The Role of the Ministry of Defense and Self-Defense Forces in Nonproliferation of Weapons of Mass Destruction (WMD): Toward Strengthening WMD Intelligence

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Abstract

The proliferation of weapons of mass destruction (WMD) is a threat to the international community as a whole, and international efforts toward its prevention are continuing. However, North Korea and a few other states are even now in pursuit of the possession of WMD, posing a threat to surrounding states. Moreover, along with concerns about the proliferation of WMD from these states, revelations of the existence of the "Khan Network," which can be considered a black market in WMD, hint at a diversification of proliferation routes. While efforts in response to this situation, including stronger export controls and the Proliferation Security Initiative (PSI), are being taken, the situation does not merit optimism regarding their effectiveness. In addition, such events as North Korea's announcement of a nuclear test, which exposed the deficiencies in Japan's intelligence capabilities, show that further efforts for the prevention of WMD proliferation are needed. The Ministry of Defense and the Self-Defense Forces will surely need to train WMD specialists and special units, and to strengthen intelligence capabilities and expand intelligence contributions through the PSI and other efforts.

Introduction

Proliferation of WMD is a threat not just to Japan but also to the international community as a whole, and international efforts toward its prevention are continuing. Despite these efforts, however, a few states are pursuing possession of WMD, posing a threat to their neighboring countries. The prime example of serious WMD proliferation issues near Japan is the North Korean nuclear development issue. The announcement on October 9, 2006 by North Korea of a nuclear test meant the possibility of a new nuclear-armed nation in Northeast Asia, and could be considered the beginning of a new phase in that country's nuclear development that first surfaced in the 1990s. Furthermore, multiple test firings of ballistic missiles around the same time as that announcement, including of the new Taepodong 2 ballistic missile, showed that development was continuing not just of WMD, but also of its delivery method, and left a strong impression that

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North Korea poses a major WMD proliferation threat. Moreover, North Korea is believed to be actively involved in Iran's nuclear development and missile development, with the result that the WMD proliferation problem near Japan is no longer restricted to the Northeast Asia region, but has evolved into an extremely complex problem that is intertwined with the Middle East WMD proliferation issue.

Moreover, a particular concern of recent years in WMD proliferation has been the actual use of WMDs in terrorist activities, with terrorist use of nuclear weapons being the prime example. This threat rises with the proliferation of nuclear weapons development technology to states feared to have close links with terror organizations, or to states believed to have problems with the security and control of nuclear materials. One example of the existence of this kind of threat is the network created by Abdul Qadeer Khan of Pakistan (the Khan Network), which was revealed to have supplied nuclear technology to North Korea and Iran, while another is the revelation by U.S. intelligence services that North Korea has supported nuclear development in Syria.

As is clear from these facts, WMD nonproliferation efforts by the international community do not always result in perfect success. In addition, proliferation routes have become more diversified in recent years, and countries suspected of proliferation have developed advanced methods for obtaining related technologies, materials, and equipment. As a result, verification of WMD proliferation routes, strengthening of existing efforts, and study of new methods in response to these developments, have become essential in recent years for boosting the effectiveness of proliferation prevention.

In this paper, we first analyze the state of proliferation of WMD-related technologies and equipment in North Korea, the Khan Network, etc. Next, we investigate routes in areas near Japan believed to be most likely for future proliferation attempts, and analyze the characteristics of each. We also assess proliferation prevention efforts by the international community, and Japan's contribution to those efforts, and study current problems and future issues. Finally, we examine what kind of contributions can be made by the unique capabilities of the Ministry of Defense and Self-Defense Forces in future WMD nonproliferation efforts, with a particular focus on intelligence capabilities and the use of technological knowledge, and propose some policy options that Japan could examine and/or adopt.

1. State of WMD Proliferation in Areas Surrounding Japan

In this section, we first investigate North Korean WMDs, and particularly nuclear weapons development, and the possibility of their proliferation. This involves analysis of related technologies that North Korea is believed to possess, because it can be considered a part of future proliferation trends. Next, we analyze the allegations of nuclear development in Iran and Syria conducted to date in cooperation with North Korea in ballistic missile development, and look at the Khan Network, to investigate the possibilities for future WMD proliferation.

(1) Nuclear Development in North Korea

While North Korea's nuclear fuel cycle passes through what is referred to as front end and back end processes, it also requires a further operation known as "weaponization" for manufacture of nuclear weapons.[1] The front end consists of the uranium mining, uranium smelting, uranium conversion, uranium enrichment, and nuclear fuel rod manufacturing processes, and is completed with combustion of nuclear fuel in the reactor core.[2] These processes are performed in North Korea in a 5 MW graphite-moderated reactor. The back end consists of reprocessing of spent fuel rods, processing and disposal of radioactive waste, and other processes. In this stage, the concern is how much plutonium can be extracted from the spent fuel rods, and in North Korea there is a reprocessing facility that goes under the name of the "Radiochemical Laboratory."

Uranium ore has been confirmed to exist within the confines of North Korea, and there is a possibility that the front end technologies related to domestic manufacture of the fuel rods loaded into the 5 MW graphite-moderated reactor located at Yong Byong have been supplied to other countries.[3] The technologies required for uranium alloy molding, processing, etc., which are technologies needed for fuel rod manufacture, are particularly valuable technologies for countries desiring uranium-type nuclear weapons,[4] and there is a distinct possibility that North Korea's reactor design technology has been exported to countries desiring to possess the nuclear fuel cycle.[5] For example, the Syrian reactor bombed by the Israeli Air Force in September 2007 was equipped with the characteristics of a graphite-moderated reactor, similar to the North Korean facility. As a result, the possibility has been raised that North Korea assisted in its construction.[6]

In the back end, the process that attracts the most attention is the one that reprocesses spent fuel rods to extract plutonium. Although North Korea has been reporting the amount of extracted plutonium to the countries affiliated with the Six-Party Talks, there is some variance in the reports, with the amount reported to the United States in November 2007 being 30 kg, the amount in the approximately 18,000 pages of reactor operation records presented to the United States in 2008 being 37 kg, and the amount in the 60-page report presented to China

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1 For the method of classifying the North Korean nuclear fuel cycle into front end, back end, and weaponization processes, see a paper prepared by Siegfried S. Hecker, former director of the U.S. Los Alamos National Laboratory, and William Liou of the Lawrence Livermore National Laboratory. Siegfried S. Hecker and William Liou, "Dangerous Dealings: North Korea's Capabilities and the Threat of Export to Iran," *Arms Control Today*, vol.37, no. 2 (March 2007).

2 While North Korea is suspected of engaging in uranium enrichment activities, the existence of related facilities has not been confirmed. In addition, the manufacturing process for nuclear fuel rods uses natural uranium rather than enriched uranium.

3 Hecker and Liou, "Dangerous Dealings," pp. 7-8.

4 Ibid., pp. 6-11.

5 Ibid., p. 7.

6 Office of the Director of National Intelligence, "Background Briefing with Senior U.S. Officials on Syria's Covert Nuclear Reactor and North Korea's Involvement," April 24, 2008, <http://www.dni.gov/interviews/20080424_interview.pdf>, accessed on September 8, 2008; "Syria's Covert Nuclear Reactor at Al Kibar," *Voice of America*, <http://www.voanews.com/mediaassets/english/2008_04/Video/wmv/pentagon%20presentation-vb.wmv>, accessed on September 8, 2008; Robin Wright and Joby Warrick, "Purchases Linked N. Korean to Syria," *Washington Post* (May 11, 2008), <http:// www.washingtonpost.com/wp-dyn/content/article/2008/05/10/AR2008051002810_pf.html>, accessed on September 8, 2008.

being 38.5 kg.[7] While confirmation of this amount depends on the degree that transparency of future verification activities can be assured, at the present time North Korea is not allowing the intrusive third-party verification activities that would be needed.

Next is the process known as weaponization. While this process does not include fissile material production facilities, it does include activities and facilities for the purpose of manufacturing and maintaining nuclear weapons, or in other words, activities enabling the transport of nuclear explosive devices on missiles, bombs, etc., selection of nuclear weapon design (fission-based, boosted, fusion-based/thermonuclear weapons), high explosive test facilities, nuclear weapon assembly facilities, nuclear weapon storage facilities, underground nuclear test facilities, etc.[8] Because the first North Korean nuclear test using a plutonium type (implosion type) weapon was smaller in scale than the expected output, at less than 1-kiloton (sub-kiloton, at around 0.2-kiloton to 1.0-kiloton), U.S. experts concluded that the nuclear test had been a "failure," differing from the Chinese view of "not perfect, but still a success." Various explanations have been given for the failure, including the purity of the plutonium and problems with the implosion technology; it appears that the weaponization technology possessed by North Korea is limited.[9] Nevertheless, there is a possibility that non-nuclear explosive testing, computer modeling technology, and other plutonium metallurgical technology has been transferred to other countries.[10]

In addition, on May 25, 2009, North Korea announced that it had successfully conducted a second underground nuclear test.[11] It is believed that the the nuclear bomb output during this test exceeded the previous nuclear test, because the scale of the artificial earthquake detected by the Preparatory Commission for the Comprehensive Test Ban Treaty Organization (CTBTO), and by many countries, was larger than the first test. Hecker states that the output of this latest North Korean nuclear test was about 2 to 4 kilotons, and the prevailing view is that it was a bomb on the scale of several kilotons.[12]

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7 Some U.S. specialists believe that the extracted plutonium amounts to 28 to 50kg. David Albright and Paul Brannan, "The North Korean Plutonium Stock," Institute for Science and International Security (ISIS), February 2007.

8 Houston Wood Ⅲ, "A Nuclear Weaponization Program," University of Virginia Department of Mechanical and Aerospace Engineering, <http://www.isis-online.org/nucwep1.pdf>, accessed on September 8, 2008.

9 For analysis of the reasons for the failure of North Korea's nuclear test, see: Adam Ward and James Hacket, "North Korea's Nuclear Test," IISS Strategic Comments (October 2006), <http://www.iiss.org/publications/strategic-comments/past-issues/volume-12---2006/volume-12--issue-8/north-korea s-nuclear-test/>, accessed on September 8, 2008. In addition, for the limits to weaponization technology held by North Korea, see: Hecker and Liou, "Dangerous Dealings," pp. 6-11.

10 Hecker and Liou, "Dangerous Dealings," pp. 6-11.

11 *Korean Central News Agency*, May 25, 2009.

12 For example, the U.S. Director of National Intelligence announced that the blast had been several kilotons. Public Affairs Office, Office of the Director of National Intelligence, "Statement by the Office of the Director of National Intelligence on the North Korea Nuclear Test," <http://www.dni.gov/press_releases/20090615_release.pdf>, accessed on August 10, 2009; Peter Crail, "N. Korean Nuclear Test Prompts Global Rebuke," *Arms Control Today*, vol. 39, no. 5 (June 2009), p. 28; David A. Fulghum, Osan AB, Bradley Perrett and Douglas Barrie, "Testing, Testing; Protracted Brinkmanship is North Korea's Road to Relevance," *Aviation Week and Space Technology*, vol. 170, no. 22 (June 1 2009), p. 23.

Nevertheless, confirmation that the latest event was a "nuclear test" requires detection of the radioactive noble gas xenon, which is emitted after a nuclear test. Following the previous test, the United States, South Korea, and Canada detected xenon, and thereby concluded that North Korea had conducted a nuclear test. This can be inferred from the difference in content of the announcements made by the U.S. Director of National Intelligence, who heads all U.S. intelligence organizations, after each of the nuclear tests. Regarding the earlier test, the director said that "analysis of radioactive debris confirms that North Korea conducted an underground nuclear explosion." This time, however, he said that "the U.S. intelligence community assesses that North Korea probably conducted an underground nuclear explosion. Analysis of the event continues." This is hardly a conclusive statement.[13]

At any rate, there is a good likelihood that North Korea did conduct a nuclear test, and while the assessment of some former U.S. intelligence officials is that North Korea's nuclear weapons show technological progress, opinion on that assessment is divided. For example, Professor Theodore Postol of the Massachusetts Institute of Technology said that, while the output was amplified by more than 10 times, there was a problem with the implosion technology and it was therefore not sufficient as a weapon.[14] Moreover, others said that, since the first nuclear tests of other nuclear weapons powers have always been larger in scale, at 10 to 60 kilotons, and since the scale of this latest test did not reach the initial nuclear weapons output (12 to 20 kilotons) first expected, "it was just too small in scale and cannot be called a success.[15]"

On the other hand, it should be noted that the small scale of North Korea's nuclear weapons test has attracted a large number of hypotheses. One that ought to merit particular attention is the idea that North Korea's nuclear weapons are actually more modern and compact.[16] The reason

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[13] Public Affairs Office, Office of the Director of National Intelligence, "Statement by the Office of the Directorate of National Intelligence on the North Korea Nuclear Test" (October 16, 2006), <http://www.dni.gov/announcements/20061016_release.pdf>, accessed on August 10, 2009; "Statement by the Office of the Director of National Intelligence on the North Korea Nuclear Test," <http://www.dni.gov/press_releases/20090615_release.pdf>, accessed on August 10, 2009. The CTBT monitoring the nuclear test reported that detection of radioactive noble gases was the means ("smoking gun") for concluding that it had been a nuclear test. "Next Phase in the Analysis of the Announced DPRK Nuclear Test," CTBTO Press Release (May 27, 2009), <http://www.ctbto.org/press-centre/press-releases/2009/next-phase-in-the-analysis-of-the-announced-dprk-nuclear-test/>, accessed on August 10, 2009.

[14] Blaine Harden, "North Korean Nuclear Blast Draws Global Condemnation," *The Washington Post,* May 26, 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/05/25/AR2009052501672_pf.html>, accessed on August 10, 2009.

[15] Jeffrey Park, "The North Korean Nuclear Test: What the Seismic Data Says," *Bulletin of the Atomic Scientists,* May 26, 2009, <http://thebulletin.org/web-edition/features/the-north-korean-nuclear-test-what-the-seismic-data-says>, accessed on August 10, 2009; Siegfried S. Hecker, "Report on North Korean Nuclear Program," Center for International Security and Cooperation, Stanford University (November 15, 2006), p. 5, <http://iis-db.stanford.edu/pubs/21266/DPRK-report-Hecker-06-1.pdf >, accessed on August 10, 2009.

[16] *Kyodo News*, June 28, 2008, <http://www.47news.jp/CN/200806/CN2008062801000652.html>, accessed on August 20, 2009; *Mainichi News*, July 5, 2008, <http://mainichi.jp/select/world/news/20080705k0000m030115000c.html>, accessed on July 5, 2008. Note that this hypothesis also encompasses the view that, while there is a good likelihood that North Korea's nuclear weapon is a Nagasaki-style early type weapon, the underground nuclear test tended to prevent leakage of radioactive materials to the outside, causing the output to drop. Siegfried S. Hecker, "Denuclearizing North Korea," *Bulletin of the Atomic Scientists*, vol. 64, no. 2 (May/June 2008), p. 44. In addition, in regards to North Korea's capability to mount nuclear weapons on ballistic missiles, Kim Tae-Young, Chairman of the ROK Armed Forces Joint Chief of Staffs, said in answer to a question at the National Assembly that North Korea

why such a hypothesis might appear is the effect of intelligence operations on the North Korean side. For example, while at first North Korea reported to the United States that it had used about 6 kg of plutonium in the 2006 nuclear test, in the nuclear declaration submitted to China in accordance with the Six-Party Talks, this figure was apparently revised downward to 2 kg.[17] Since it is said that a smaller amount of plutonium required for nuclear weapons to achieve a certain output means a more advanced technology, if the North Korean declaration is accurate then the assessment of their nuclear weapons manufacturing technology level must go up.[18] In addition, there are assessments pointing out that North Korea has from the start aimed for development of a more compact nuclear weapon.[19] Nuclear declarations and their certifications are essential in asserting any certainties about North Korea's nuclear weapons manufacturing technology.

