP made up 42.4% or approximately 2.1 trillion yen, inclusive of costs of R&D, purchasing equipment, and maintenance.⁵⁶ Now compare this with a private company. For example, at Canon Inc., a company considered to be actively managing IP, sales in FY2016 was approximately 3.4 trillion yen, and

⁵⁵ The Advisory Council on Defense Equipment and Technology Policy, chaired by Dr. Shiraishi, then President of GRIPS (now Chancellor of the Prefectural University of Kumamoto), met six times between February 23, 2016 and June 29, 2017. No concrete proposals were made regarding the handling of operational and technical information relating to transfers. Ministry of Defense, "Boei Sobi Gijutsu Seisaku ni kansuru Yushikisha Kaigi Sono hoka no Joho [Advisory Council on Defense Equipment and Technology Policy and Other Information]," http://www.mod.go.jp/j/approach/agenda/meeting/bouei_gijutsu/sonota/jouho.html.

⁵⁶ Ministry of Defense, *Defense of Japan 2016*, pp. 190-193.

over 400 employees belong to the IP department.⁵⁷ By simple comparison, this would mean that MOD needs approximately 250 personnel to effectively manage IP arising from contracts valued at 2.1 trillion yen, which, in reality, is unfeasible. Therefore, MOD may follow the example of the United States and Europe and employ the Bayh-Dole system as a means to actively make good use of IP. Namely, the government would retain the rights to use and dispose technical outputs arising from government contracts, while obligating companies to commercialize the outputs and attributing ownership rights to contracting companies. Taking into account the subsequent growth in the U.S. technology trade balance and other factors, it can be evaluated that the U.S. Bayh-Dole system has delivered some successes as an innovation policy.

As noted above, of the contracts handled by MOD, its production contracts, service contracts, research outsourcing contracts, and experimental research contracts include some outsourcing of R&D and could potentially lead to technical outputs that can become IP. It is thus appropriate that these four types of contracts be made eligible for the Bayh-Dole system. In order to attribute the technical outputs arising from MOD contracts to parties to the contract, it is necessary to expand the eligible contracts and scope of IP provided for in the Directive on the Handling of Rights to Patent, etc. Pertaining to Research Outsourcing Contracts and Experimental Contracts (hereinafter “Bayh-Dole Directive”).

ii. Contracts and attribution pertaining to works of computer programming and trade secrets

The first type of IP rights—patent right, utility model right, design right, trade secret, copyright, and layout-design exploitation right—are technical outputs arising as a result of commissioning some R&D activities for equipment and technology to companies. It is therefore appropriate to make them eligible for the Bayh-Dole system. Patent right, utility model right, and design right are already eligible under the existing directive. Trade secret, copyright, and layoutdesign

exploitation right will likely need to be newly added to be eligible. If the Special Provision Clause on Computer Program Copyrights has been issued for works of computer programming, their copyright will be attributed to the national government. However, both Article 19 of the Industrial Technology Enhancement Act and the Bayh-Dole Directive prescribe that it is optional to attribute the relevant IP to the party to a contract. Accordingly, it would not be inconsistent to make copyright eligible for the Bayh-Dole system if the Special Provision Clause is issued, only when either the national government or the party to a contract chooses to attribute the copyright to the national government.

A more detailed study is needed regarding the attribution of trade secrets to the party to a contract, pursuant to Article 19 of the Industrial Technology Enhancement Act, i.e., the Japanese style Bayh-Dole system. Eligible IP are defined as “patent rights or other rights specified by Cabinet Order” in Article 19. Other rights specified by Cabinet Order are prescribed in Article 11 of the Order for Enforcement of the Industrial Technology Enhancement Act (Cabinet Order No. 206 of 2000) as “a patent right, right to obtain a patent, utility model right, right to obtain a utility model registration, design right, right to obtain a design right, copyright, layout-design exploitation right, right to obtain a registration of the establishment of a layout-design exploitation

⁵⁷ Airi Akama, “Chiteki Zaisan Bumon to Kaihatsu Bumon no Senryakuteki Kyodo: Kyanon no Jirei kara [Strategic Cooperation Between Intellectual Property and Development Departments: The Case of Canon],” *IP Management Review*, no. 17 (June 2015), pp. 67-78.

