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Feature Report

“Foundations of State Policy of the Russian Federation in the Area of Nuclear Deterrence”.

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1. These Foundations are a strategic planning document in the field of assuring defense and reflect official views on the essence of nuclear deterrence, define military dangers and threats for the neutralization of which nuclear deterrence is carried out, the principles of nuclear deterrence, as well as the conditions for the transition of the Russian Federation to the employment of nuclear weapons
2. Guaranteed deterrence of a potential adversary from aggression against the Russian Federation and (or) its allies is one of the highest state priorities. The deterrence of aggression is ensured by the totality of the military might of the Russian Federation, including nuclear weapons.
3. The state policy of the Russian Federation in the area of nuclear deterrence (hereafter referred to as state policy in the area of nuclear deterrence) is a set of coordinated, unified by a common concept¹ political, military, military-technical, diplomatic, economic, information, and other measures carried out relying on the forces and means of nuclear deterrence, to prevent aggression against the Russian Federation and (or) its allies.

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NUCLEAR WEAPONS AND DETERRENCE

Journal of Indo-Pacific Affairs, Air University Press (Maxwell AFB, Ala.)

Exporting Nuclear Norms: Japan and South Korea in the International Nuclear Market

By Dr. James E. Platte

June 8, 2020

Introduction

Nuclear energy has been connected to notions of national security since the advent of nuclear reactor technology during the Manhattan Project in the early 1940s. Countries have taken different views of nuclear energy's connections to national security, but these views can be broadly placed into two themes. First, nuclear energy can significantly contribute to energy security, due to the relatively small amount of fuel required for commercial power reactors, the inherent ability for nuclear fuel to breed more fuel during use, and the stability of many nuclear fuel supplier countries. Second, nuclear materials and technologies can also have strategic military applications, such as nuclear weapons and nuclear propulsion for naval vessels, which has led to national and international efforts to control the spread and use of nuclear energy.

Cases for both views have been made in the United States, but arguably the prevailing stance has been that a strong nuclear power industry, both in the domestic and export markets, gives the United States the ability to enforce nuclear nonproliferation, safety, and security norms worldwide. The United States has used various policy tools to enforce these norms, and US export partners are expected to abide by these norms in their domestic nuclear industries. However, the domestic US nuclear industry has struggled in recent years due to poor economics for some existing nuclear plants, particularly those in deregulated state markets, cost overruns on new nuclear plant construction, and strong competition from cheap natural gas, and US dominance in the global nuclear energy market also has waned. This has led to worries that China and Russia would supplant the United States and that Washington would no longer be able to enforce its nuclear norms around the world, which is particularly concerning when considering that much of the anticipated growth for nuclear power could occur in developing countries with little or no experience operating commercial nuclear power plants.

Russia currently is the leading nuclear reactor exporter in the world, with seven reactors under construction and 22 more reactor exports either contracted or ordered.¹ China entered the export market more recently, and only Pakistan has imported Chinese nuclear reactors, including four operational units and two units under construction.² Yet, like Russia, China is aggressively pursuing other reactor export projects around the world, and Russian and Chinese bids are bolstered by strong domestic industries and a variety of state-backed financing options for importers, both of which are key factors that can give China and Russia an edge over bids from private US nuclear vendors. Beijing and Moscow also place strategic and political importance on nuclear reactor exports (e.g., Beijing's inclusion of nuclear technology in the Belt and Road Initiative), making export projects not just a matter of economics for their state-owned nuclear enterprises. Beyond economics and geopolitics, some experts cite lax safety and security standards in China and Russia as reason for concern about what types of norms they would impart to their export partners, particularly to potential export partners in Africa, the Middle East, and Southeast Asia.³

With the US position in the international nuclear energy market falling, could like-minded US allies and partners step up and enforce similar nuclear nonproliferation, safety, and security norms? In particular, could Japan or South Korea become leaders in enforcing nuclear norms in the export

market? Japan and South Korea have been major US trade partners in nuclear energy, as both countries imported and indigenized US nuclear reactor technology early in the development of their nuclear industries. Both countries also have been subject to US policies enforcing nuclear norms, and at times, the terms of nuclear cooperation have been the subject of contentious debate, despite being close US allies. Many Japanese and South Korean nuclear firms maintain close ties or partnerships with US nuclear firms, but Japanese and South Korean firms may play more leading roles in future export projects. In addition to being close US allies, Japan and South Korea can be viewed as middle powers with the ability to influence the international system and spread norms to other countries.