(2) Nuclear Developments in Iran and Syria

Iran is a signatory country to the Nuclear Non-Proliferation Treaty (NPT) and, as regulated in Article 4 of the NPT, asserts a state right to uranium enrichment activities and construction of a heavy water reactor at Arak, as long as it is developing nuclear power for peaceful uses. However, in regards to the safeguards stipulated in Article 3 of the NPT as an obligation accompanying nuclear power development, because Iran cannot assure adequate transparency, and has not provided the International Atomic Energy Agency (IAEA) with persuasive answers regarding the suspicion of Iranian diversion of nuclear energy development for military purposes, the existence of undeclared nuclear development activities is suspected.[20]

An example of a suspicious activity is the program called the "Green Salt Project," which is

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is progressing in the development of a small nuclear warhead, and Walter Sharp, commander of U.S. Forces in Korea, agrees with this view. Michael Maples, Director of the U.S. Defense Intelligence Agency (DIA), testified in the Senate Military Affairs Committee that North Korea has probably succeeded in development of nuclear weapons that can be mounted on ballistic missiles. U.S. Defense Secretary Robert Gates agreed that while this is the long-term intention, he takes a skeptical view at the present stage. See: *Yonhap News*, October 9, 2008, http://www.wowkorea.jp/news/Korea/2008/1009/10049274.html; *Kyodo News*, October 9, 2008, http://www.47news.jp/CN/200810/CN2008100901000148.html; "Transcript: Secretary Gates on 'FNS,'" *Fox News*, March 29, 2009, <http://www.foxnews.com/story/0,2933,511368,00.html>, all accessed on August 20, 2009; *Annual Threat Assessment*, Statement before the Committee on Armed Services United States Senate, May 10, 2009, p. 26.

17 While North Korea has never made a public announcement regarding the amount of plutonium used in nuclear tests, or the output, it is reported that Vice Minister of Foreign Affairs Kim Kye-gwan representing North Korea at the Six-Power Talks in November 2007 told U.S. Assistant Secretary of State Christopher Hill that 6 kg had been used in the nuclear test. Moreover, Hecker has indicated that there is a possibility that the nuclear explosive device North Korea used in the test was similar to the type dropped on Nagasaki (6kg plutonium used, output 21 kilotons).

18 This kind of assessment is based on calculations used in a paper, "The Amount of Plutonium and Highly-Enriched Uranium Needed for Pure Fission Nuclear Weapons," promulgated by the Natural Resources Defense Council (NRDC), a U.S. think tank with expertise in nuclear nonproliferation issues. This calculation classifies nuclear weapons manufacturing technology into three levels (low, medium, and high), which would position the Nagasaki-type weapon as low level, and the series of nuclear tests conducted by the United States in 1951 (1 kiloton output on Pu 1 to 2 kilograms) as medium to high level. Thomas B. Cochran and Christopher E. Paine, "Nuclear Weapons Databook: The Amount of Plutonium and Highly-Enriched Uranium Needed for Pure Fission Nuclear Weapons," Natural Resources Defense Council, Inc., April 13, 1995, <http://docs.nrdc.org/nuclear/nuc_04139501a_144.pdf>, accessed on August 11, 2009.

19 Park, "The North Korean Nuclear Test: What the Seismic Data Says."

20 IAEA, *Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions 1737 (2006) and 1747 (2007) in the Islamic Republic of Iran,* GOV/2008/4.

said to have included a uranium tetrafluoride manufacturing process, high-explosive tests, and design of a missile re-entry vehicle, with the use of nuclear-related materials in mind.[21] Furthermore, from 2001 to 2003, Iran is said to have tested the mounting of a nuclear weapon on its own medium-range ballistic missile, the Shahab-3. This is because mounting a spherical object inside the nose cone of the Shahab-3 was envisioned, and the dimensions, shape, weight, firing height, and other information about the object make it quite likely that it was intended to be an implosion-type nuclear weapon.[22] In addition, material related to the hemispherical uraninum metal manufacturing process said to have been obtained from Pakistan is thought to be related to nuclear weapons manufacture.[23]

Regarding ballistic missiles, the Shahab-3 deployed by Iran is said to be based on North Korea's Rodong missile, and was developed with technical assistance received from that country. Iran is also said to have purchased 18 BM-25 medium-range ballistic missiles (range 2,500 to 4,000 km) from North Korea.[24] This missile was originally a submarine-launched ballistic missile SS-N-6 (R-27) capable of mounting nuclear warheads deployed by the former Soviet Union in 1968 (withdrawn in 1988),[25] and North Korea appears to have purchased retired R-27s from Russia in the 1990s and converted them to a ground-launched type.[26] Elsewhere, in 2006 a number of Chinese companies were sanctioned by the U.S. State Department, including having their U.S. assets frozen, because they had transferred missile technology to Iran.[27]

Meanwhile, suspicion has long existed that Syria, which like Iran is an NPT signatory country, is engaged in nuclear weapons development. In particular, the aerial bombing of a Syrian reactor in September 2007 became the trigger for increased suspicions.[28] According to materials released by the U.S. Central Intelligence Agency regarding this incident, the targeted reactor was equipped with the characteristics of a graphite-moderated reactor, similar to the one at Yong

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[21] IAEA, Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran, GOV/2006/15, p. 8; Stockholm International Peace Research Institute (SIPRI), SIPRI Yearbook 2007: Armaments, Disarmament and International Security (London: Oxford University Press, 2007), p. 488.

[22] Institute for Science and International Security (ISIS), *Iran's Strategic Weapons Programmes*, p. 64; Carla Anne Robbins, "U.S. Gives Briefing on Iranian Missile to Nuclear Agency," *Wall Street Journal*, July 27, 2005. The IAEA appears to have obtained information regarding many other suspicious activities. For example, Deputy Director General Olli Heinonen said in a briefing given on the February 2008 meeting of IAEA member countries, including Iran, that activities related to nuclear development in Iran appear to include systems for remote firing at 400 m underground or from a distance of 10 km, and systems for firing at a height of 600 m after separation of a missile warhead. ISIS, "Briefing Notes from February 2008 IAEA Meeting Regarding Iran's Nuclear Program," April 11, 2008, <http://www.isis-online.org/publications/iran/IAEA_Briefing_Weaponization.pdf>, accessed on September 9, 2008.

[23] *Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions 1737 (2006) and 1747 (2007) in the Islamic Republic of Iran*, p. 4; *SIPRI Yearbook 2007*, pp. 487-488.

[24] Alon Ben-david, "Iran Acquires Ballistic Missiles from DPRK," *Jane's Defence Weekly,* January 4, 2006, <http://www.janes.com/>, accessed on June 18, 2008. The name of the missile used by the U.S., Japanese, and South Korean defense agencies is reported to be Musudan. Joseph S. Bermudez, "Japan Reveals Name of North Korea's R-27 IRBM," *Jane's Defence Weekly,* May 23, 2007, <http://www.janes.com/>, accessed on June 19, 2008.

[25] Pavel Podvig, ed., *Russian Strategic Nuclear Forces* (London: The MIT Press, 2004), pp. 319-323.

[26] Ben-david, "Iran Acquires Ballistic Missiles from DPRK."

[27] U.S. Department of the Treasury, "Treasury Designates U.S. and Chinese Companies Supporting Iranian Missile Proliferation," June 13, 2006, <http://www.treas.gov/press/releases/js4317.htm>, accessed on September 10, 2008.

[28] NTI Syria Profile, "Nuclear Overview," <http://www.nti.org/e_research/profiles/Syria/Nuclear/index.html>, accessed on January 9, 2009.

Byong in North Korea. Moreover, the agency explained that a synthesis of various information sources led to the assessment that the purpose of the reactor was nuclear weapons manufacture.

While attention is focused on this graphite-moderated reactor because of its military aspect as a plutonium production reactor for North Korea, it is actually a reactor that can also be used for civilian purposes. In the latter 1950s, the IAEA released data for this reactor type, and it is said to have been available for examination in every country. In general, nuclear-related technologies can be divided into technologies for peaceful uses (nuclear power plants, etc.) and technologies for military use (nuclear weapons manufacture). The problem that arises is that the two types have areas of overlap, with countries introducing the first type of nuclear technology becoming capable at the very least of possibly obtaining the second type of technology and the basic infrastructure required for the manufacture of plutonium and highly enriched uranium, which constitute the raw material for nuclear weapons. As a result, countries introducing nuclear power technology are required to use IAEA safeguards to ensure transparency in their nuclear development, and are under obligation to guarantee that the technology will not be diverted to military purposes.

Syria's reactor facility was suspected of being for the purpose of nuclear weapons manufacture because of the lack of nearby power generating facilities, the isolated location avoiding human contact, the cover-up operation implemented after the aerial bombing, and the lack of transparency in events leading up to introduction of the reactor. However, the existence in Syria of a reprocessing facility necessary for plutonium extraction has not been confirmed, and the U.S. government admits that the credibility of the assessment that this reactor facility was for military purposes is low.[29]

While the intentions regarding, or actual state of, nuclear power development in Iran or Syria remain unknown, the important thing that these two cases show is that, despite the existence of the NPT regime, an international framework centering on the NPT or IAEA safeguards, the basic nuclear technologies (introduction of nuclear reactors, etc.) can be legally obtained through international institutions or bilateral technological assistance that covers up the two-sided nature of nuclear power-related technology, and the loopholes through which countries can divert those technologies at some later point to military purposes have not been sufficiently blocked. This type of situation, in which the mode of nuclear proliferation of most concern in the future will be self-restraint in obtaining nuclear weapons even while possessing a certain degree of nuclear technology, brings the cases of Iran and Syria to the fore.

[29] "Background Briefing with Senior U.S. Officials on Syria's Covert Nuclear Reactor and North Korea's Involvement;" Peter Crail, "U.S. Shares Information on NK-Syrian Nuclear Ties," *Arms Control Today*, vol. 38, no. 4 (May 2008), p. 38. Note that multiple media sites have reported that the three countries of Iran, Syria, and North Korea are jointly engaged in nuclear weapons development, with a typical example being Germany's *Der Spiegel*. "Syria's Al-Kibar Facility Was Site of 'Secret Military Project,'" *Spiegel Online,* June 23, 2008, Open Source Center, accessed on September 24, 2008.

(3) Proliferation from North Korea

Allegations that North Korea is exporting ballistic missiles have been made any number of times, with Michael McConnell, the U.S. Director of National Intelligence, telling a House of Representatives Intelligence Committee on February 7, 2008, that "we have learned that North Korea is involved in nuclear proliferation.[30]" Is North Korea distributing nuclear-related materials and related technologies in its possession to other countries? Regarding this problem, first we need to examine which technologies, materials, and equipment are being distributed to what places and, second, examine the stance of related countries taken versus North Korea's nuclear proliferation, and particularly the efforts of the United States and of geographically adjacent China.

Regarding the first point, if a complete and accurate declaration agreed upon by North Korea cannot be expected at the Six-Party Talks, then what is of most concern is the transfer of the plutonium that forms the core of the nuclear weapon, and its manufacturing technology. For the suspected transfer destinations of Iran and Myanmar, attention can focus on a number of points. While Iran is advancing the construction of a heavy water reactor facility capable of extracting weapons-grade plutonium, none of the reprocessing activity required for extraction has been confirmed.[31] However, according to a report by the U.S. Congressional Research Service, in October 2003 Iran revealed that it had performed a plutonium reprocessing test at the Tehran Nuclear Research Center.[32] To begin full-scale reprocessing, it is likely that technology will be transferred to Iran from North Korea, with which it is said to have a close, cooperative relationship.[33]

For Myanmar, meanwhile, diplomatic ties with North Korea were cut off after the Rangoon Incident of 1983. Entering the 1990s, however, the country commenced purchases from North Korea of small arms ammunition, artillery, etc. In the 2000s, the two countries agreed to promote cooperation in the military sector, and top officials of the Myanmar military administration visited North Korea in November 2008 to sign a memorandum of military cooperation. While the visiting delegation was in North Korea, it is reported to have toured a radar and jamming facility, an anti-aircraft unit, an air force unit, a computerized command and control system, and a Scud missile manufacturing plant. In WMD-related areas, such incidents as a North Korean freighter ship entering a port in Myanmar, North Korean aircraft landing at a Myanmar military base, and persons affiliated with a company involved in North Korean nuclear weapons-related procurement and proliferation visiting Myanmar, hint at the existence of a cooperative

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30 David Ignatius, "A Ticking Clock on N. Korea," *Washington Post*, March 23, 2008, <http://www.washingtonpost.com/wp-dyn/content/article/2008/03/21/AR2008032102555.html>, accessed on April 7, 2008; "Hearing of the House Permanent Select Committee on Intelligence Annual Worldwide Threat Assessment," February 7, 2008, <http://www.dni.gov/testimonies/20080207_transcript.pdf>, accessed on April 7, 2008.

31 *Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions 1737 (2006) and 1747 (2007) in the Islamic Republic of Iran*, p. 8.

32 Sharon Squassoni, "Iran's Nuclear Program: Recent Developments," *CRS Report for Congress,* updated on March 8, 2007, pp. 3-4.

33 Hecker and Liou, "Dangerous Dealings," p. 8.

relationship between Myanmar and North Korea.[34] In June 2009, the Kanagawa Prefectural Police investigated a North Korean trading company located in Tokyo on suspicion of violating the Foreign Exchange and Foreign Trade Act by attempting to illegally export materials to Myanmar that could be diverted to the manufacture of ballistic missiles.[35] This evidence points to the existence of a close military cooperation relationship between the two countries, and raises concerns of a cooperative relationship in the area of WMD development as well.

In addition, Myanmar plans to introduce a research reactor from Russia; U.S. policymakers and experts have expressed concerns about this. For example, in 2003 Richard Lugar, Chairman of the U.S. Senate Committee on Foreign Relations, asserted that Myanmar's introduction of a reactor would needlessly boost proliferation risks, while in February 2004, Lugar's chief of staff Keith Luse said that North Korea was suspected of supplying Myanmar with nuclear technology and Scud missiles.[36] Moreover, after the start of the Obama Administration, Secretary of State Hillary Clinton visited Bangkok, Thailand prior to her participation in an Association of Southeast Asian Nations (ASEAN) meeting, and expressed concerns about the possibility of nuclear technology transfer from North Korea to Myanmar.[37]

Regarding the second point, after the North Korean nuclear test, President George W. Bush released a statement saying, "the transfer of nuclear weapons or material by North Korea to states or non-state entities would be considered a grave threat to the United States, and we would hold North Korea fully accountable for the consequences of such an action,[38]" and said that "if information that North Korea is transferring nuclear weapons is obtained, the United States will stop the ships and aircraft involved in the transfer.[39]" In addition, U.S. Secretary of State Condoleeza Rice said that "North Korea should know that should it cross that line and try to

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[34] Aung Zaw, "Burma's Secret Mission to North Korea," *The Irrawaddy*, vol. 17, no. 4 (July 2009), p. 26; Bertil Lintner, "Myanmar and North Korea Share a Tunnel Vision," *Asia Times*, July 19, 2006; Andrew Selth, "Burma and Nuclear Proliferation: Policies and Perceptions," Griffith Asia Institute, Regional Outlook Paper, no.12 (2007), p. 12. According to David Albright of the Institute for Science and International Security, a U.S. think tank with expertise in the nuclear proliferation sector, persons affiliated with the North Korean trading company Namchongang have visited Myanmar. This company was involved in 2003 in the export from Germany to North Korea of a large volume of aluminum pipe that could be used in a centrifugal separator for uranium enrichment, attracting attention as a company with strong suspicions of being involved in procuring materials needed for nuclear development. The company is also suspected of involvement in materials procurement for the alleged reactor facility in Syria that was aerially bombed by Israel in September 2007. Glenn Kessler, "U.S. Concerns Growing about N. Korean Military Ties with Burma," *The Washington Post,* July 22, 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/07/21/AR2009072101021. html>, accessed on August 13, 2009.

[35] *Yomiuri News* electronic edition, June 30, 2009, <http://www.yomiuri.co.jp/feature/20080115-899562/news/20090630-OYT1T00623.htm>, accessed on September 3, 2009.

[36] Paul Kerr, "U.S. Accuses Burma of Seeking Weapons Technology," *Arms Control Today*, vol. 34, no. 4（May 2004), p. 36.

[37] Des Ball, Phil Thornton and Daniel Flitton, "Burma's Nuclear Secrets," *The Sydney Morning Herald*, August 1, 2009, <http://www.smh.com.au/world/burmax2019s-nuclear-secrets-20090731-e4fv.html?page=-1>, accessed on August 11, 2009; "Clinton Warns of Nuclear Ties between Burma, North Korea," *VOA News*, July 22, 2009, <http://www.voanews.com/english/2009-07-22-voa7.cfm>, accessed on August 11, 2009.