right, and breeder's right." Trade secrets correspond to "right to obtain a patent, right to obtain a utility model registration, right to obtain a design right, and right to obtain a registration of the establishment of a layout-design exploitation right" (hereinafter "right to obtain a patent, etc."). Specifically, as stated in Q21 in the Q&As related to the "Guidelines on the Status of Consultations between Employers, etc. and Employees, etc. to be Considered in the Case of Stipulating Money or Economic Benefits for Encouraging Inventions in Accordance with Article 35, Paragraph 6 of the Patent Act" (METI Notice [April 22, 2016]), it falls within the scope of "in cases where the invention is not established as a patent right and is retained as a trade secret or know-how."⁵⁸ In other words, MOD must take procedures to attribute the right to obtain a patent, etc. to the party to a contract, and simultaneously, have the party commit to non-disclosure.

iii. Patent pool system

Similar to consumer products, numerous subcontracting companies are involved in the production of a single piece of defense equipment. This tendency will become more pronounced as equipment becomes even more complex and sophisticated. While major companies enter into a contract with MOD as the "prime contractor," the actual production involves companies referred to as "vendors" (subcontracting companies). The production of a tank, escort vessel, and fighter involves approximately 1,300 vendors, approximately 2,500 vendors, and approximately 1,100 vendors, respectively, most of which are small- and medium-sized enterprises (SMEs). Many of these vendors have technologies which no other company has and which are essential for production.⁵⁹ In short, in the case of attributing IP to the party to a contract, IP could be dispersed to each of the more than 1,000 companies making up the consortium.

If the IP of a single piece of equipment is dispersed to multiple companies, the reutilization of this equipment for defense equipment and technology cooperation would involve complex procedures, which in turn could hinder the use of the IP. The same applies to consumer products. As a requirement for applying the Bayh-Dole system, METI's "Guidelines for Intellectual Property Management in Government-commissioned Research and Development"⁶⁰ specifies that before entering into a contract, companies must pledge to the national government to form a patent pool (multiple patent and other rights holders aggregate the patent, etc. owned by the respective rights holders or the authority to license patent, etc. into a corporate or organizational entity [the entities take various forms; new organizations may be established or existing organizations may be utilized], and members and others receive the necessary licenses through the corporate

⁵⁸ Japan Patent Office, "Shishin ni Kansuru Q&A [Q&A on Guidelines]," https://www.jpo.go.jp/seido/shokumu/shokumu_guideline.htm; and 2015 Supreme Court Judgment on Intellectual Property (2014 [Ne], No. 10126), http://www.courts.go.jp/app/hanrei_jp/search7.

⁵⁹ Toyo Keizai Shimbunsha, "Jieitai no Kosuto, Kokuki ya Sensha, Kantei nado wo Kaihatsu, Seizo suru Boei Sangyo no Jittai towa [cost of SDF and Defense Industry that Develops and Manufactures Aircraft, Tanks, Vessels, and Other Assets]," *Shukan Toyo Keizai* [Weekly Toyo Keizai], January 21, 2012, p. 1, <http://toyokeizai.net/articles/print/8455>.

⁶⁰ Ministry of Economy, Trade and Industry, "Guidelines for Intellectual Property Management in Government-commissioned Research and Development," May 2015, <http://www.meti.go.jp/press/2015/05/20150515002/20150515002.html>.

or organizational entity).⁶¹ In addition to METI's measures, MOD requires that the patent pool takes into account units, such as parts and components, for the "transfer of parts and components (including licensed production parts)"⁶² noted in the report compiled by the Study Committee on Issues of the Transfer of Defense Equipment and Technology.

The Bayh-Dole system is intended to attribute rights to the party to a contract on the premise that the IP will be commercialized or utilized. Hence, if the commercialization or utilization of IP is neglected, the national government may exercise right of intervention to make parties make improvements.⁶³ To ensure that right of intervention can function, the New Energy and Industrial Technology Development Organization (NEDO) has made it such that, as a condition for applying the Bayh-Dole system since FY2011, clauses of outsourcing agreements obligate parties to cooperate with IP utilization studies.⁶⁴ It is incumbent on MOD to include this obligation in its contract clauses as well.