Building from US views on the connections between nuclear power and national security, this article will explore how Japan and South Korea have received and interpreted nuclear norms from the United States and how they have or could enforce norms with export partners. Concepts of middle-power diplomacy will be used as a theoretical base to analyze Japanese and South Korean views of their role in enforcing nuclear norms and to project future behavior.

This article will proceed as follows. The second section will summarize US views on nuclear power and national security, along with the history of US efforts to enforce nuclear nonproliferation, safety, and security norms around the world. Next, section three will provide an overview of the nuclear power sectors in Japan and South Korea and how those countries view the nuclear export market. Section four will introduce concepts of middle-power diplomacy and use those concepts to analyze Japan and South Korea's role in enforcing nuclear norms internationally. The article then will conclude with policy implications for the United States, Japan, and South Korea on enforcing nuclear norms and competing with China and Russia in the global nuclear marketplace.

Nuclear Power, National Security, and Enforcing US Nuclear Norms

Since the beginning of the nuclear age, the United States has sought to control the international flow and use of nuclear technology, and Washington has especially focused on limiting the proliferation of nuclear materials and technology that could be used in a nuclear weapons program. Starting with the Acheson–Lilienthal report and the Baruch plan that the United States presented to the United Nations in 1946, the US government has led numerous bilateral and multilateral initiatives to enforce nuclear norms around the world.⁴ One of the most prominent initiatives was President Dwight Eisenhower's Atoms for Peace program that led to the creation of the International Atomic Energy Agency (IAEA) in the 1950s.

In the Atoms for Peace program, the United States supplied nuclear materials and technology to recipient countries, with the aim of both spreading the benefits of civilian nuclear technology and restricting the military applications of nuclear technology. The United States was the clear world leader in nuclear technology at the time and, thus, could effectively employ such supply-side tools to enforce nuclear nonproliferation. Supplying US nuclear technology and training to recipients also meant that US norms on nuclear safety and security could be spread around the world, but again, the ability to do this was based on the dominant US position in the global nuclear market.

The United States initially wanted to give responsibility for safeguarding nuclear materials worldwide to the IAEA, but while the IAEA built its system, the United States proceeded with signing bilateral agreements for cooperation in the civil uses of nuclear energy (so-called 123 Agreements). These bilateral cooperation agreements included provisions for safeguards, and 35 bilateral agreements were in effect by the mid-1960s.⁵ But as IAEA capabilities grew, the United States worked to transfer responsibilities for safeguards to the IAEA. In this way, Washington institutionalized its norms on nuclear nonproliferation in the international system.

As the United States transferred safeguards responsibilities to the IAEA, US companies dominated the international nuclear market, providing over 90 percent of the world reactor export market through the early 1970s.⁶ This market position allowed the United States to dictate the terms of other countries' nuclear energy programs, but even at that time, this level of influence appeared time-limited. Most countries starting nuclear energy programs at the time planned to use US vendors for their first reactors, indigenize the technology, and then transfer production for future reactors to domestic companies.⁷ License transfer agreements from US nuclear vendors to export partners helped facilitate the transfer of US nuclear technology and know-how, but such agreements also helped other countries develop their own nuclear reactor design and production capabilities.⁸

In addition to exporting its reactor technologies around the world, the United States was the primary supplier of uranium enrichment and nuclear fuel fabrication services to its export partners. But the 1973 oil embargo and 1974 Indian nuclear explosive test heightened US concerns about energy supplies and nuclear weapons proliferation, respectively. The US government responded to these pressures by announcing that it could not accept new contacts for enrichment services, pushing to stop any further spread of enrichment or reprocessing technology, and suspending domestic reprocessing and breeder reactor development.⁹ While Pres. Jimmy Carter later sought to increase US enrichment capacity to lock in foreign supply contracts and enforce nonproliferation norms, US nuclear export partners saw the economic and political risks of excessive reliance on the United States for nuclear materials and technology. Some US partners, such as France, Germany, and Japan, responded by increasing their domestic capacity, seeking export contracts, and further internationalizing the global nuclear market.