[38] U.S. White House, "President Bush's Statement on North Korea Nuclear Test," October 9, 2006, <http://www.whitehouse.gov/news/releases/2006/10/20061009.html>, accessed on April 17, 2008.

[39] "North Korea Says It Will Not Give Terrorists Nuclear Weapon," *Voice of America*, October 19, 2006.

transfer a weapon or technologies to a non-state actor, to a dangerous actor, then it would have to be held fully accountable for that act," showing that nuclear transfer is a "red line" for the United States.[40]

Meanwhile, China has also expressed support for the WMD nonproliferation system, and even voted in favor of UN Security Council Resolution 1718 (which was passed in response to the North Korean nuclear test), that incorporated ship cargo inspections to prevent the transfer of WMD-related materials. As discussed below, China is a key transit point for air and sea routes in North Korean trade with the Middle East and, with the known existence of North Korean front companies and funding networks, the reality is that there are many loopholes, which are harmful to nonproliferation efforts.[41] However, China has warned North Korea on its sloppy domestic management of nuclear fission materials, and can be expected to become involved in the nuclear issue in a more intrusive fashion if there are concerns about North Korea's nuclear management.[42]

The U.S.-China response to date appears to show that the possibility of proliferation from North Korea of nuclear fission materials or nuclear weapons themselves is considered to be low. In fact, attention should probably instead be paid to the supply and smuggling out of civilian nuclear power technology possessed by North Korea. There are experts who have pointed out that states striving for possession of nuclear weapons may well search for a discreet method that uses the area of overlap between civilian nuclear technology (nuclear power generation) and nuclear weapons manufacturing technology to secure ownership of the basic infrastructure in the civilian sector, and then at some point cross over into weapons development.[43]

The movement of nuclear technologists is also important. In the history of nuclear proliferation, the role of nuclear technologists has been important. As can be seen from the cases of Dr. Qian Sanqiang, who returned to China from France, or Dr. A.Q. Khan, who obtained centrifugal separator technology in the Netherlands, for late-developing countries aiming for the development of nuclear weapons, nuclear technologists play a central role in the transfer of technologies from advanced countries.[44] Through the acquisition of such know-how, states aiming for new development of nuclear weapons and their transport methods can reduce the time and cost required for that development.[45] In particular, one point shared by North Korea, Iran,

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[40] U.S. White House, "President Bush's Statement on North Korea Nuclear Test," and U.S. Secretary of State Condoleezza Rice, "Interview with Katie Couric of CBS's 60 Minutes," <http://www.state.gov/secretary/rm/2006/73810.htm>, accessed on December 8, 2008.

[41] David L. Asher, "How to Approach the China-North Korea Relationship," Heritage Lectures, no. 969（October 10, 2006）, <http://www.heritage.org/research/AsiaandthePacific/upload/hl_969.pdf>, accessed on April 16, 2008.

[42] Bonnie Glaser, Scott Snyder, and John S. Park, "Keeping an Eye on an Unruly Neighbor: Chinese Views of Economic Reform and Stability in North Korea," A Joint Report by the Center for Strategic and International Studies & U.S. Institute of Peace, January 3, 2008, pp. 14-19, <http://www.usip.org/pubs/working_papers/wp6_china_northkorea.pdf >, accessed on April 16, 2008.

[43] Robert J. Einhorn, "Identifying Nuclear Aspirants and Their Pathways to the Bomb," *The Nonproliferation Review*, vol. 13, no. 3 (November 2006), pp. 496-497.

[44] Shigeo Hiramatsu, *Chugoku no Kaku Senryoku* [*China's Nuclear Strength*] (Keiso Shobo, 1996), p. 129.

[45] Gregory D. Koblentz, "The Politics of Nuclear Cooperation: Why States Share Nuclear Weapons Technology," prepared for delivery at the 2005 Annual Meeting of the American Political Science Association, September 1-4, 2005, p. 21.

and Myanmar is that all three countries learned nuclear technology in Russia. As a result, the possibility that knowledge held by North Korean technologists related to nuclear weapons development could apply to nuclear weapons development in Iran and Myanmar cannot be ruled out.

(4) Proliferation Through the Khan Network

The first example that comes to mind of an actual threat of civilian nuclear technology being smuggled out of nations in possession of nuclear weapons, or out of advanced nations with nuclear-related technology, is the Khan Network. This network consisted of human connections and distribution networks spanning multiple countries for the purpose of procurement and supply of nuclear power technology-related equipment and information, built in the 1980s and 1990s around Dr. A.Q. Khan, called the father of Pakistan's nuclear development. Already, more than 20 persons have been clearly identified as having a relationship with this network, utilizing links with friends, businessmen, and family members.[46] Twelve countries, including China, Malaysia, Singapore, Turkey, the United Kingdom, Italy, the Netherlands, Switzerland, Germany, Spain, South Africa, and Japan, appear to have supplied nuclear-related technology via the Khan Network to Dr. Khan's customers in Libya, Iran, and North Korea.[47]

Dr. Khan, who went to Europe in 1961 to study metallurgy and obtained a doctorate, gained employment in 1972 at the Physical Dynamics Research Laboratory (FDO), a research company subcontracting from Urenco, an international joint venture company of European countries engaged in uranium enrichment. Over a period of several years, Dr. Khan sent to the Pakistan government the design drawings for a centrifugal separator (P-1) and other information related to suppliers of related devices obtained from the FDO research facility located in Almelo, Netherlands. After returning to Pakistan in 1975, he played a central role in nuclear weapons development plans as a member of the Pakistan Nuclear Power Committee.[48]

Dr. Khan's procurement network for nuclear-related equipment and materials, which was at first built up for nuclear development in his own country, with Dubai in the UAE as his activities base, appears to have become an "export route" to countries such as Libya, Iran, and North Korea that were aiming for possession of nuclear weapons.[49] What the network was able to supply included a comprehensive starter kit from Iraq's uranium enrichment program, blueprints of the basic-level centrifugal separator (P-1) stolen by Dr. Khan from FDO, design drawings for a more advanced centrifugal separator (P-2), and parts required for the manufacture of that product, a centrifugal separator using state-of-the-art technology, blueprints of a nuclear warhead

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[46] Kenly Butler, Sammy Salama and Leonard S. Spector, "Where is the Justice?" *Bulletin of the Atomic Scientists,* vol. 62, no. 6 (November/December 2006), p. 28.

[47] Bill Powell and Tim McGirk, "The Man Who Sold the Bomb," *Time,* February 14, 2005.

[48] Gordon Corera, *Shopping for Bombs: Nuclear Proliferation, Global Insecurity, and the Rise and Fall of the A.Q.Khan Network* (New York: Oxford University Press, 2006), pp. 3-56.

[49] Sammy Salama and Nilsu Goren, "Special Report: The A.Q. Khan Network: Crime…and Punishment?" *WMD Insights,* March 2006, p. 2, <http://www.wmdinsights.com/PDF/FP_MarIssue.pdf>, accessed on June 23, 2008.

designed by China, and uranium hexafluoride.[50] Technological information for ballistic missile development was also distributed through the network.[51] For assembly of the procured materials, and usage methods, the network is also said to have provided detailed explanations regarding the quality of technologists, number of people, and operating periods required for each step, resulting in proliferation of know-how, as well.[52]

In addition, it is now clear that even more advanced technologies were transferred via the Khan Network.[53] For example, in an investigation conducted in 2004, the Swiss government discovered files related to design drawings for a compact nuclear weapon that could be mounted on a ballistic missile loaded on a personal computer in the possession of a defendant found guilty of illegally distributing nuclear-related technology and information.[54] This actually marked the second case of smuggling of nuclear weapon design drawings uncovered since investigation of the network had started. The first case was discovered in 2003, during an investigation of the state of Libya's nuclear weapons development launched at the time Libya announced it was abandoning WMD development. This compact nuclear weapon had been manufactured and tested in China in 1966, and it appears that Libya obtained it through the Khan Network. However, it is said to have been unsuitable for mounting on a missile. But the newly discovered design drawings were of Pakistani manufacture, and depicted a lightweight, compact object that halved the amount of uranium used. Because this lightweight, compact nuclear weapon is suitable for mounting on a ballistic missile, and because the design drawings were discovered on a computer hard disk, the investigation is proceeding on the assumption that the drawings can easily be reproduced, and that it is likely that they have already been passed to North Korea or Iran.[55]

As shown by these cases, there are probably many cases involving the Khan Network that have not yet been brought to light, and the degree and details of involvement by North Korea, Iran, or other countries suspected of nuclear development are yet to be clarified. Furthermore, the network has not yet completely collapsed, and the possibility that third parties have continued the functions of the "nuclear black market" to this day cannot be discounted.[56] The IAEA has

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[50] Graham Allison, *Nuclear Terrorism – The Ultimate Preventable Catatastrophe*, Nobumasa Akiyama, Hiroshi Tosaki, and Junko Horibe, translators (Nihon Keizai Shimbunsha, 2006), p. 76.

[51] Corera, *Shopping for Bombs*, pp. 86-102.

[52] Douglas Frantz and Catherine Collins, *The Nuclear Jihadist* (New York: Twelve Hachette Book Group USA, 2007), p. 300.

[53] David Albright, "Swiss Smugglers Had Advanced Nuclear Weapons Designs," Institute for Science and International Security, June 16, 2008, <http://www.isis-online.org/publications/expcontrol/Advanced_Bomb_16June2008.pdf>, accessed on June 23, 2008; David E. Sanger and William J. Broad, "Officials Fear Bomb Design Went to Others," *The New York Times,* June 16, 2008, <http://www.nytimes.com/2008/06/16/world/asia/16nuke.html?_r=1&oref=slogin&pagewanted=all >, accessed on June 17, 2008; Joby Warrick, "Smugglers Had Design for Advanced Warhead," *Washington Post,* June 15, 2008, <http://www.washingtonpost.com/wp-dyn/content/article/2008/06/14/AR2008061402032_pf.html >, accessed on June 16, 2008.

[54] Albright, "Swiss Smugglers Had Advanced Nuclear Weapons Designs."

[55] Ibid.

[56] Corera, *Shopping for Bombs*, p. 244.

indicated that it will continue observing and illuminating this network and, as the investigation proceeds, may well find that the proliferation network has widened still more.[57]

2. Analysis of Most Probable Routes for WMD Proliferation

While WMD-related items can proliferate via land, sea, or air routes, in the regions around Japan, the probability of proliferation by sea or air routes will likely be higher. As a result, we shall investigate proliferation routes centering on cases of specific ships being taken into custody for carrying WMD-related items or military goods while in port or in transit, and of aircraft reported to possibly have been carrying these suspected goods.

Here follows six examples of sea transport related to the shipment of chemical weapons, nuclear-related materials, and conventional weapons (1999 to 2006), and three examples of air transport (2002 to 2003). Sea regions with the high possibility of WMD-related materials being transported through them include the sea regions off the west coast of North Korea and the east coast of China, or in other words, the Bohai Sea, Yellow Sea, East China Sea, and South China Sea. For air routes, the transit routes from North Korea to Pakistan and Myanmar mean that, geographically speaking, the existence of China cannot be ignored.

(1) Proliferation Via China

U.S. experts have pointed out the high likelihood of Chinese ports being used for trade between North Korea and other countries. David L. Asher, who was a U.S. State Department official in charge of negotiations with North Korea during the Bush Administration years of 2001 to 2005, has asserted that "thousands of North Korean containers go through Chinese ports for onward shipment globally without any form of inspection… North Korean front companies, agents, and secret funding networks exist within China, so that many North Korean companies have continued activities in China even after sanctions were applied.[58]" Proliferation of missile-related parts and technologies to Iran and elsewhere by Chinese companies is continuing, and in December 2005 the U.S. government imposed sanctions on five Chinese companies, followed in June 2006 with sanctions on six more companies, and on one more company in August of that year, including the freezing of U.S.-based assets, and bans on trading between those companies and U.S. corporations.[59]

In addition, on May 20, 2008, U.S. Principal Deputy Assistant Secretary of State Patricia A. McNerney used an appearance at the U.S.-China Economic and Security Review Commission to

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[57] IAEA, *Implementation of the NPT Safeguards Agreement in the Socialist People's Libyan Arab Jamahiriya*, GOV/2008/39, see the speech given by Kenji Murakami, director of the IAEA Department of Safeguards, on "Current State and Future of International Atomic Energy Agency (IAEA) Safeguards" (February 13, 2008), sponsored by the Japan Atomic Energy Agency, Nuclear Nonproliferation Science & Technology Center.

[58] David L. Asher, "How to Approach the China-North Korea Relationship," *Heritage Lectures*, no. 969 (October 10, 2006), <http://www.heritage.org/research/AsiaandthePacific/upload/hl_969.pdf>, accessed on April 16, 2008.

[59] U.S.-China Economic and Security Review Commission, "2006 Report to Congress of The U.S.-China Economic and Security Review Commission," One Hundred Ninth Congress Second Session, November 2006, pp. 82-95, <http://www.uscc.gov/annual_report/2006/annual_report_full_06.pdf>, accessed on September 25, 2008.

indicate the following problems related to China's export controls:[60] (1) China is not actively cooperating in shutting down the North Korean front companies in China; (2) the nonproliferation efforts announced by the Chinese government are not actually being implemented; (3) Chinese ports and international airports are being used for trans-shipment of equipment and materials; and (4) even when China is aware that a customer has ties to terrorists or to Iran or other end users, it accepts the end user certification submitted by the customer at face value.

Despite such allegations, however, China has expressed its opposition to WMD development in all countries, and supports international frameworks for handling WMD proliferation.[61] China has expressed its intention to actively participate in such international export control regimes as the Nuclear Suppliers Group (NSG), the Missile Technology Control Regime (MTCR), the Australia Group (AG), and the Wassenaar Arrangement (WA). China has been a member of the NSG since 2006, applied for participation in the MTCR in 2004, and engaged in AG export control discussions since 2004.[62] Moreover, McNerney reports that some of the Chinese companies slapped with U.S. sanctions have strengthened their internal compliance procedures in response to demands from the U.S. government to enforce nonproliferation of WMD-related materials, resulting in cessation of the equivalent of US$100 million in trade with North Korea and Iran.[63]

China holds reservations about the effectiveness and the legal basis for the Proliferation Security Initiative (PSI), and has taken the stance that political and diplomatic solutions should be taken within an international legal framework as the method for solving the WMD proliferation issue.[64] This does not mean, however, that China has rejected the PSI. Top Chinese government officials have expressed understanding of the PSI as coming from a "broad background of anti-terrorism, and there is a certain degree of rationalism in such an initiative.[65]" In February 2004, when former U.S. Undersecretary of State John Bolton visited Beijing, he reached agreement with Foreign Minister Li Zhaoxing and others regarding the importance of a political and diplomatic solution as policy for the prevention of WMD proliferation, on

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60 U.S. Principal Deputy Assistant Secretary of State Patricia McNerney, "China's Nonproliferation Practices: Principal Deputy Assistant Secretary of State for International Security and Nonproliferation Testimony before the U.S.-China Economic and Security Review Commission," Washington D.C., May 20, 2008, <http://www.uscc.gov/hearings/2008hearings/written_testimonies/08_05_20_wrts/08_05_20_mcnerney_statement.pdf>, accessed on June 23, 2008.

61 Information Office of the State Council of the People's Republic of China, "China's Non-Proliferation Policy and Measures," December 3, 2003, <http://english.gov.cn/official/2005-07/28/content_17957.htm>, accessed on January 15, 2009.

62 Masayuki Masuda, "The Proliferation Security Initiative and East Asia – Deepening and Expanding Cooperation," Ministry of Education, Culture, Sports, Science and Technology, Science Frontier Promotion Project, *Humanities and Social Science Interdisciplinary Research into Crisis Management*, No.14 (November 2005), pp. 10-11.