(2) Use of undisclosed technical information (trade secrets)

i. Application and protection of trade secrets

The U.S. argument in the 1980s that Japan was free riding on basic technology made the United States, on the one hand, recognize once again that the production technologies that Japan excels in were IP⁶⁵ and steer its IP policy towards heavily protecting such IP. Production technologies consist of information, such as blueprint, test report, technical description, and computer software document, which are not disclosed to the public, are know-how-type recorded information of a scientific or technical nature, and are protected in the United States by technical data right under copyright. On the other hand, it cannot be said that information such as undisclosed know-how can be protected under Japan's Copyright Act. Due to a series of recent cases in which undisclosed know-how that forms the basis of corporate competitiveness leaked from Japanese companies to foreign companies,⁶⁶ significant enhancements were made in 2016 to Japan's Unfair Competition Prevention Act protecting trade secrets, such as undisclosed know-how.⁶⁷ By extension, MOD must

⁶¹ Japan Fair Trade Commission, "Chiteki Zaisan no Riyo ni Kansuru Dokusen Kinshiho no Shishin Dai 3-2-(1)-A [Guidelines on the Anti-Monopoly Act Related to Intellectual Property Use No. 3-2-(1)-A]," <http://www.jftc.go.jp/dk/guideline/unyokijun/chitekizaisan.files/chitekizaisangl.pdf>.

⁶² "Report of the Study Committee on Issues of the Transfer of Defense Equipment and Technology," September 30, 2015, p. 9.

⁶³ Maho Furuya and Toshiya Watanabe, "Bai Dooru Seido no Kakkoku Hikaku [Bayh-Dole System: Country Comparison]," IAM Discussion Paper Series, no. 17 (August 2014), <http://pari.u-tokyo.ac.jp/unit/iam/index.html>.

⁶⁴ New Energy and Industrial Technology Development Organization, "Chiteki Zaisanken ni kansuru Setsumeikai Shiryo [Materials from Briefing on Intellectual Property Rights]," October–November 2016, <http://www.nedo.go.jp/itaku-gyomu/shisan.html>.

⁶⁵ Masahiro Matsumura, *Nichibei Domei to Gunji Gijutsu* [Japan-U.S. Alliance and Military Technology] (Tokyo: Keiso Shobo, 1999), pp. 21-32.

⁶⁶ Office of Intellectual Property Protection, Ministry of Economy, Trade and Industry, "Kinji no Gijutsu Ryushutsu Jirei e no Taisho to Gijutsu Ryushutsu no Jittai Chosa ni tsuite (Responses to Recent Cases of Technology Outflow and Fact-Finding Survey of Technology Outflow)," December 2012, <http://www.meti.go.jp/policy/economy/chizai/chiteki/pdf/121221gijutsuryushutsu.pdf>.

⁶⁷ Ministry of Economy, Trade and Industry, "Fusei Kyoso Boshiho no Koremade no Kaisei ni tsuite [Previous Revisions of the Unfair Competition Prevention Act]," http://www.meti.go.jp/policy/economy/chizai/chiteki/kaisei_archive.html.

also develop rules to enable the application of “trade secrets” prescribed in the Unfair Competition Prevention Act when it enters into contracts with companies.

Regarding the protection of trade secrets, METI has released the “Guidelines on Managing Trade Secrets”⁶⁸ on the minimum measures for managing trade secrets to receive legal protection, and the “Handbook on Protecting Secret Information: For Enhancing Corporate Value,”⁶⁹ which contains examples of sophisticated measures for managing trade secrets, including preventing technology outflow. It would be suitable for MOD to take similar measures by referring to this Handbook, given that it is indispensable for MOD to rigorously manage unclassified technology related to defense and take thorough measures to prevent technology outflow. However, trade secrets in this case are considered undisclosed technical information in Article 5, Item 2 of the Act on Access to Information Held by Administrative Organs (Act No. 42 of 1999), and are different from security “secret” and “specially designated secret” in Article 5, Item 3 of the same Act. For the purposes of document management at MOD, it is reasonable that MOD establish rules to notify the operational guidelines in “Handling of Confidential Documents and Confidential Electronic Computer Information (Notification)” (Bobocho of April 27, 2007).⁷⁰ It is also appropriate that technical information which meets the requirements of trade secrets and is designated security “secret” or “specially designated secret” be managed under more rigorous rules on secret protection.

ii. Access to information on trade secrets

Since trade secrets are a source of company competitiveness, they must enable corporate activities to be implemented more efficiently and smoothly. Furthermore, it is essential that information be easily accessible. With economic globalization leading to a global scattering of R&D and hubs for design, manufacturing, and production, there is an urgent need to balance both smooth access to information in a cloud network / fog computing environment and measures against information leakage. The U.S. DoD, for example, requested contracting companies to comply with NIST SP800-171⁷¹ on the handling of Controlled Unclassified Information (CUI) by the end of December 2017. Its aim was realization of both access and information security in cyberspace.⁷² Private companies already offer solutions for preventing information leakage through public-key cryptography (functional encryption) that allows for advanced functions in complex communication

⁶⁸ Ministry of Economy, Trade and Industry, “Guidelines on Managing Trade Secrets,” <http://www.meti.go.jp/policy/economy/chizai/chiteki/trade-secret.html>.