This impending relative decline in US market position made the role of the IAEA and of IAEA member states even more important, something an official from the US Arms Control and Disarmament Agency noted in the mid-1960s: "Whether the IAEA will be able to act as an international instrument for regulating the peaceful uses of atomic energy will depend for the foreseeable future on the national policies of the Member States."¹⁰ In addition to the IAEA itself, the continued enforcement of US nuclear norms is dependent on IAEA member states remaining committed to the norms that Washington transferred to the IAEA.

The US domestic nuclear market experienced a major shock with the partial meltdown at the Three Mile Island (TMI) nuclear power plant in 1979, which remains the most serious accident in the history of the US commercial nuclear industry. Nuclear power in the United States already was experiencing increasing reactor construction costs in the late 1970s, and the TMI accident thrust nuclear reactor safety to the top of the public consciousness. The US nuclear industry struggled in the face of economic and public acceptance challenges, and more than 30 years passed between new reactors construction starts, from 1977 to 2013.¹¹ Construction on four reactors at two nuclear power plants in Georgia and South Carolina began in 2013, but none of those reactors has entered operation yet. Construction on the two reactors in South Carolina was ceased in 2017, and the construction projects in Georgia face economic difficulties, cost overruns, and delays.

The domestic US nuclear industry faces other challenges in addition to the lack of new construction starts over the past 40 years. Several reactors have shut down in recent years, leading to a slow decline in the number of operating reactors in the United States. There currently are 97 operable nuclear reactors, down from a peak of 112 in the 1990s. Research and development on new reactor technology continues, but "on a smaller scale and less relevant for substantial improvements in power production or sophistication."¹² The United States lacks significant nuclear fuel cycle capabilities, including inadequate uranium enrichment capacity, no commercial spent nuclear fuel reprocessing, and no permanent repository for spent nuclear fuel. The commercial nuclear industry also faces significant economic competition from natural gas and renewable energy sources.

In the export market, US nuclear vendor Westinghouse completed four AP1000 reactors, the same type that are being built in the US state of Georgia, in China in 2018 and 2019. These marked the first reactors built abroad by a US company since the 1990s.¹³ However, there are no other US-led nuclear reactor projects in the world, bringing the US share of global nuclear reactor exports to zero.

The struggles of the domestic US nuclear industry and declining export market position has led to a robust debate in recent years about restoring US leadership in the global nuclear market. In a 2018 article in *The Washington Quarterly*, Laura Holgate and Sagatom Saha succinctly state the prevailing view on the need for US leadership: “The United States must participate in the commercial export market so it can insist on strict protocols that promote nuclear security, deter nuclear theft, and prevent weapons development.”¹⁴ Moreover, they argue that “exporting nuclear reactors helped the United States develop critical diplomatic and economic links throughout Europe and the Asia-Pacific . . . and design international standards for nonproliferation and security.”¹⁵

On nuclear safety, Michael Wallace, Amy Roma, and Sachin Desai claim that being a leading exporter of nuclear reactor technology meant that the United States “was able to promote reactor designs and standards that favored nuclear safety . . . which has made nuclear power the safest of all energy sources around the world.”¹⁶ Related to these commercial ties, the US Nuclear Regulatory Commission (NRC) has worked with partners around the world “to develop codes and standards worldwide to ensure that regulatory environments are based on sound approaches.”¹⁷ Proponents of the US nuclear industry argue that the United States must remain involved in the global nuclear market to instill robust safety culture principles in other countries’ nuclear operators and regulators, particularly important for influencing countries with new nuclear programs.¹⁸

Holgate and Saha also clearly identify what they view as the risks if the United States loses its ability to set global nuclear norms and cedes leadership in the international nuclear export market to China and Russia: “Both China and Russia are known for lax standards on nuclear security and poor track records on nuclear safety.”¹⁹ They add that these risks “would inevitably worsen as nuclear reactors are sited in countries with fragile institutions, weak regulatory environments, and unstable security situations.”²⁰ The Middle East and Southeast Asia are cited as two regions with strong potential for nuclear growth, but most of the countries in those regions have no experience with commercial nuclear power and face some of the problems stated by Holgate and Saha.