63 McNerney, "China's Nonproliferation Practices."

64 Ye Ru'an, Zhao Qinghai, "The PSI: Chinese Thinking and Concern," *The Monitor,* Spring 2004, pp. 22-24.

65 Masuyuki Masuda, "PSI and East Asia: Deepening and Expanding Cooperation," *Strategy 21*, No. 15 (2005 Spring/Summer), p. 219.

cooperation with information-sharing, and on promoting cooperation with the PSI.[66] In response to UN Security Council Resolution 1718, China agreed to perform inspections on cargoes transiting its own country, and is said to have started inspections of trucks headed toward North Korea across China's borders. On the other hand, the country showed that it had no intention of stopping North Korean ships at sea.[67] China is thus taking an inconsistent stance toward the PSI, and the possibility of loopholes in its export controls cannot be denied.

(2) Proliferation by Sea Routes

There have been more than a few cases of shipborne transport of WMD equipment and materials. For example, here follows some major proliferation examples of transport by sea of ballistic missiles or weapons of mass destruction in regions surrounding Japan in recent years.

In June 1999, when the *Kuwolsan* entered the port of Kandla in India, a search by the Indian authorities turned up the tips of missile nose cones, metal sheets used for missile bodies, machine tools, missile performance evaluation devices, etc. Yet the boxes that these were packed in were labeled "water purifier-related parts." A large number of design drawings for Scud missiles were also found, and the shipment was believed to be a Scud B and Scud C manufacturing line package. The Indian authorities stated that this was a "complete transfer of missile manufacturing technology." The ship had departed from Nampo and passed through two ports in Thailand before arriving in Kandla, and apparently planned to call in Malta before arriving in Libya.[68]

The South Korean media reported that in February and November 2002, the *Iran Meead* had departed Tianjin port in China and docked multiple times in Nampo and the North Korean port of Songrim, and took aboard missile fuel for Iran. The ship is believed to have loaded missile parts and heat seeker devices in the port of Tianjin before heading to the two North Korean ports.[69]

Also, in December 2002, a Spanish Navy ship participating in a U.S.-led anti-terrorism operation conducted an inspection of the cargo ship *So San* bound for Yemen off the southeast coast of Yemen, and discovered 15 Scud missiles of North Korean manufacture. While the cargo consisted of 15 Scud missiles equipped with conventional warheads and rocket fuel, the ship's manifest listed a cargo of 40,000 bags of cement, and the missiles were hidden under the bags of cement. In addition, the freighter had changed its ship name and nationality a number of times. Although when it was seized no flag was flying, the registry showed Phnom Penh and a Cambodian flag was found. The ship had departed the port of Nampo on the east coast of North

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[66] Masayuki Masuda "The Proliferation Security Initiative and East Asia," p. 10.

[67] U.S.-China Economic and Security Review Commission, "2006 Report to Congress of The U.S.-China Economic and Security Review Commission," p. 89.

[68] "North Korea Missile Milestones 1969-2005: The Risk Report," *Wisconsin Project on Nuclear Arms Control*, vol. 11, no. 5 (September-October 2005), <http://www.wisconsinproject.org/countries/nkorea/north-korea-miles.html>, accessed on June 18, 2006; "North Korea: Pyongyang Uses Covert Approach to Acquire WMD-Related Items," Global Security Newswire, August 15, 2003, <http://www.nti.org/d_newswire/issues/newswires/2003_8_15.html>, accessed on June 20, 2008.

[69] Mohan Malik, "The Proliferation Axis: Beijing-Islamabad-Pyongyang," *Korean Journal of Defense Analysis*, vol. 15, no. 1 (Spring 2003), pp. 75-76.

Korea in mid-November, and the final port of call before seizure had been in China.[70]

In April 2003, the *Ville de Virgo* loaded 214 aluminum tubes apparently for use as casings in a centrifugal separator (total of 22 tons) in the German port of Hamburg, and entered an Egyptian port where it was impounded. North Korea had procured the aluminum tubes from the German company Optronics, and stated that the final customer was the Dandong branch of an aircraft manufacturing company located in Shenyang, China. German authorities, however, concluded that the actual destination was North Korea, and filed charges.[71]

In August 2003, Taiwan custom authorities detained the *Be Gaehung* in Kaohsiung port. It had on-board 158 casks of phosphorus pentasulfide (an export-restricted item under the Australia Group because of the possibility of its use in the nerve gas VX). As the Thai export regulations could not be used to crack down on the phosphorus pentasulfide, the Taiwan export control law was applied instead. The ship had sailed from Italy to Bangkok, and a trader located there had planned to re-export the cargo to North Korea (Nampo port) by way of Taiwan.[72]

Finally, in September 2006, the *Gregorio 1* was not allowed by the authorities to leave the port of Limassol in Cyprus on the grounds that it was exporting suspicious materials from North Korea to Syria. On board the ship 21 trucks (18 of the trucks were equipped with mobile radar, as part of an apparent anti-air defense system) were discovered, as well as more than 2,000 metal pipes (for irrigation). These items differed from the "meteorological instruments and equipment" listed on the ship's manifold. The ship had left port in North Korea, sailed to China (details unknown), and then to Port Said (Egypt) and Limassol before moving on to Latakia (Syria).[73]

All of these cases were clear examples of ship-loaded missiles or WMD-related equipment and materials, and it is impossible to deny that there may be many others in existence that were not discovered. As sea routes are easy to access from any country, and are capable of transporting

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[70] Thom Shanker, "Scud Missiles Found on Ship of North Korea," *The New York Times,* December 11, 2002, <http://www.proquest.com/>, accessed on June 19, 2008; "Spanish Defense Minister Says 15 Scud Missiles Seized on Ship," *AFP,* December 11, 2002, Open Source Center, accessed on June 19, 2008; *Dong-a Ilbo*, December 13, 2002, < http://japan.donga.com/srv/service.php3?biid=2002121416358 >, accessed June 19, 2008.

[71] Mark Hibbs, "DPRK Sought Enough Aluminum Tubing in Germany for 4,000 Centrifuges," *Nuclear Fuel*, vol. 28, no. 10 (May 12, 2003), pp. 1, 16-17; "German Officials Identify Former DPRK Diplomat as 'Ringleader' in WMD Export Deal," *Der Spiegel*, September 22, 2003, Open Source Center, accessed on July 20, 2008.

[72] Australian Government, *Weapons of Mass Destruction: Australia's Role in Fighting Proliferation-Practical Responses to New Challenges*, p. 29; "North Korea Missile Milestones 1969-2005."

[73] David Osler and Nigel Lowry, "Syria-bound Cargoship Held on Suspicion of Arms Smuggling," *Lloyd's List,* September 11, 2006; "Cyprus Finds Air Defense Systems on Syria-bound Ship," *Reuters*, September 11, 2009, <http://www.haaretz.com/hasen/spages/761360.html>, accessed on June 10, 2008. While it could not be confirmed whether the ship was carrying WMD-related items, the British marine transport newspaper *Lloyd's List* wrote that there were many suspicious elements in the ship's movements that made it a natural target for monitoring by authorities, which would be of use in grasping the characteristics of suspicious ships.

・The ship's nationality registry had undergone frequent changes (Panama, Singapore, South Korea, Panama). Of the ship's crew of 15, there were 14 Ukrainians and one Russian.

・The ship's name also changed frequently (in 2006, *Gregorio*; in 2006, *Pioneer Kona*; in 2004, *Sea Ranger*; and in 2002, *Timber Glory*) and, with the exception of Buenos Aires in 2001, had mainly been active in the Far East, including Korea, China, and Japan, as well as in Southeast Asian sea regions. While two inspections in 2005 had apparently uncovered a large number of ship defects, it was not impounded. David Osler and Nigel Lowry, "Syria-bound Cargoship Held on Suspicion of Arms Smuggling," *Lloyd's List*; *Register of Ships 2007-08* (London: Lloyd's Register Fairplay, 2007).

large sizes of equipment and materials, it is likely that they will continue to be used as a proliferation route.

(3) Proliferation by Air Routes

Also, while the number of known examples is small, transport of WMD-related equipment and materials by aircraft has also occurred. Here follows some major examples of proliferation via air routes in areas surrounding Japan.

First is proliferation from North Korea to Iran and Syria. In the period from April to July 2003, it appears that Iranian IL-76 transport aircraft flew out of North Korea six times, transporting cargoes that appeared to be cruise missile-related parts. Since permission for these flights had been obtained from the Chinese government, the United States filed a protest with China in June 2005. After receiving the protest, China is said to have agreed to no longer recognize flights of transport aircraft between North Korea and Iran. The Central Asian nations are also said to have taken the same measures as China.[74]

Other incidents include August 2008, when the Indian government at the request of the United States refused to allow a North Korean Air Koryo aircraft bound for Iran to overfly Indian airspace, on suspicion of carrying WMD-related materials, and June 2007, when the United States in cooperation with allied countries (details unknown) stopped a Syrian aircraft apparently involvd in a missile-related transaction from flying to North Korea.[75]

Next is proliferation by air routes from North Korea to Pakistan. It is believed that Pakistan, in the late 1990s or later, used C-130 transport aircraft to transport centrifugal separator-related parts to North Korea. And in July 2002, a C-130 transport aircraft belonging to the Pakistan Air Force apparently flew to North Korea, transporting missile-related parts.[76]

Finally, there is proliferation from North Korea to Myanmar (Burma). While the timing is unknown, an Air Koryo aircraft appears to have landed at a military base located in central Myanmar.[77] Elsewhere, in the August 2008 incident in which the Indian government refused to

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[74] Shirley A. Kan, "China and Proliferation of Weapons of Mass Destruction and Missiles: Policy Issues," *CRS Report for Congress,* December 13, 2007, pp. 21-22, <http://www.fas.org/sgp/crs/nuke/RL31555.pdf >, accessed on June 23, 2008; John Larkin and Donald Macintyre, "Arsenal of the Axis," *Time,* July 7, 2003, <http://www.time.com/time/printout/0,8816,463132,00.html#>, accessed on August 6, 2009.

[75] Jay Solomon, Krishna Pokharel and Peter Wonacott, "North Korean Plane was Grounded at U.S. Request," *The Wall Street Journal,* November 1, 2008, <http://online.wsj.com/article/SB122549443144289535.html>, accessed on August 6, 2009; Jay Solomon and Yochi J. Dreazen, "U.S. Keeps Close Eye on North Korean Ship," *The Wall Street Journal,* June 24, 2009, <http://online.wsj.com/article/SB124571192210838865.html>, accessed on June 26, 2009; *Asahi News* electronic version, November 2, 2008, <http://www.asahi.com/special/08001/TKY200811020149.html>, accessed on August 6, 2009.

[76] Kan, "China and Proliferation of Weapons of Mass Destruction and Missiles;" David E. Sanger, "U.S. Rebukes Pakistanis for Lab's Aid to Pyongyang," *The New York Times,* April 1, 2003, <http://proquest.umi.com/pqdweb?did=320089631&sid=1&Fmt=3&clientId=52927&RQT=309&VName=PQD>, accessed on August 6, 2009; The International Institute for Strategic Studies, *Nuclear Black Markets: Pakistan, A.Q. Khan and the Rise of Proliferation Networks - A Net Assessment* (London: IISS, 2007), pp. 72-75.

[77] Andrew Selth, "Burma and Nuclear Proliferation: Policies and Perceptions," *Griffith Asia Institute Regional Outlook Paper*, no. 12 (2007), p. 12, <http://www.griffith.edu.au/__data/assets/pdf_file/0015/18240/regional-outlook-volume-12.pdf>, accessed on June 23, 2008; Bertil Lintner and Shawn W. Crispin, "Dangerous Bedfellows," *Far Eastern Economic Review,* November 20, 2003, <http://www.asiapacificms.com/articles/pyongyang_rangoon/>, accessed on August 6, 2009.

allow a North Korean aircraft bound for Iran to overfly its territory, the aircraft is reported to have used Mandalay in central Myanmar as a transit point.[78]

3. Assessment of International and Japanese Efforts to Prevent WMD Proliferation

International export control organizations for materials and technologies related to WMD and WMD transport methods include the Nuclear Suppliers Group (NSG), the Australia Group (AG) and the Missile Technology Control Regime (MTCR).[79] These are all frameworks unsupported by international treaties that have been organized by countries with weapons capabilities and related supplies and technologies, and which agree on nonproliferation. The four export control regimes offer participating countries common guidelines for setting up their own export control systems, and prevent proliferation of WMD-related parts, materials, and technologies to nations of concern or to terrorist organizations, but in terms of effectiveness cannot be said to be a perfect system.[80]

In this regard, the program that focuses on WMD-related resources, equipment, and technologies being shipped on the high seas, having slipped past export controls and water's edge enforcement actions, is the Proliferation Security Initiative (PSI).[81] The PSI was announced as a new effort to prevent proliferation by President Bush in May 2003 in a speech given in Krakow, Poland. At the outset, the PSI consisted of 11 countries, but presently counts more than 80 countries as members.[82]

Japan participates in all of these export control regimes and in the PSI. While the export control regimes and PSI tend to overlap, and are said to complement each other, what sort of effectiveness have they shown to date? Moreover, the international export control regimes have their effectiveness ensured through the development of each nation's domestic laws. As a result, we shall proceed here to assess efforts to prevent proliferation in the three areas of the international export control regimes, the PSI, and domestic laws.

(1) The International Export Control Regimes

The effect of the international export control regimes has been identification of WMD-related general-purpose parts and technologies, and creation of a framework among countries in possession of these technologies for sharing information and concerns about proliferation, and

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78 Solomon, Pokharel and Wonacott, "North Korean Plane was Grounded at U.S. Request."

79 The Wassenaar Arrangement (WA) also plays a role in the prevention of WMD proliferation, in the area of general-purpose technologies that can be used in WMD.

80 Ministry of Foreign Affairs, *Nihon no Gunshuku Fukakusann Gaiko [Japan's Disarmament and Non-Proliferation Diplomacy]*," 4th edition (March 2008), p. 118.

81 Ichiro Ogasawara, "Tairyo Hakai Heiki no Kakusan to Nihon no Seisaku," *Kokusai Mondai*, No.529 (April 2004), p. 72.

82 Prior to this, the United States in December 2002 announced the *National Strategy to Combat Weapons of Mass Destruction*, and PSI constituted a more specific version of this national strategy. Ministry of Foreign Affairs, *Nihon no Gunshuku Fukakusann Gaiko [Japan's Disarmament and Non-Proliferation Diplomacy]*," p. 129.

creation of a set of regulations.[83] Moreover, in addition to the actions of member states, another positive effect has been the actions of even non-member states (such as India, Israel, Singapore, and China) to conform to the export control regimes by preparing their own lists of restricted items, etc. As more and more nations come to recognize the standards for prevention of the movement of subtle technologies or equipment, such exports come to be monitored, and on occasion approvals for export come to be withheld, the cost of obtaining resources, equipment, and technologies will balloon for countries with plans to develop WMD.[84]

However, the international export control regimes do not always necessarily create a perfect system, and they face many problems. In particular, the following points could be raised regarding shared problems for the four regimes in operation: the NSG, AG, Wassenaar Arrangement (WA), and MTCR.[85]

The first point that can be raised is the increase in the number of countries participating in the export control regimes, which has resulted in the loss of the shared recognition of threat that existed among the original member countries. While the initial members were limited to the United States and other Western nations, after the end of the Cold War, countries from the former Soviet Union and from Eastern Europe also joined. While in the beginning the group shared the common objective of WMD nonproliferation, and was a gathering of countries in possession of skills for the manufacture of WMD-related materials, many of the newly entered members do not share either of these traits.[86]

The second point is that the principle of unanimity by consensus has been adopted for managing export control regimes. The newly entered members may include states that do not necessarily intend to always conform to the regulations of the international regimes. If such a country were to object to an updating of the restricted items list, proceedings based on the principle of consensus could be delayed, resulting in a restrictive list that could not keep up with rapid advances in technology.[87]

A third point is that the regime agreements do not have any coercive force, and enforcement of the agreement items is in the end left to the discretion of member states. Some member states have a tendency to place priority on national interest ahead of enforcement of international obligations. But because there is no mechanism for member states to apply sanctions against other member countries for such rule violations, we can imagine cases where the effectiveness of the export control regimes cannot be guaranteed.[88]

A final point that can be raised is the inability of member countries to share information with

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[83] Seema Gahlaut, "Multinational Export Control Regimes: Operations, Successes, Failures and the Challenges Ahead," in Daniel Joyner, et al., eds., *Non-Proliferation Export Controls: Origins, Challenges, and Proposals for Strengthening* (Hampshire: Ashgate Publishing Limited, 2006), pp. 14-15.
[84] Ibid.
[85] Ibid., pp. 11-23.
[86] Ibid., pp. 14, 17.
[87] Ibid., p. 17.
[88] Ibid., pp. 17-18.

each other on a timely basis. For example, a report by the U.S. Government Accountability Office (GAO) noted that effective information-sharing is not yet being performed in the NSG for many of the member countries regarding cases of non-approval of exports. In addition, the United States did not share AG-related (biological and chemical weapons-related) information with other member countries from 1996 to 2001, and about half of the members of the WA had not informed other member countries of cases of non-approval of exports by the deadline dates.[89] As a remedy, the GAO report included a proposal to construct a highly confidential online database that would enable the timely sharing of information. However, there is little sign of major improvement in the situation at the present time.