⁶⁹ Ministry of Economy, Trade and Industry, “Handbook on Protecting Secret Information: For Enhancing Corporate Value,” February 2015, <http://www.meti.go.jp/policy/economy/chizai/chiteki/trade-secret.html>.

⁷⁰ Ministry of Defense, “Handling of Confidential Documents and Confidential Electronic Computer Information (Notification),” http://www.clearing.mod.go.jp/kunrei_web/.

⁷¹ Technology standards established by the U.S. National Institute of Standards and Technology (NIST) to protect Controlled Unclassified Information (CUI) held by companies from cyber attacks.

⁷² U.S. Under Secretary of Defense for Acquisition, Technology and Logistics, “Memorandum for Commander,” September 2, 2017, <https://www.acq.osd.mil/dpap/policy/policyvault/USA002829-17-DPAP.pdf>; Ministry of Economy, Trade and Industry, “Cybersecurity Management Guidelines Revised,” http://www.meti.go.jp/english/press/2017/1116_001.html; Acquisition, Technology and Logistics Agency, “Boei Sobicho no Saikin no Torikumi ni tsuite [Recent Initiatives of ATLA],” June 29, 2017, p. 15, http://www.mod.go.jp/j/approach/agenda/meeting/bouei_gijutsu/sonota/06_a.pdf; “Shasetsu Bei Boei Chotatsu no Genkakuka [Commentary: Stricter U.S. Defense Procurement],” *Nihon Kogyo Shimbun* [Japan Industry Newspaper], February 28, 2018, p. 4; and Hiroyuki Tabata, “Boei Sangyo no Genjo to Kadai [Current Situation and Challenges of the Defense Industry],” *Gekkan JADI* [Monthly JADI], April 2018, pp. 15-16.

environments and communication models, along with consulting services to ensure compatibility with NIST SP800-171.⁷³

The Information-technology Promotion Agency (IPA) of Japan has published “Information Leakage Prevention by Encryption: A Guide,” which recommends encryption as a means for realizing both access to information and information leakage prevention.⁷⁴ METI has held the Public-Private Forum on Trade Secrets three times since 2015. The Forum provides an opportunity for working-level representatives of the public and private sectors to exchange views concerning the latest methods used for stealing/smuggling trade secrets and measures against such attempts. Efforts are under way in concert with cybersecurity measures, including promotion of encryption.⁷⁵ With regard to information that is undisclosed for security purposes in Article 5, Item 3 of the Act on Access to Information Held by Administrative Organs (Act No. 42 of 1999), it would seem suitable to implement rigorous information security measures, such as encryption through common key involving the use of encryption key. Meanwhile, trade secrets are undisclosed technical information and could be treated differently from the handling of undisclosed information for security purposes, and measures such as introduction of new public keys are plausible.

(3) Handling of IP for international joint development and production

i. Management and attribution of critical technologies

The United States and European countries share the view that acquisition of advanced weapons requires building defense equipment and technology systems through joint production of defense equipment among multiple countries, as well as international procurement using technologies found in several nations.⁷⁶ Along these lines, MOD has developed the “Strategy on Defense Production and Technological Bases” to replace the “Guideline for Indigenous Development/Production” of 1970, which promoted independent domestic development and production of equipment and technology. In this manner, MOD seeks to address the prolonged leveling-out of defense spending, greater equipment sophistication, rises in unit costs, and increased momentum for international joint development and production.

Observers note that the F-35 project, a major experimental project of the United States, demonstrates that a country must be technically able to bring in to joint development technologies which have low substitutability and in which it has a comparative advantage, in order to attain a superior position in international joint development and production. The project furthermore shows that it is essential to have a production quota that will bring in business profits in order to

⁷³ Information-technology Promotion Agency, “Angoka ni yoru <Joho Roei> Taisaku no Shiori [Information Leakage Prevention by Encryption: A Guide],” March 20, 2014, p. 2, https://www.ipa.go.jp/security/keihatsu/announce20140320_2.html; and Fujitsu Limited, “Fujitsu Launches Consulting Service to Meet Security Standard for Nonfederal US Organizations and IT Systems,” October 19, 2017, <http://www.fujitsu.com/global/about/resources/news/press-releases/2017/1019-01.html>.