In addition to these problems, with wide dispersal of the advanced technologies and general-use technologies that can be used in the development of WMD, and the increasing mobility of technologists, it is becoming increasingly difficult for countries to both pursue their economic interests and observe the export regulations stipulated in the international regimes. Where companies find economic profit in exporting general-use technologies, and are engaged in fierce competition with companies in other countries, states are strengthening regulations to prevent advanced general-use technologies from being applied to military uses. As a result, more than a few private-sector companies feel dissatisfaction with the regulatory impediments on exports of general-use technologies that cause them to lose economic opportunities. In their place, new supplier countries for such technologies have arisen in such emerging states as China, India, and Israel. However, these emerging countries are also appealing markets for implementing technology cooperation in certain sectors. In such situations, the international regimes are faced with the dilemma of promoting the conflicting objectives of technological cooperation and proliferation prevention.[90]

Moreover, the nations of concern or terrorist organizations that are aiming for acquisition of WMD do not necessarily even require the most advanced technologies. For example, while the technologies possessed by North Korea, Pakistan, Malaysia, the United Arab Emirates, and other countries may not be the most advanced, they can be considered to be fully adequate for the force required. In particular, since the goal for terrorists intent on self-destruction is, above all else, damage to the enemy, they do not need to be concerned about safety even when making use of WMDs, which probably eliminates the necessity for advanced technologies. As a result, in order to prevent proliferation to terrorists, there is a need to review the level of technologies, resources, and materials targeted for export restrictions.[91]

(2) Proliferation Security Initiative (PSI)

While there are few PSI activity results that have been made public, a top U.S. government official revealed that more than 20 WMD-related shipments were interdicted in 2005 and 2006.

[89] Ibid., p. 18.
[90] Ibid., pp. 16-17.
[91] Ibid., pp. 17, 20.

Among these were parts related to Iran's ballistic missile development plans and, in the nuclear development area, parts related to heavy water manufacture.[92] There was also a case in February 2007 of four countries cooperating together to interdict the transfer to Syria of ballistic missile-related materials.[93]

One case where the PSI was clearly effective was Libya's abandonment of WMD. In September 2003, the cargo ship *BBC-China* heading from Malaysia to Libya via Dubai was interdicted while carrying centrifugal separator-related parts planned for use in Libya's nuclear development, and that incident led Libya to abandon its WMD development plans.[94] It has also been pointed out that Libya's procurement costs were twice the normal amount because it was being forced to use illegal methods to obtain WMD-related materials.[95]

However, this does not mean that there are no problems with the PSI. To participate in the PSI, a country must agree to the "Interdiction Principles for the PSI" created mainly by countries in the so-called "Core Group" most closely linked to its establishment. Under these principles, countries are asked to contribute to prevention of WMD proliferation based on a framework of domestic law, international law, and the UN Security Council.[96] "When," "where," and "how" the actual interdiction activities are implemented is left to the discretion of each country. At present more than 80 nations are PSI participants, but with the domestic law framework differing in each country, and with differences in interpretation of international law and foreign policy perspectives, failure to maintain a consistency of effort is a problem.[97] There is no agreement, for

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[92] Robert G. Joseph, U.S. Undersecretary for Arms Control and International Security, "Broadening and Deepening Our Proliferation Security Initiative Cooperation," Warsaw, Poland, June 23, 2006, <http://www.state.gov/t/us/rm/68269.htm> accessed on September 24, 2008.

[93] Remarks by National Security Advisor Stephen J. Hadley at the Proliferation Security Initiative Fifth Anniversary Senior Level Meeting, Washington Hilton Hotel (May 28, 2008), <http://www.whitehouse.gov/news/releases/2008/05/print/20080528-3.html> accessed on October 8, 2008.

[94] At the time, the United States and Britain were engaged in negotiations with Libya on the abandonment of its WMDs. The United States had asked to be allowed entry to related sites but Libya had refused. While the seizure of the BBC-China is viewed as the catalyst that induced Libya to allow entry to related sites, making possible the inspection of related facilities, there is much controversy over the reasons why Libya decided to abandon WMDs. Some argue that it was due to multiple factors, including the UN sanctions imposed on Libya for the PanAm airline bombing incident of 1988 over Lockerbie, and the 2003 Iraq war. Tsuyoshi Matsumoto, "Complete Abandonment of Weapons of Mass Destruction by Libya," *Journal of Middle Eastern Studies*, No.485 (2004－2005), pp. 52-53; Andrew C. Winner, "The Proliferation Security Initiative: The New Face of Interdiction," *The Washington Quarterly*, vol. 28, no. 2 (Spring 2005), pp. 137-138.

[95] Frantz and Collins, *The Nuclear Jihadist*, p. 302.

[96] "Proliferation Security Initiative: Statement of Interdiction Principles," September 4, 2003, <http://www.proliferationsecurity.info/principles.html> accessed on September 29, 2008.

[97] Winner, "The Proliferation Security Initiative," p.133. Regarding the interpretation of international law for PSI activities, some have noted that this is becoming fixed as the international norm, as evidenced by the call in UN Security Council Resolution 1540 for the adoption of measures by each country for interdiction of WMD proliferation, and the amendment to the Convention for the Suppression of Unlawful Acts against Vessels at Sea (SUA) in 2005 incorporating regulations for the prevention of illegal behavior using cargo ships, etc., and of WMD proliferation behavior. Richard T. Cupitt and Chris Jones, "The Proliferation Security Initiative: An Anti-Institution?" in Joyner, et al., eds., *Non-Proliferation Export Controls*, p.199; Michael Richardson, *The Proliferation Security Initiative (PSI): An Assessment of its Strength & Weakness, With Some Proposals for Shaping Its Future* (Singapore: Institute of Southeast Asian Studies, 2006), pp.12-14, <http:// www.iseas.edu.sg/tr32006.pdf>, accessed on October 8, 2008; United Nations Security Council, "United Nations Security Council Resolution 1540," <http://daccessdds.un.org/doc/UNDOC/GEN/N04/328/43/PDF/N0432843.pdf?OpenElement>, accessed on October 6, 2008.

example, on the details of what countries, companies, people, or goods are targeted by the PSI.[98]

However, the United States, which leads these activities, is clearly focusing its attention on Iran, North Korea, and Syria.[99] But China, which has a deep relationship with these countries, is not a participant in the PSI, and it has been pointed out that the non-participation of a regional power with influence over countries suspected of proliferation is a factor obstructing the effectiveness of PSI activities. South Korean participation was particularly desired in regard to North Korea, and South Korea announced its participation in the PSI after the second nuclear test by North Korea.[100]

Moreover, differences in the foreign policies of each country can have an effect on the operation of an effective PSI.

For example, the case of the *BBC-China* mentioned above was pursued against the background of close cooperation between the United States and Britain in regard to the issue of Libyan WMD abandonment, with the two countries of the United States and Britain being the core countries in terms of information sharing, and being joined by the cooperation of Germany, the location of the company with ownership of the cargo ship, and of Italy, the specified port of call.[101] This is surely an example of alignment of foreign policy among the involved countries having a positive effect on the PSI.

There was also a case, however, in which the clash of foreign policy between countries resulted in the tacit acceptance of a North Korean ship activity that should have been a target of the PSI.[102] In January 2007, the United States accepted the activity of a cargo ship that appeared to be carrying arms from North Korea to Ethiopia. While the details of the ship's cargo manifest are unknown, Ethiopia had long been purchasing tanks from former Soviet countries, and had in recent years appeared to be purchasing weapons from North Korea as well at a lower price, and this case appears to have been part of the same kind of transaction. However, UN Security Council Resolution 1718 targeting North Korea's ballistic missile test launchings and nuclear tests also includes measures prohibiting the transfer of WMD-related materials involving North

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98 Cupitt and Jones, "The Proliferation Security Initiative," pp. 201-202.

99 John R. Bolton, *Stopping the Spread of Weapons of Mass Destruction in the Asian-Pacific Region: The Role of the Proliferation Security Initiative*, Tokyo American Center, Field Program Design (October 27, 2004), <http://www.state.gov/t/us/rm/37480.htm>, accessed on October 2, 2008.

100 While the previous Roh Moo-hyun Administration had showed a negative stance toward participation in PSI because it would irritate North Korea, President Lee Myung-bak had taken a forward-looking stance to PSI even before his inauguration. In addition, participation by India is also important. In a case that predates establishment of the PSI, the seizure of the Ku-Wol San, which was carrying ballistic missile-related parts from North Korea to Libya, shows the possibilities of monitoring ships passing through the Bay of Bengal, the Indian Ocean, and the Arabian Sea. Mark J. Valencia, "The Proliferation Security Initiative: Making Waves in Asia," *Adelphi Paper*, no. 376 (London: Routledge, 2005), pp. 63-66.

101 Matsumoto, *Ribia niyoru Tairyo Hakai Heiki no Kanzen Haki [Complete Abandonment of Weapons of Mass Destruction by Libya*].

102 For details of this case, see the following media report: Michal R. Gordon and Mark Mazzetti, "North Koreans Arm Ethiopians as U.S. Assents," *The New York Times,* April 8, 2007, <http://www.nytimes.com/2007/04/08/world/africa/08ethiopia.html?_r=1&oref=slogin&pagewanted=print>, accessed on October 3, 2008.

Korea, as well as of tanks and other military supplies and parts,[103] and there is a possibility that funds obtained from the sale of the weapons will be diverted to WMD development.

Not only is prevention of North Korean WMD development and its proliferation a matter of international agreement, it is naturally an extremely important policy issue for the United States as well. On the other hand, the fight against Islamic fundamentalism is a priority issue for US foreign policy, and since Ethiopia is projecting force against Islamic forces in the neighboring country of Somalia, the United States provides support for that effort. If the response of the United States, the leader of the PSI, appears to be one-sided when two foreign policy issues clash in this way, the content of activities is left to the discretion of each country, and the risk of damage to the consistency of PSI activities is also present.[104]

Moreover, the fact that more than 90% of general-use items now distributed on the regular market could be of use in WMD is another reason for the difficulty of PSI interdiction activities.[105] Not only is it difficult to discern whether specific resources and equipment are to be used in WMD, stopping ordinary commercial vessels for the purpose of inspection unavoidably causes economic losses for the involved companies, etc., which means that sufficient evidence for targeting needs to be presented by the PSI. In a case before the advent of the PSI, in August 1993, the Chinese freighter *Yinhe* bound for Iran was stopped by the United States on suspicion of carrying precursor materials necessary for the manufacture of mustard gas and sarin gas. However, the material was not found in a search of the ship. China demanded an apology and compensation from the United States but was refused.[106] Even when PSI participant countries consider taking an interdiction action, fear of such a failure probably causes them to think twice about launching an interdiction action.[107]

While the main target of the PSI is cargo ships, there are some problems that should be pointed out in regards to the marine shipping that handles the vast majority of international distribution. First is the problem of ship registration. Many of the cargo ships transporting WMD-related materials are Flag of Convenience ships.[108] Flag of Convenience ships refers to registration of cargo ships in foreign countries, with the laws of the country of registration being applied. This

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[103] United Nations Security Council, "United Nations Security Council Resolution 1718," <http://daccessdds.un.org/doc/UNDOC/GEN/N06/572/07/PDF/N0657207.pdf?OpenElement>, accessed on October 3, 2008.

[104] For political reasons, the United States is not engaging in interdiction activities of cargo ships going in and out of India, Israel, and Pakistan. In addition, out of dissatisfaction at the failure of the United States to ratify the United Nations Convention on the Law of the Sea for regulating the freedom of ocean navigation, Netherlands, a PSI core member, has hinted that it may leave the PSI, while Norway and Russia have stated that they will not participate in activities that contravene international law and domestic law. Valencia, *The Proliferation Security Initiative,* pp. 70-72.

[105] Ibid.

[106] Winner, "The Proliferation Security Initiative," pp. 130-131.

[107] Ibid., pp. 138-139; Richard T. Cupitt and Chris Jones, "The Proliferation Security Initiative: An Anti-Institution?" in Joyner, et al., eds., *Non-Proliferation Export Controls*, p. 208.

[108] Some figures show that Flags of Convenience ships account for 60% of the world's commercial vessels. Donna J. Nincic, "The Challenge of Maritime Terrorism: Threat Identification, WMD and Regime Response," *The Journal of Strategic Studies*, vol. 28, no. 4 (August 2005), pp. 633-634.

has many economic benefits for ship operations, due to relaxation of various regulations.[109] Flag of Convenience ships are not necessarily always present in the country of registration, with most being active overseas, and with crews consisting mainly of foreigners. Moreover, frequent changes of a ship's registry and a ship's name are said to make monitoring by satellite or aircraft difficult. And even if there is suspicion that a ship in transit on the high seas is carrying WMD-related materials, under international law the ship cannot be boarded and searched without the consent of the country of registration.[110] For this reason, as one aspect of the PSI the United States has signed bilateral treaties with countries such as Liberia, Panama, and the Marshall Islands, which have large numbers of Flag of Convenience ships, allowing U.S. authorities to board ships of third countries on suspicion of carrying WMD-related materials and missiles, even on the high seas.[111]

In addition, the United States is at the center of multilayered efforts to prevent WMD terror using international marine shipping. One of these efforts, for example, is called the Container Security Initiative (CSI). The CSI was implemented after 9-11, beginning in 2002, with U.S. customs officials being stationed in ports in countries all over the world to monitor and inspect the content of containers using inspection equipment, and is intended to prevent terrorism in the form of WMDs being hidden in marine shipping containers and then blown up inside the United States. As of October 2007, a total of 34 countries (with 58 ports) were participating, with cooperation in Japan at the ports of Tokyo, Yokohama, Kobe, and Nagoya.[112]

Underlying these efforts is the fact that 90% of internationally traded cargo uses containers, with 230 million containers being shipped each year, and the fact that the contents of these containers are not being carefully inspected. For example, it is reported that 6 to 7 million containers (about 40% of international shipping) enter the United States each year, but no more than 5% of these are inspected, while the percentage for the world is less than 1%.[113]

Other efforts include the Megaports Initiative being promoted by the U.S. Department of Energy's National Nuclear Security Administration. This is an effort to prevent the proliferation of nuclear materials or radioactive materials through installation of radioactive material detection

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[109] Koichi Kihata, *Bengi Chiseki Sen—Umi no Takokuseki Kigyo* [*Flags of Convenience Ships—The Sea's Multinational Corporations*] (Seizando Shoten, 1974), pp. 156-157.

[110] Nincic, "The Challenge of Maritime Terrorism," p. 634.

[111] Ibid., p. 635.

[112] See the below materials: U.S. Department of Homeland Security Customs and Border Protection, "CSI Fact Sheet," (October 2, 2007), <http://www.cbp.gov/linkhandler/cgov/trade/cargo_security/csi/csi_fact_sheet.ctt/csi_fact_sheet.doc>; and "Container Security Initiative: Securing the Trade Lanes," <http://www.cbp.gov/linkhandler/cgov/trade/cargo_security/csi/csirev_1002.ctt/csi_presentation.ppt>, accessed on January 15, 2009; and Japan's Ministry of Foreign Affairs, "Efforts Regarding 'Safe and Smooth Trade' between Japan and the United States," July 2008, <http://www.mofa.go.jp/mofaj/area/usa/keizai/trade_07.html>, accessed on September 18, 2008.

[113] Nincic, "The Challenge of Maritime Terrorism," p. 624.

facilities at major ports around the world, and 27 countries and regions were participating as of May 2008. In Japan, test operations at the Port of Yokohama commenced in July 2008.[114]

As can be seen, the effectiveness of the PSI is limited because it relies on the discretion of individual countries for interdiction activities, and because some countries with influence on states suspected of the targeted activities are not participants. Furthermore, even container monitoring requires more efforts to boost its efficacy, as can be seen by North Korea's apparent past use of non-participating Chinese ports (i.e. Tianjin Port) for the shipment of WMD-related materials.

(3) Domestic Laws

In Japan, the export of weapons, related materials and equipment that contribute to the development and manufacture of WMDs, etc., of general-use items related to conventional weapons, and of related technologies, is regulated by the Foreign Exchange and Foreign Trade Act (Foreign Exchange Act), and such exports require the approval of the Minister of Economy, Trade and Industry.[115] These restricted items and technologies are regulated in further detail under lists attached to the government-issued Export Trade Control Order and Foreign Exchange Order. The restricted items and technologies regulations are based on the multilateral NSG, AG, WA, and MTSR export control regimes in which Japan is a participant. As a result, Items 1 to 15 in the lists attached to both the Export Trade Control Order and the Foreign Exchange Order consist of restricted items from these regimes, and are referred to as the "Control List.[116]" Approval from the Minister of Economy, Trade and Industry is mandatory when materials and technologies corresponding to specs on the Control List are exported.

In addition, a framework called the "Catch-All Control" was introduced in 2002, requiring the approval of the Minister of Economy, Trade and Industry for the export of materials and technologies that, while not corresponding to the Control List, are viewed as meeting various conditions that point to concerns about their use in WMD development. These are regulated under Item 16 in the list attached to the Export Trade Control Order and Foreign Exchange Order. In the Catch-All Control, if items are found to be going to a region other than a group of 26 countries (white countries), such as the United States and other Western countries where export control are strictly implemented, or if the exported materials and technologies are shown to have

[114] See the below materials: U.S. Department of Energy National Nuclear Security Administration, "Megaports Initiative: Protecting the World's Shipping Network from Dangerous Cargo and Nuclear Materials," <http://nnsa.energy.gov/nuclear_nonproliferation/1641.htm>, accessed on September 18, 2008; and Japan's Ministry of Foreign Affairs, "Efforts Regarding 'Safe and Smooth Trade' between Japan and the United States."

[115] Export of cargoes specified in Article 48 Paragraph 1 of the Foreign Exchange Act, and of technologies specified in Article 25 Paragraph 1 of the same law, is regulated as requiring the approval of the Minister of Economy, Trade and Industry. Center for Information on Security Trade Control, *Japan's Security Export Control System*, <http://www.cistec.or.jp/export/yukan_gaiyou/anpo_gaiyou/index.html>. Also see the Ministry of Economy, Trade and Industry, *Security Export Control Handbook, 2nd edition, 2007*, <http://www.meti.go.jp/policy/anpo/kanri/bouekikanri/daigaku/0803handbook.pdf>. Both accessed on October 7, 2008.

[116] Items correspond to the following regimes: Item 1 (WA-related); Item 2 (NSG-related); Item 3 (AG-related); Item 4 (MTCR-related); and Items 5 to 15 (WA-related).

a good possibility of being diverted to WMD development based on trade documentation or on other provided information, approval from the Minister of Economy, Trade and Industry is required in the same way as with the Control List.

However, even with these export control regulations in place, the international nuclear black market procurement network revealed in recent years has exposed the involvement of Japanese companies. For example, the most striking example of a violation of the Foreign Exchange Act was by the precision measuring instrument manufacturer Mitsutoyo Corporation, which filed an application purposely understating the performance of a three-dimensional measuring instrument that could be used in the development of nuclear weapons and exported it to Malaysia without obtaining approval from the Ministry of Economy, Trade and Industry. A few of the three-dimensional measuring instruments exported by Mitsutoyo were discovered at a nuclear-related facility in Libya, exposing the involvement of a Japanese company. What merits attention as the *modus operandi* for this illegal export is that the export to a Malaysian affiliate went through a Singapore subsidiary. It was then passed from the Malaysian affiliate to Scomi Precision Engineering Sdn. Bhd., a Malaysian company exporting centrifugal separator-related parts to Libya as one part of the Khan Network. Since it is impossible to apply Japan's export control regulations after export of equipment from overseas affiliates, it appears that exports that detour through a third country are taking advantage of a loophole in export controls. Since this detour export route has surfaced, the Ministry of Economy, Trade and Industry has provided guidance on export controls to companies with overseas subsidiaries.[117]

Leakage of advanced information technology from universities and research institutions is also a problem causing concern. With universities becoming more international, increasing numbers of foreign exchange students are coming to Japan to study, and the possibility is growing that technologies that should be targeted for restriction may be illegally supplied via these exchange students, foreign researchers, etc. According to a report prepared at Tohoku University in March 2008, "Response to Foreign Exchange Act," there were 118,598 foreign exchange students in Japan as of 2007, an increase of more than double the number over 10 years earlier (51,298 students in 1998).[118] Moreover, there have been cases of export-restricted equipment used in international joint research being taken overseas without receiving the necessary export permissions, including an infrared radiation thermometer (thermotracer) and a high-speed camera.[119] Against this background, the Ministry of Economy, Trade and Industry and the Ministry of Education, Culture, Sports, Science and Technology issued seven directives from

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[117] Ministry of Economy, Trade and Industry, "Comprehensive Strengthening of Export Controls" News Release (April 1, 2005), <http://www.meti.go.jp/press/20050401006/050331yusyutu.pdf>, accessed on October 6, 2008.

[118] Tohoku University Office of Cooperative Research and Development, *Response to Foreign Exchange Act.*, FY2007 Ministry of Education, Culture, Sports, Science and Technology, University Intellectual Property Headquarters Development Project, "Model Program Related to Building a 21st Century-Style Industry, Academia, and Government Cooperation Method," Performance Report (March 2008), p. 24, <http://www.rpip.tohoku.ac.jp/honbu/tohokuunvfe.pdf>, accessed on October 7, 2008.

[119] Ministry of Economy, Trade and Industry, "Comprehensive Strengthening of Export Controls."

2005 to 2008 calling for vigilance in observance of the Foreign Exchange Act, and providing information about the rules. Nevertheless, the results of a questionnaire survey included in the above report that was sent to 42 universities regarding the current state of export controls at universities showed that only two of the universities had actually established an on-campus system for handling export control based on the Foreign Exchange Act, and that only two other universities had plans to do so in the future. Moreover, it was revealed that about 60% of the respondents (21 universities) have not even studied the possibility of establishing such an on-campus organization. Other reasons given for the lack of action in this area were resistance among researchers to regulation of research activities, and a lack of know-how regarding the building of an export control system on-campus, etc.,[120] revealing the difficulties of export controls in the academic sector.

4. Utilization of Skills Held by the Ministry of Defense and Self-Defense Forces

Finally, the Ministry of Defense and Self-Defense Forces can make specific contributions to the prevention of WMD proliferation. In this regard, first we offer an overview of efforts by the United States, which is most aggressively engaged in the prevention of WMD proliferation. While the fight against the WMD threat proposed by the United States takes an extremely broad approach, here we focus on the efforts of the U.S. Department of Defense and the U.S. military, and use it as a touchstone for investigating the Ministry of Defense and Self-Defense Force contribution.

(1) U.S. Military Efforts Regarding the WMD Threat

The "National Strategy to Combat Weapons of Mass Destruction," announced in December 2002 following the 9-11 terrorist attacks, shows a recognition of the reality of terrorists obtaining WMDs and making use of them, and positions it as one of the United States' top security issues.[121] Efforts to meet this threat are presented in three pillars, with specific content as follows.[122]

1) Counterproliferation
   Interdiction
   Deterrence
   Defense and Mitigation

[120] See the below reports at the Japan Association of International Security and Trade Seventh Research Conference (September 13, 2008): Tadashi Yoshida, chairman of the International Cooperation Office at the Tohoku University Office of Cooperative Research and Development, "Current State of Building a University Export Controls System;" and Sadashi Higuchi, National Institute of Advanced Industrial Science and Technology, "*Daigaku - Kennkyuu no Yusyutsu Kanri nitsuite*."

[121] *National Strategy to Combat Weapons of Mass Destruction*, December 2002, <http://www.whitehouse.gov/news/releases/2002/12/WMDStrategy.pdf>, accessed on August 21, 2008, pp. 2-6.

[122] Ibid, pp. 2-6. Heigo Sato, "Counterproliferation and U.S. Security," Center for the Promotion of Disarmament and Non-Proliferation, *U.S. Nuclear Policy, and Nuclear Disarmament and Nonproliferation Policy* (March 2007).

2) Nonproliferation
    Active Nonproliferation Diplomacy
    Multilateral Regimes
    Nonproliferation and Threat Reduction Cooperation
    Nuclear Material Controls, Export Controls, and Economic Sanctions
3) WMD Consequence Management
    Minimization of Damage to U.S. from WMD Use
    Response to WMD Use Against Allied and Friendly Nations, etc.

One item of particular note here is "counterproliferation." Counterproliferation is divided into two categories, with the preventive methods for forestalling the future proliferation of nuclear weapons and other WMDs being joined by protective methods for dealing with the threat of weapons that have already proliferated.[123] Specifically, prevention of WMD proliferation, removal and dismantling, deterrence, and military preparations against WMD use are included.[124] When a country intends to develop and possess WMDs or methods of delivering them (ballistic missiles), there are multiple methods that can be incorporated into counterproliferation so that it plays a role in the general suppression of WMD proliferation and use, including raising the costs of acquiring WMDs, and nullifying any military and political benefits that accrue from having them.[125] This strategy, announced under the Bush Administration, appears to be viewed as more important than the other two pillars, and a proposal for interdiction activities was later incorporated into the PSI.[126]

The policies presented in the "National Strategy to Combat Weapons of Mass Destruction" include many items that span multiple departments and agencies, and a number of military methods are also being investigated.[127] Then, in February 2006, the Department of Defense unveiled the "National Military Strategy to Combat Weapons of Mass Destruction," drawn up for the purpose of providing military support for these three pillars (counterproliferation,

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[123] Shuichiro Iwata, *Kaku Senryaku to Kaku Gunbi Kanri—Nihon no Hikaku Seisaku no Kadai* [*Nuclear Strategy and Nuclear Armament Controls—Issues in Japan's Nonnuclear Policy*] (The Japan Institute of International Affairs, 1996), pp. 51-52, Heigo Sato, "Counterproliferation and U.S. Security," p. 91.

[124] Shinichi Ogawa, *Kaku Gunbi Kanri Gunshuku no Yukue* [*The Future of Nuclear Armament Controls and Disarmament*] (Ashi Shobo, 1996), pp. 264-265.

[125] Ibid, pp. 265-266.

[126] Winner, "The Proliferation Security Initiative," pp. 130-132.

[127] The *National Strategy to Combat Weapons of Mass Destruction* investigates a number of military methods in the section on "counterproliferation." For example, interdiction activity is posited as playing an extremely important role in fighting the WMD threat, necessitating the strengthening of military, information, technology, and legal institutions to prevent the proliferation of related parts and technologies to enemy states or to terrorists. Deterrence requires effective military force to respond to current threats that are impossible to predict, and responding to an attack using WMDs on the United States and allied countries with a counterattack that brings overwhelming military force to bear. For defense and mitigation measures, U.S. military and other institutions must be able to detect the state of WMD possession by enemy forces and have the capability to take preemptive measures, and it is proposed that missile defense be used to nullify an attack using WMDs. *National Strategy to Combat Weapons of Mass Destruction*, pp. 2-6.

nonproliferation diplomay, and minimization of damage).[128] This document lists eight categories as roles for the U.S. military, as shown below.[129]

1) Offensive Operations

Use conventional weapons, nuclear weapons, and intelligence operations to deter and destroy the threat of enemy WMDs. The objective is to detect, discern, and destroy enemy WMDs, related facilities, and methods of delivery. There will also be cases in which capabilities are needed to discover, secure, stabilize, and destroy stolen or lost WMDs, and to destroy related facilities that are buried deep underground. A capability is needed to prevent secondary damage when destroying biological and chemical weapons. Target the weak points in WMD proliferation routes.

2) Elimination Operations

The objective is to monitor WMD development plans by state and non-state entities, and to neutralize or destroy them. Depending on the nature of the attack, this action may require risks that cannot be condoned by the country's citizens or by U.S. military and allied forces. If elimination actions reach a specific stage, it may also be possible to transfer responsibility to other U.S. government institutions or to international institutions, and then monitor to ensure that manufacture of general-use parts or development of WMD is not restarted. The Department of Defense is currently organizing this task as doctrine, and is providing training, personnel, and related material.

3) Interdiction Operations

Prevent the shipment of WMDs, their methods of delivery, and related resources and technologies to states of concern or to non-state entities. Since trade in WMDs is becoming more complex and increasing, cooperation among departments and agencies is needed. Interdiction action must be timely with a high degree of assurance, and adequate intelligence is needed to instigate an action.

4) Active Defense

Specific active defense measures that can be taken against a WMD attack include missile defense and anti-air operations. A multi-tiered defense capability is a synthesis of systems based on land, sea, air, and space in the mainland U.S. and in other regions.

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[128] Chairman of the Joint Chiefs of Staff, *National Military Strategy to Combat Weapons of Mass Destruction* (February 13, 2006), <http://www.defenselink.mil/pdf/NMS-CWMD2006.pdf>, accessed on August 27, 2008. Then-U.S. Defense Secretary Donald H. Rumsfeld touched on this point in his introduction to the document, and it is also discussed on p. 22 of the document.

[129] Ibid., pp. 22-27.

5) Passive Defense

Passive defense is a policy for minimizing or eliminating the damage of a WMD attack against the United States and its allies, and against important U.S. military infrastructure, etc., and the following four capabilities are needed: (1) the capability to detect a CBRN (chemical, biological, radiological, and nuclear) attack (Sense); (2) the capability to estimate current threats and future dangers (Shape); (3) the capability to defend against attack (Protect); and (4) the capability to execute an operation even in contaminated environments (Sustain). These are also related to elimination action, interdiction action, and WMD consequence management.

6) WMD Consequence Management

Reduce the damage of a WMD attack or incident, and perform the requisite military operations and restore services. If instructed, the U.S. military will respond not just in the United States but also for allied countries as well.

7) Security Cooperation and Partner Activities

Seek international cooperation in the fight against WMDs. Some representative examples are the PSI and the establishment of the NATO (North Atlantic Treaty Organization) CBRN defense unit. In the field of nonproliferation activities, the U.S. military can offer support with treaty compliance, sanction activities, export controls, etc.

8) Threat Reduction Cooperation

Provide defenses for the WMD development programs, storage facilities, etc., of certain states, install detection devices, and perform disarmament and dismantling.

The U.S. military is strengthening its capabilities in these eight sectors to better handle the fight against WMDs. Moreover, the "National Strategy to Combat Weapons of Mass Destruction" notes the importance of intelligence in effectively utilizing these capabilities.[130] While recognizing that there are limits to the collection of the intelligence needed for implementing plans and operations in the fight against WMDs, improvement can come through the development of capabilities for early warning of an attack using CBRN, and through a merging of operations and intelligence that can improve WMD-related information collection, assessment, and dissemination. With early detection of the WMD threat, intelligence institutions could be able to learn details of WMD-related facilities, and therefore provide options for policy decisionmakers.[131]

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[130] Chairman of the Joint Chiefs of Staff, *National Military Strategy to Combat Weapons of Mass Destruction,* pp. 20-21.

[131] Ibid.