⁷⁴ Ministry of Economy, Trade and Industry, “Eigyo Himitsu: Eigyo Himitsu wo Mamori Katsuyo suru [Trade Secrets: Protecting and Utilizing Trade Secrets],” <http://www.meti.go.jp/policy/economy/chizai/chiteki/trade-secret.html>.

⁷⁵ Ibid.

⁷⁶ Skolnikoff, *The Elusive Transformation: Science, Technology, and the Evolution of International Politics*, pp. 132-253; and Sato, “Guroobaruka suru Boei Sangyo to Yushutsu Kanri,” pp. 165-202.

maintain and develop the domestic industry base.⁷⁷ Technology with a comparative advantage refers to advanced technologies, and industry base with a comparative advantage refers to advanced production skills. The United States and Europe strive to protect vital technologies, which have low substitutability and in which they have a comparative advantage, by treating them as critical technologies in the context of security trade management, and implementing policies for improving corporate competitiveness. The Obama administration has successfully taken advantage of U.S. competitive superiority by implementing export control reforms that integrate the Commerce Control List (CCL) and U.S. Munitions List (USML), eliminating overlaps of the management system, and further clarifying the management of technologies.⁷⁸

ATLA has identified the critical technologies of Japan and controls the technologies in a way that fosters their development and prevents their unintentional outflow.⁷⁹ With respect to such critical technologies, if the international joint development and production project that Japan is participating in involves equipment systems, such as fighters and missiles, where the government plays a leading role in the project design, an option could be to attribute IP rights to the government without applying the Bayh-Dole system upon the creation of basic technologies, from the standpoint of increasing the government's discretion.⁸⁰

ii. Management of foreground IP

For international joint development and production projects, the United States and Europe have provisions regarding the attribution, use, and disposition of background IP, which are technologies participants bring into the project, and foreground IP, which are IP that emerge as an outcome of the project. According to a study and analysis of the Society of Japanese Aerospace Companies, the basic law in the case of the United States is the "US Code Title 10 2350A Cooperative R&D Agreements: NATO Organizations; Allied and Friendly Foreign Countries." The F-35 project is carried out in conformity with this law. In the case of Europe, it is noted that the attribution, use, and disposition of IP related to international joint development and production projects are contingent on the agreements of the Organisation for Joint Armament Cooperation (Organization Conjointe de Coopération en matière d'Armement: OCCAR) or the European Defense Agency's (EDA) "General Provisions Applicable to Ad Hoc Research & Technology Projects and Programmes of

⁷⁷ Sato, "Guroobaruka suru Boei Sangyo to Yushutsu Kanri," pp. 178-189.

⁷⁸ Defense Production Committee, Keidanren, "Beikoku no Boei Sangyo Seisaku ni kansuru Chosa Misshon Hokoku [Report of the Study Mission on U.S. Defense Industrial Policy]," July 1, 2011, <http://www.keidanren.or.jp/japanese/policy/2011/071.pdf>.

⁷⁹ Acquisition, Technology and Logistics Agency, "Boei Sobi Gijutsu Seisaku, Boei Sobi Gijutsu Kyoryoku no Genjo [Policy on Defense Equipment and Technology, Situation of Defense Equipment and Technology Cooperation]," (February 2016), http://www.mod.go.jp/j/approach/agenda/meeting/bouei_gijutsu/sonota/01_b.pdf. The Ministry of Economy, Trade and Industry established the "Guidelines on the Concept which will Become the Standard for the Appropriate Management of Information on Critical Technologies in the Manufacturing Industry" in April 2017 and endeavors to raise Japan's industrial competitiveness and prevent the outflow of critical technologies. For more information, see Tabata, "Boei Sangyo no Genjo to Kadai," pp. 1-7 and http://www.meti.go.jp/policy/mono_info_service/mono/technology_management/.

⁸⁰ Of the three types of defense equipment cooperation categorized by the Ministry of Economy, Trade and Industry ((1) "Governments of two countries→Companies of two countries"); (2) "Government of Japan (Japanese company)→Foreign government"; and (3) "Companies of two countries→Governments of two countries"), those which apply to (2). For more information, see Tabata, "Boei Sangyo no Genjo to Kadai," pp. 21-22.

the EDA” (June 10, 2010).⁸¹

In Japan’s bilateral joint research and development projects, the handling of background and foreground IP has been discussed with the partner country and stated in the Memorandum of Understanding (MOU) and its accompanying Program Agreement (PA), or Letter of Agreement (LOA) for each individual project.⁸² Going forward, if Japan intends to participate in international joint development and production projects with the goal of maintaining the foundation of domestic defense production and technologies and gaining access to advanced technologies, it is imperative that Japan exemplify and unveil a basic policy for participation, similar to the United States and Europe. Only then will the national government have the latitude to take the lead and enter into negotiations and only then will companies feel reassured and be incentivized to participate in international joint development and production, should Japan and the United States or Europe collide over their basic policies.

Conclusion

In terms of contracts for the mass production of domestically developed equipment, Japan had not considered their associated production technologies and technical information as IP of the company in the contract. For this reason, the terms for the application of the IP and measures for protecting them have remained unclear. In order to promote applications of IP, MOD must review existing clauses of the various types of contracts that attribute all outputs to the national government. The public and private sectors should discuss and shift measures towards appropriate classification of technologies and information as IP and towards clear specification of terms regarding the attribution, use, and disposition of IP. Clarification of the relationship of rights will lead to the effective use of the developed technology by the contracting company and create incentives for the appropriate protection of IP. Moreover, with regard to the broad range of technologies and information not covered by the four laws on industrial property rights,⁸³ some rights must be attributed to the contracting company to advance negotiations in such situations as international competitive biddings where companies are the main players. Under Japanese legislation, technical and trade information useful for business activities are protected by the Unfair Competition Prevention Act as IP, namely, trade secrets. It is appropriate that Japan stipulates such information as trade secrets and takes measures to protect them.

Furthermore, MOD needs to understand the significance of the so-called Japanese-style Bayh-Dole system. If some of the rights to IP that were researched or developed as part of defense equipment are attributed to contracting companies, this would realize the objectives of encouraging cooperation on defense equipment and technology, facilitating effective and efficient acquisition of IP, and strengthening international competitiveness. MOD should share this notion with the

⁸¹ The Society of Japanese Aerospace Companies, “Seifu Keiyaku ni okeru Chiteki Zaisan no Gaikan: Obei Shokoku to Nihon tonon Hikaku.”

⁸² Koji Oshima, “Boei Sobihin no Kokusai Kyodo Kenkyu Kaihatsu no Hokosei to Wagakuni no Taio: Gijutsu Shuyakugata Kyodo Kenkyu no Suishin to Sangakukan no Renkei no Arikata wo Chushin to shite [Direction of International Joint R&D of Defense Equipment and Japan’s Response: Focusing on Promotion of Technology-Intensive Joint Research and Industry-Academia-Government Partnership],” *Boei Kenkyusho Kiyo* [NIDS Security Studies], vol. 12, no. 2-3, March 2010, pp. 147-183.

⁸³ Japan Patent Office, “Sangyo Zaisanken ni tsuite (About Industrial Property Rights),” https://www.jpo.go.jp/seido/s_gaiyou/chizai01.htm.

government and finance authorities, and, as much as possible, expand the types of IP and contracts eligible under the Bayh-Dole system. As defense equipment becomes increasingly complex and sophisticated, companies numbering several dozens to sometimes over a thousand are said to be involved in the production as subcontractors of the principal contractor company. In applying the Bayh-Dole system, measures will become necessary like patent pool which enables the mutual use of IP attributed to the respective companies.

Lastly, the increasing performance and price of leading-edge equipment has made it mainstream for countries to develop and produce such equipment by participating in international joint development and production projects, which hold down development and production costs while making use of advanced technologies possessed by allies and partner countries. When participating in such projects, the relationship of IP rights between the government and contracting companies in Japan should be clarified for technologies in which Japan has superiority. Furthermore, Japan should exemplify and unveil a basic policy similar to the United States and Europe regarding the attribution, use, and disposition of technologies produced from advanced technologies brought in to the project by Japan, its allies and partners. By presenting a policy to the domestic and international community, Japanese companies will be able to better predict whether they should invest in defense R&D, upon studying the tradeoffs between the advantages and disadvantages of participating in international projects with the national government. At the same time, if Japan's public and private sectors make united efforts to participate in international joint development and production, Japan will be able to demonstrate its willingness to maintain the foundation of defense production and technology to the United States and Europe, which have swiftly adapted to the globalization of defense production.