(2) Importance of Intelligence in Regards to WMD

By strengthening intelligence, what the U.S. military wants is possession of an intelligence capability for grasping the state of WMD and related technology transfers from certain specific countries to other countries, to interdict such shipments, and also to discern the state of WMD development and possession in those countries. Specifically, then, what kinds of intelligence are required? While this will be covered in more detail below, the categories that the U.S. Air Force uses as key intelligence for determining the WMD threat include human intelligence (HUMINT), measurement and signature intelligence, (MASINT), signals intelligence (SIGINT), and imaging intelligence (IMINT).[132]

Information obtained from multiple intelligence sources has played a certain role in intelligence activities implemented in the past for WMD proliferation prevention activities. For example, according to a report presented to President Bush by The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction[133] in March 2005, intelligence activities related to Libya's WMD development can be considered an example of success.[134]

One characteristic of Libya's nuclear weapon development plans was its heavy dependence on the Khan Network, and the above report notes that U.S. intelligence institutions had acquired a great deal of information about that network.[135] In particular, when viewed from the perspective of nuclear nonproliferation activities, the seizure of the *BBC-China* cargo ship carrying nuclear-related materials bound for Libya can be considered a major success.[136] Jeffrey T. Richelson of the National Security Archive includes in a book he authored a quote by former CIA director George Tenet that "our intelligence network had infiltrated right into the house, the facilities, and the rooms of Dr. Khan," and also states that the route of the *BBC-China* was obtained through intelligence-gathering activities using satellites and other technological methods.[137]

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[132] Cristina M. Stone, "Air Force Intelligence Role in Combating Weapons of Mass Destruction," *Air War College Maxwell Paper*, no. 39 (November 2006), p. 17. For explanations of the terms "human intelligence," "measurement and signature intelligence," "signals intelligence," and "imaging intelligence," see Fumio Ohta, *Interigyensu to Kokusai Jyoho Bunseki* [*Intelligence and International Situation Analysis*] (Fuyo Shobo Shuppan, 2007), pp. 14-16.

[133] This commission was established by Presidential Executive Order No.13328 (February 6, 2004), and over the period of a year surveyed the capabilities of U.S. intelligence institutions in information gathering, analysis, and reporting activities on WMD proliferation. It assessed intelligence-gathering activities related to Iraq, Libya, and the Khan Network. This report can be obtained from the following Web site: <http://www.wmd.gov/about.html>, accessed on August 18, 2008.

[134] Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, "Report to the President of the United States," <http://www.wmd.gov/report/wmd_report.pdf>, accessed on August 18, 2008, p. 11.

[135] Ibid, pp. 257-258. Moreover, it is reported that people were providing information from inside the Khan Network as HUMINT. Frantz and Collins, *The Nuclear Jihadist*, pp. 299-330.

[136] In October 2003, the United States, Britain, Germany, and Italy cooperated in the inspection of the German-registered cargo ship *BBC-China* in the southern Italian port of Taranto, seizing several thousand centrifugal separator-related parts planned to be used for uranium enrichment in Libya. These parts had been manufactured in Malaysia, and then transshipped by way of a trading company in Dubai of the UAE. Press Release by Inspector General of Police (Malaysia) in Relation to Investigation on the Alleged Production of Components for Libya's Uranium Enrichment Programme, released February 20, 2004, <www.iranatom.ru/reports/rep059.htm>, accessed on July 4, 2008.

[137] Jeffrey T. Richelson, *Spying on the Bomb: American Nuclear Intelligence from Nazi Germany to Iran and North Korea* (New York: W.W. Norton and Company, 2007), p. 542.

(3) Intelligence Capabilities Possessed by the Ministry of Defense and Self-Defense Forces

While the U.S. military utilizes intelligence capabilities to contribute to efforts for the nonproliferation of WMD around an axis of proliferation resistance, there is also a question of how much of a contribution that Japan's Ministry of Defense and Self-Defense Forces can make. Of the HUMINT, MASINT, SIGINT, and IMINT intelligence deemed necessary to fight the proliferation of WMDs, the Ministry of Defense and Self-Defense Forces possess all of the intelligence capabilities of the United States, with the exception of HUMINT.[138] While assessment of these capabilities is difficult, we can attempt to gain a perspective by looking at the responses of the United States, South Korea, and Japan to the North Korean underground nuclear test of 2006.

The North Korean nuclear test on October 9, 2006 was confirmed after a U.S. Air Force WC-135 aircraft taking air samples near North Korea detected xenon gas on the 11th of that month.[139] Collection of xenon gas is a MASINT activity.[140] The WC-135 was being operated by the U.S. Air Force Technical Applications Center (AFTAC), which is located at Patrick Air Force Base in the state of Florida. AFTAC has since 1973 been assigned the task of monitoring nuclear tests implemented anywhere in the world, and operates the U.S. Department of Energy's U.S. Atomic Energy Detection System (USAED). It cooperates with the international nuclear test monitoring network developed by the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO), and includes a facility for the analysis of radionuclides (debris). It also has a facility in South Korea for measuring the seismic waves that accompany underground nuclear tests.[141]

South Korea is said to have detected xenon at this same time.[142] South Korea made specific moves toward installation of xenon gas detection equipment from the moment of North Korea's announcement in early October that it had performed a nuclear test, and appears to have brought this equipment on line the day after the nuclear test. In addition, it was reported that Korean Army soldiers with specialist level knowledge in geology, etc., were dispatched to the Korean Institute of Geoscience and Mineral Resources (KIGAM) to strengthen monitoring of the seismic

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[138] The Defense Intelligence Headquarters includes a Signals Intelligence Division and Imagery Division, which handle SIGINT and IMINT. Ohta, *Interigyensu to Kokusai Jyoho Bunseki* [*Intelligence and International Situation Analysis*], p. 23. While Measurement and Signature Intelligence is covered in more detail below, the Air Self-Defense Force has a limited MASINT intelligence gathering capability.

[139] Public Affairs Office, Office of the Director of National Intelligence, "Statement by the Office of the Directorate of National Intelligence on the North Korea Nuclear Test," October 16, 2006, <http://www.dni.gov/announcements/20061016_release.pdf>, accessed on August 18, 2008; Kinji Koyama, "Was the North Korean Nuclear Test a Failure? Or a Success?," Center for the Promotion of Disarmament and Non-Proliferation, October 31, 2006, http://www.cpdnp.jp/pdf/DPRKnuke_test1031.pdf, accessed on August 18, 2008. On the WC-135 activities, see the Global Security Web site: "Intelligence: Constant Phoenix WC-135W," <http://www.globalsecurity.org/intell/systems/constant_phoenix.htm>, accessed on August 18, 2008.

[140] Ohta, *Interigyensu to Kokusai Jyoho Bunseki* [*Intelligence and International Situation Analysis*], p. 16.

[141] On this point, see the AFTAC and Federation of American Scientists web site: "Air Force Technical Applications Center," http://www.afisr.af.mil/library/factsheets/factsheet.asp?id=10309, accessed on January 15, 2009; "AFTAC Introduction," <http://www.fas.org/irp/agency/aftac/intro.htm>, accessed on August 20, 2008.

[142] *Yomiuri Shimbun*, October 25, 2006, http://www.yomiuri.co.jp/feature/fe7000/news/20061025i213.htm, accessed on August 19, 2008.

waves generated by the nuclear test.[143] Since South Korea joined the Comprehensive Nuclear Test Ban Treaty (CTBT), KIGAM, an earthquake monitoring institution under the Ministry of Education, Science and Technology, has constantly monitored seismic waves as a part of the international nuclear test monitoring network.[144]

Concerning the response of Japan's Ministry of Defense and Self-Defense Forces, a T-4 belonging to the Air Self-Defense Force flying over Japan Airspace Region 3 (this region was expanded on the 13th of that month) failed to collect any substances that were a product of the North Korean nuclear test.[145] For seismic waves, on the other hand, the Meteorological Agency observed a seismic wave with an origin in North Korea on the day of the nuclear test (the 9th), and announced analysis results on the 11th that showed it had not been a natural earthquake. Nevertheless, they refrained from confirming that the quake had been due to a nuclear test.[146] The Japanese government announced on the 27th that an integrated analysis of independently collected intelligence coupled with intelligence provided by other countries showed that there was a high probability that North Korea had performed a nuclear test.[147] However, this should probably be read as saying that Japan was unable to find evidence for the nuclear test based on independent intelligence activities.

Since the United States was able to conclude that North Korea had conducted a nuclear test based on the detection of xenon (Xe), as described above, Japan should probably strengthen its own xenon collection capabilities. While the Ministry of Defense and Self-Defense Forces, and other relevant institutions in Japan, implemented radiation measurement all over the country, they were unable to detect radionuclides. For effective radiation monitoring, specialists have pointed out that knowledge of nuclear tests is essential, and particularly knowledge about dispersion of radioactive substances released from the proximity of the blast center and their flow through the atmosphere.[148] As part of efforts to strengthen its nuclear test montitoring system,

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[143] *JoongAng Ilbo*, August 20, 2006, <http://japanese.joins.com/article/article.php?aid=79041&servcode=200&sectcode=200>, accessed on August 19, 2008.

[144] See the web site of the Korea Institute of Geoscience & Mineral Resources, <http://www.kigam.re.kr/eng/butt02/main3.asp>, accessed on August 19, 2008.

[145] In addition to the Ministry of Defense and Self-Defense Forces, the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of the Environment also performed measurements of radiation dosage rates, collection and measurements of aboveground airborne dust, and collection and measurements of fallout, at affiliated facilities all over the country, but none were able to collect data showing a nuclear test. Ministry of Defense and Self-Defense Forces, "On Cooperation for Strengthening Monitoring," <http://www.mod.go.jp/j/news/2006/10/12b.html>; Ministry of Education, Culture, Sports, Science and Technology, "On the Results of Monitoring Radiation Effects in Regards to the North Korean Nuclear Test Announcement," October 24, 2006, <http://www.mext.go.jp/b_menu/houdou/18/10/06101104.htm>, both accessed on August 18, 2008.

[146] Meteorological Agency Report Briefings, "Seismic Wave Analysis Results Related to North Korea," October 9, 2006, "On Seismic Waveform at 10:35 on October 9," October 9, 2006, <http://www.jma.go.jp/jma/press/0610/09a/20061009kitachosen.html>, <http://www.jma.go.jp/jma/press/0610/11a/20061011kitachosen.html>, accessed on August 19, 2008.

[147] Chief Cabinet Secretary Press Release, "Receipt of North Korean Announcement of Underground Nuclear Test on October 9," October 27, 2006, <http://www.kantei.go.jp/jp/tyoukanpress/rireki/2006/10/27_p.html>, accessed on August 19, 2008.

[148] Koyama, "Was the North Korean Nuclear Test a Failure? Or a Success?," pp. 1-2.

Japan installed a device capable of collecting xenon at Takasaki that went into operation in January 2007.[149]

The Ministry of Defense and Self-Defense Forces should act to train specialists in seismic wave monitoring, and should also cooperate with existing nuclear test monitoring institutions, establish an independent nuclear test monitoring network at posts and bases all over Japan, and strengthen their xenon collection technology.

Of this important intelligence, the Ministry of Defense and Self-Defense Forces have IMINT and SIGINT functions at the Defense Intelligence Headquarters. Moreover, when the limited possession of MASINT collection functions is considered, it is plain that the role played by the Ministry of Defense and Self-Defense Forces in prevention of WMD proliferation is not a small one. What is important is that cooperation with other intelligence institutions is required to boost the certainty of the intelligence obtained.

Regarding the effectiveness of SIGINT, a number of possibilities can be considered for investigating its role in eradicating terror networks after 9-11. First, prevention of WMD possession by enemy states and terrorist groups is an urgent issue for the United States and for Japan as well, and SIGINT is important for grasping trends. It should go without saying that, for effective opposition to international terrorist organizations that are globally active, cooperation in intelligence activities and sharing of intelligence is desirable.[150] A particularly famous grouping for international SIGINT collection is the UKUSA agreement regulating cooperation among the SIGINT institutions of the five countries of the United States, United Kingdom, Canada, Australia, and New Zealand. These five countries have cooperated to prevent terrorist acts in the United States and United Kingdom, and maintain links between intelligence institutions and investigative authorities, both within and among the member countries. SIGINT appears to have been successful in catching the e-mails and phone conversations of terrorists planning attacks, in tracking Al Qaeda identities and networks, and in detaining Al Qaeda-affiliated people.[151] Elsewhere, Canada's SIGINT institution, the Communication Security Establishment (CSE), contributed to the rescue in March 2006 of a Canadian held hostage by Iraqi armed forces.[152]

In addition, as is clear from the case of the Khan Network, the methods for purchasing WMD-related materials entail the involvement of a large number of middlemen and front companies in a complex framework. If the application of the PSI and other interdiction action causes the shipment routes to shift away from sea routes toward the use of air and land routes, and also toward methods that involve the transfer of know-how related to WMD manufacture,

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[149] Japan Atomic Energy Agency, "Okinawa Monitoring Facility Obtains International Certification–Start of Operations at All of Japan's CTBT Radionuclide Monitoring Facilities," February 23, 2007, <http://www.jaea.go.jp/02/press2006/p07022303/index.html>, accessed on August 20, 2008.

[150] Martin Rudner, "Canada's Communications Security Establishment, Signals Intelligence and Counter-Terrorism," *Intelligence and National Security*, vol. 22, no. 4 (August 2007), pp. 479-484.

[151] Ibid.

[152] Ibid.

detection of proliferation could well become extremely difficult.[153] As SIGINT has been shown to play an important role in revealing terrorist groups and their networks, it should also be able to contribute to understanding the increasingly complex WMD proliferation networks. In addition, cooperation between intelligence institutions and investigative authorities, both within and among countries, can be expected to contribute to the smooth operation of the PSI and other interdiction actions.[154]

(4) Means Possessed by the Ministry of Defense and the Self-Defense Forces

Of the eight categories of capabilities possessed by the U.S. military listed above, the Ministry of Defense and Self-Defense Forces could play a certain role in the "WMD Consequence Management" sector. In the Mid-Term Defense Program (FY2005 to FY2009), the Ministry of Defense and Self-Defense Forces included efforts to improve resistance capabilities to nuclear, biological, and chemical weapons (NBC weapons), and established the Central Special Weapons Protection Unit within the Central Readiness Force that was newly established in 2007. This unit is assigned the task of protecting units and Self-Defense Force personnel from attack by NBC weapons.[155]

Furthermore, development of capabilities for prevention, detection, protection, diagnosis, treatment, and contamination functions in response to an attack by NBC weapons was incorporated as a major project in the FY2007 Defense Program. In addition, development of an NBC recon vehicle for handling this kind of situation is also in progress.[156] The Self-Defense Forces have experience in performing decontamination operations, in 1995 for the subway sarin gas incident, and in 1999 for the criticality accident at the JCO uranium processing plant in Tokaimura in Ibaraki prefecture, and in case of a biological weapons attack, it is the Self-Defense Forces that will take the lead in performing decontamination activities, transport of patients, and medical activities.

On the other hand, Self-Defense Force capability to resist attacks using nuclear weapons or devices for scattering radioactive substances (dirty bombs), etc., is limited to equipment held by chemical units.[157] In the case of a terrorist attack, however, there would be a need to determine who actually committed the crime. Here, attention turns to a technology for determining the instigator of terrorist attacks using WMDs. This technology is called "Nuclear Forensics," and if nuclear materials or radioactive materials are smuggled, or if dirty bombs or nuclear weapons are

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[153] Winner, "The Proliferation Security Initiative," p. 140.

[154] In February 2008, Israeli Prime Minister Olmert visited Japan, and in discussions with Prime Minister Fukuda is said to have exchanged intelligence regarding cooperation in military technology between North Korea and Iran. Israel views military expansion by Iran and Syria as a threat to its security, and North Korea, which appears to be cooperating with these two countries, is a threat to Japan. Promoting exchanges of information between Japan and Israel on the links between North Korea and Middle Eastern countries would be of significance.

[155] Ministry of Defense, *Nihon no Bouei – Bouei Hakusho* [*Defense of Japan 2009 – Defense White Paper*] (Gyosei, 2009), p. 168.

[156] Ibid.

[157] Ibid.

actually used in a terrorist attack, scientific methods can be used to analyze objects containing radioactive material left behind at the blast scene to determine the type of nuclear weapon and specify the source (manufacturing country) of the plutonium and uranium.[158] Since establishment of this kind of technology may mean that trade in radioactive materials or nuclear weapons, and their use in terrorism, may pinpoint their source, exposing the supplier (country) of nuclear weapons and nuclear technology to the terrorists, etc., and raising the threat of retribution, it may well play a role in deterrence of nuclear proliferation and nuclear terror.

While nuclear forensics requires preservation of the crime scene and collection of evidence, since non-nuclear materials will be mixed in with the evidence, there will be a need to sort these items out. To deal with this type of situation, the U.S. military held a training exercise in October 2005 in cooperation with other departments and agencies that included the participation of workers collecting radioactive materials at the crime scene, nuclear-related experts transporting the collected materials to research facilities, and officials from intelligence departments, and achieved a certain level of results. In addition, robot technology is in development to perform sampling in areas highly contaminated with radiation, and manuals detailing how to respond in case of a nuclear attack by terrorists have been distributed to government authorities.

Meanwhile, in Japan it is believed that possession of an independent nuclear forensics capability is impossible. For example, if nuclear weapons were to actually be used within Japan, it is assumed that experts from the United States and other nuclear weapons powers would perform the actual intelligence gathering, and would handle the task of specifying the perpetrator. Even if the process of nuclear forensics were to pinpoint the type of nuclear weapon or the manufacturing country, there is a possibility that the intelligence supplied to the Japanese government would be limited, and that information directly connected to the type of nuclear weapon would not be provided. This would happen because there is no system in place for non-nuclear powers to gain access to information about nuclear weapons, and no framework built for international cooperation in nuclear forensics after a nuclear explosion.[159] In such a case, the Defense Ministry and Self-Defense Forces expect to be relegated to a supporting role for the U.S. nuclear forensics personnel.

For the response to an attack by a so-called dirty bomb, or to illicit trading in nuclear materials or radioactive materials, on the other hand, there is a system of international cooperation in place that centers on the IAEA, and Japan can be expected to have a wider range of action. In such cases, the Defense Ministry and Self-Defense Forces can expect to provide support for on-site investigations by Japan's own investigative authorities or the nuclear power-related research institutes.

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[158] While this is also known as "Nuclear Attribution," the IAEA differentiates between these two. Shuji Sue, "Nuclear Forensics: The International Commitment to Non-proliferation (Japanese) " *Bouei Kenkyu Jyo Kiyou [NIDS Security Studies]*, vol. 10, no. 3 (March 2008), pp. 74-83.

[159] Ibid, p. 75. Nuclear analysis after a nuclear explosion is called post-detonation forensics and post-detonation analysis, while analysis not specifically directed at the nuclear explosion is called pre-detonation analysis, etc. In addition, when the IAEA implements nuclear weapons-related inspections, inspectors from countries in possession of nuclear weapons perform the inspections.

(5) Utilization of Knowledge Possessed by the Ministry of Defense and Self-Defense Forces

Japan's framework for export controls on WMD-related parts and materials is found in the Export Trade Control Order under the Foreign Exchange Act, which regulates specific materials, specifications, etc. The export of items on the list of regulated items requires a review and approval by the Ministry of Economy, Trade and Industry. Even though WMD is a military technology, under the current system the Ministry of Defense and Self-Defense Forces are not directly involved in export controls. This situation contrasts sharply with Australia, for example, where the Department of Defence plays a guiding role in export control, holding the right to issue approvals for the export of WMD-related materials.

In Australia, restrictions on WMD-related parts, technologies, etc., are regulated by the Defence Strategic Goods List (DSGL) and the Weapons of Mass Destruction Act of 1995 (WMD law), and items on this list must obtain export approval from the Department of Defence.[160]

The Defence Strategic Goods List regulates the list of related parts specified by the international regimes for prevention of WMD proliferation (MTCR, NSG, AG, and WA). The materials, equipment, and technologies not included on the List, but which carry a risk of being used in WMD development, are regulated by the WMD Act (Proliferation Deterrence Act), which provides the so-called Catch-All regulations.[161] In the Department of Defence, the Defence Export Control Office (DECO) is mandated to screen documentation submitted by companies, etc. If the content of a trade is judged to require further examination, it is passed to the Standing Interdepartmental Committee on Defence Exports (SIDCDE), which consists of the Department of Defence, Department of Foreign Affairs and Trade, Attorney General's Department, Department of the Prime Minister and Cabinet, Customs Office, and Australian Trade Commision (Austrade). As can be seen from the participating institutions, a comprehensive examination is performed from the point of view of foreign policy, the economy, effect on industry, human rights, and defense. However, the standing committee can only make recommendations; the final decision is made by the Department of Defence.

The role of Australia's Department of Defence is to: (1) confirm the end user; (2) technically assess the items being exported; (3) check whether the target items' capabilities are suitable for the end user; and (4) perform surveys, etc., of the political and military purposes of the target items in the country of final destination. Of particular interest are (1) and (4). In Japan, confirmation of the end user is determined by the Ministry of Economy, Trade and Industry,

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[160] For Australia's export controls on WMD-related materials and technologies, see numerous pamphlets and other publications issued by the Australian government. Some of the main ones are as follows: Department of Defence, *Australian Controls on the Export of Defence and Dual Use Goods: A Guide for Exporters and Importers,* February 2004; Department of Defence, *Australian Export Controls for Defence and Dual-use Goods: "Ensuring Australia Exports Responsibly,"* February 2004; Department of Defence, "Defence Export Controls Bulletin," Issue One (February 2006); Department of Defence, Department of Foreign Affairs and Trade and Australian Customs Service, *Information on Weapons of Mass Destruction: The Role of Export Controls in Preventing Proliferation,* February 2004.

[161] For nuclear materials, nuclear fuels, and special fissionable material, the Department of Industry, Tourism and Resources is in charge. *Australian Controls on the Export of Defence and Dual Use Goods,* p. 3.

which announces the companies, research institutions, etc., of countries with relationships to WMD development.[162] Information collection regarding end users by the Ministry of Defense and Self-Defense Forces could, for example, use the Defense Attachés, etc., stationed in each country, who could perform surveys of companies or trading companies with relationships with military industries in their country of assignment, or of companies, persons, etc., with a history of involvement in incidents of illegal export, etc.

In addition, in regard to (4), it is possible that questions would arise on whether the skills are present for evaluating how specifically a target item acquired by a country would eventually be used for military purposes including WMD, and what political objectives would be achieved. We described earlier a case where the United States was collecting intelligence on WMD in Iraq, and was lacking intelligence on usage intentions. In the same way, because the Ministry of Defense and Self-Defense Forces do not possess WMD, it is true that they are limited in the technological knowledge connected to such weapons. Nevertheless, since research into protection against NBC is progressing, they surely have plenty of leeway for providing information regarding WMD-related technologies to the export control authorities.

Conclusion

We have examined the intelligence, tools, and technological knowledge possessed by the Ministry of Defense and the Self-Defense Forces, but these are actually mutually related. For example, as touched upon in this paper, the acquisition of MASINT, SIGINT, etc., requires such tools as aircraft and related facilities. In addition, collection and analysis of objects left behind after a nuclear blast is a form of intelligence acquisition, and the technologies used and personnel means employed can be considered to be the tools, and also to be technological knowledge. Tools are a necessity in the acquisition of intelligence, and knowledge is what makes its analysis possible. Therefore, we should probably not attempt to categorize, but instead apply the general name of "WMD Intelligence" to all of these capabilities.[163]

To actively fulfill their roles in the prevention of WMD proliferation, the Ministry of Defense and Self-Defense Forces must strengthen WMD intelligence capabilities on top of existing nonproliferation efforts. For example, while the United States has seen some successes in the prevention of proliferation, such as the use of the PSI, etc., to eliminate Libya's WMD development, the efforts against WMD development in Iraq exposed some gaps in its intelligence capabilities. As a result, the United States established a Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, and its survey results

[162] The Ministry of Economy, Trade and Industry announces "The Foreign End User List," listing a total of 222 companies, etc., from Iran, India, North Korea, Syria, Taiwan, China, Pakistan, and Afghanistan. This list is consulted when there are exports, and if there is a possibility of a correspondence an application must be filed with the Ministry of Economy, Trade and Industry. For "The Foreign End User List," see the below: Ministry of Economy, Trade and Industry, Security Export Control Policy Division, Trade Control Department, "The Foreign End Users List," <http://www.meti.go.jp/policy/anpo/kanri/user-list/080610user-list.pdf>, accessed on January 15, 2009.

[163] This term, "WMD intelligence," is used in the U.S. Air Force report, "*Air Force Intelligence Role in Combating Weapons of Mass Destruction*" discussed below.

were submitted to President Bush in March 2005.[164] Among these reports, the one prepared by the U.S. Air Force, "Air Force Intelligence Role in Combating Weapons of Mass Destruction" is probably of particular relevance in helping the Ministry of Defense and Self-Defense Forces strengthen their WMD intelligence capabilities.[165]

In regard to the Iraq War, this report stated that intelligence-gathering on Iraq's WMD-related activities by the U.S. intelligence community was a complete failure, and that the U.S. Air Force bears some of the responsibility for that. The report adds that the Air Force can contribute to the fight against WMD by providing intelligence experts and units to the National Intelligence Agencies, but then notes that Air Force training of intelligence analysts, and of intelligence, surveillance, and reconnaissance operators is inadequate, and emphasizes the need for training specialists who are well-versed in WMD.[166]

In addition, the Air Force intelligence capabilities related to WMD development and proliferation activities in enemy states can be classified mainly as "Predictive Analysis," "Targeting," and "Intelligence, Surveillance, and Reconnaissance Operations (ISR)," and the report indicates problem areas and proposes solutions for each of these capabilities.[167]

Two problem areas exist, with the first being that, even though analysis in WMD-related sectors requires advanced technological and scientific training, the necessary training for such analysis is inadequate, and knowledge is lacking. The second is that the use of HUMINT, SIGINT, IMINT, and MASINT in collecting WMD-related intelligence has its advantages, but also has its drawbacks, including enemy advances in technology that boost camouflage and prevent detection, making intelligence acquisition more difficult.[168]

Solutions proposed in the report for improving these problems include: (1) having all relevant

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[164] Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, "Report to the President of the United States."

[165] This report was proposed in response to the above report submitted to the President by The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, for the purpose of uncovering the problem areas in the intelligence capabilities for WMD possessed by the U.S. Air Force, and proposing solutions. Stone, *Air Force Intelligence Role in Combating Weapons of Mass Destruction*.

[166] Ibid., pp. 1-2, 7-25.

[167] Regarding these terms, "Predictive Analysis" is intelligence activity for grasping potential enemy capabilities and expected actions, and is also known simply as "analysis." It is used to confirm whether an enemy has already obtained WMDs or is extending that capability. "Targeting" considers the need and capability for operational action, selects targets and attaches priority rankings, and takes suitable actions against those targets. "Intelligence, Surveillance, and Reconnaissance Operations" is the synthesis of intelligence activities and operational action. The types of intelligence that play the most important roles in the fight against WMD are HUMINT, SIGINT, IMINT, and MASINT. Ibid., pp. 7-25.

[168] In general, while HUMINT can be used to read enemy plans and intentions, it is extremely difficult to obtain intelligence sources. For example, there was virtually no information regarding Iraq's nuclear, biological, and chemical weapons, nor was there any information about the intentions of Iraqi leaders. As a result, there was a problem in relying on single sources of intelligence supplied from other countries without verification. And while SIGINT can make it possible to grasp what is being said and planned, anti-detection technologies such as encryption and the use of optical fiber are advancing. In Iraq, SIGINT could not be obtained from important circuit lines. IMINT can make it possible to grasp army movements and track shipping, but it cannot detect operations indoors and has difficulty overcoming camouflaging. During the search of WMD-related facilities in Libya, there were facilities tagged by IMINT as suspicious that turned out to be unrelated to WMD. MASINT fills in the gaps left by SIGINT and IMINT, and carries hopes of detecting the construction of underground WMD facilities, etc. While the Air Force has a number of aircraft, etc., that can be used for gathering intelligence, they have a low profile. Ibid., pp. 8-21. Ohta, *Interigensu to Kokusai Jyoho Bunseki* [*Intelligence and International Situation Analysis*], p. 15-17.

personnel participate in training programs offered by other intelligence institutions in the United States or at national research institutes, and employing personnel with degrees in the natural sciences; and (2) strengthening HUMINT, improving ties with other intelligence institutions, and deepening the understanding of the relatively low-profile MASINT among the intelligence community.

As can be seen in U.S. military policy, the Ministry of Defense and Self-Defense Forces also should be strengthening intelligence-gathering means, while provision of more thorough education of personnel for analyzing collected intelligence is essential. And while the international control regimes offer detailed regulations for the related parts and technologies used in WMD development, expert knowledge is also often required. For example, there are many general-use items incorporated into resources and equipment that carry the risk of diversion into nuclear weapons, and some experts say that states aiming for possession of nuclear weapons in the future could well be taking the cautious stance of holding related technologies or basic infrastructure capabilities for civilian purposes and then at some point suddenly diverting them to weapons development, making discrimination between military and civilian uses even more difficult than before.[169] For chemical and biological weapons, the Ground Self-Defense Force possesses special units that should be able to acquire the necessary knowledge. In this regard, training processes within the Ministry of Defense can develop personnel with the related knowledge and technologies needed, as well as links with other institutions.

In the area of nuclear weapons and ballistic missiles, the Ministry of Defense and Self-Defense Forces should probably consider participation in training courses in Japan and abroad, since they are not in possession of related technologies.[170] In addition to education and training, career paths need to be established for personnel specializing in WMDs, with positioning of superior human resources being an essential element in training Ministry of Defense and Self-Defense Force experts in WMD.

Furthermore, international efforts are also important. In particular, front companies are believed to exist in a number of Asian countries for the purpose of obtaining WMD-related technologies, materials, and equipment,[171] and criticism has been directed at their use as entry points for proliferation of WMDs into the Middle East. However, intelligence regarding these

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[169] Einhorn, "Identifying Nuclear Aspirants and Their Pathways to the Bomb," pp. 496-497.

[170] For example, in 1995 and later the U.S. Department of Defense cooperated with the U.S. Federal Bureau of Investigation (FBI) to implement education programs for officials in the countries of the former Soviet Union and Eastern Europe, related to training necessary for investigation of WMD-related technologies, etc., evidence collection, and methods for investigation of illegal trading, etc. The Department of Defense also cooperated with the Customs Office to provide training for customs officials and border police units in the above countries in support of efforts to prevent the illegal transfer and export of nuclear, biological, and chemical weapons-related materials, and to supply portable radiation detectors, etc. Sato, "Counterproliferation and U.S. Security," pp. 97-99. In addition, in Japan, the Ministry of Economy, Trade and Industry implements various kinds of training, mainly for the export control departments of private corporations, to disseminate knowledge about export control systems and restricted technologies in order to ensure that a certain standard is attained.

[171] Joby Warrick, "Iran Using Fronts to Get Bomb Parts from U.S.," *Washington Post,* January 11, 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/01/10/AR2009011002236.html>, accessed on January 13, 2009.

proliferation routes and activities is centered in the advanced countries of the West, and while these countries share a certain amount of intelligence with each other, among the Asian countries where the activity is occurring there has not really been much sharing at all. As a result, one proposal that could be made would be for states like Japan and Australia in possession of intelligence regarding proliferation to take the lead in establishing a mechanism for sharing intelligence among intelligence institutions and government authorities in Asian countries in regard to WMD proliferation routes.

As shown above, the Ministry of Defense and Self-Defense Forces need first to train experts and specialist units in WMD, and put priority on strengthening WMD intelligence, and then to build on that foundation to expand their contribution to the PSI and other activities. However, strengthening WMD intelligence is not something that can be achieved in a short time. Even the United States was unable to accurately grasp the situation regarding German atomic bomb development during World War II, or nuclear development in the Soviet Union and China during the Cold War years. Furthermore, in recent years the United States proceeded to the use of armed force without first obtaining firm information about Iraq's WMD development, showing how many intelligence failures that country has experienced.[172] For this very reason, it is important that strengthening WMD intelligence in the Ministry of Defense and Self-Defense Forces not be done looking for instant results; rather capability should be steadily built up over the long term, including the development of personnel. If WMDs were to actually be used, the damage would be massive, and the effects on security unimaginable. Strengthening WMD intelligence is surely, therefore, an urgent issue that needs addressing to enable the Ministry of Defense and Self-Defense Forces to substantially contribute to reduction of the WMD threat.

[172] Regarding this point, see Richelson, *Spying on the Bomb*, etc.