Yet, the United States must not necessarily regain its position of preeminence in the global nuclear market. The United States worked to build an international architecture for spreading nuclear norms, principally through the IAEA, and worked closely with export partners to instill US norms in them. Given the problems in the US domestic nuclear industry, it would be prudent to consider whether close US partners, particularly Japan and South Korea, could continue to uphold the nuclear norms that the United States has worked to spread and enforce. The next section will examine the nuclear industries of Japan and South Korea and how they view nuclear exports.

Nuclear Power in Japan and South Korea

Following Eisenhower’s *Atoms for Peace* speech, Japan and South Korea were early adopters of US nuclear technology. Both countries lack significant domestic energy resources and viewed nuclear energy as a way to relieve their dependence on energy imports, especially fossil fuel imports. Seoul and Tokyo also believed that developing domestic nuclear industries would grow their countries’ science and engineering workforce and bring international prestige.

Despite being close US allies, turbulent politics and concerning regional security developments in the 1960s and 1970s prompted Japan and South Korea to consider their options for nuclear

weapons development. Tokyo studied the matter internally in the late 1960s and determined that developing nuclear weapons would be too costly.²¹ Seoul initiated a clandestine program to develop nuclear weapons in the 1970s but abandoned the program by the early 1980s.²² Preserving close, positive relations with the United States was a key factor in both countries' decisions to not develop nuclear weapons. While speculation lingers regarding nuclear hedging or latent nuclear weapons capabilities, energy security has remained the primary impetus for their nuclear programs and connection between nuclear power and national security.

Japan and South Korea joined the IAEA in 1957, but Tokyo started its civilian nuclear power program a few years earlier in 1954. Japan imported its first commercial nuclear power reactor, a gas-cooled reactor, from the United Kingdom, and that reactor began operating in 1966. Every reactor constructed in Japan after that first reactor has been based on US light-water reactor (LWR) technology.²³ Starting in the early 1970s, Japan aggressively expanded its fleet of commercial nuclear power reactors and had 54 operable reactors in 2010, with plans to keep growing. The Fukushima nuclear disaster of 2011 halted Japan's nuclear growth.

All Japan's nuclear reactors shut down after the disaster, and the process of restarting reactors after new safety reviews has been long and difficult. In addition to the four reactors destroyed by the earthquake and tsunami in March 2011, utilities decided to decommission some reactors instead of going through upgrades and safety checks, and Japan has only 38 operable nuclear reactors today.²⁴ Since the first reactors restarted in 2015, the nuclear share of electricity generation in Japan has only been a few percent, down from around 30 percent before 2011.

Japan also is pursuing a closed nuclear fuel cycle, including indigenous uranium enrichment, spent nuclear fuel reprocessing, and fast breeder reactor (FBR) capabilities. Japan has an operating uranium enrichment facility at Rokkasho in northern Japan, but the reprocessing plant at Rokkasho has faced a series of delays and has yet to enter operation. FBR development has suffered similar delays, and there currently is no operating FBR in Japan. Japan's closed fuel cycle development has been controversial at times in the United States, but Tokyo received consent from Washington to develop these technologies in the 1980s—the only nonnuclear weapons state outside of Europe to receive such consent. This consent is granted in the 123 Agreement governing bilateral civil nuclear cooperation between Japan and the United States, which was extended indefinitely in 2018.²⁵

South Korea began its civil nuclear program in the late 1950s, soon after Japan did. Construction on South Korea's first commercial nuclear reactor, a turnkey plant imported from Westinghouse, began in 1972 and finished in 1977. South Korea also imported Canadian and French reactor technology in the 1970s and 1980s, but in 1987, the Korea Electric Power Company (KEPCO) selected an LWR design from US-based Combustion Engineering as the basis for developing an indigenous South Korean reactor design. By the early 2000s, South Korean firms were responsible for all major aspects of nuclear reactor design, supply, construction, and operation.²⁶

South Korea now has 25 operable commercial nuclear reactors, with four reactors under construction, and nuclear power provides nearly 25 percent of the country's electricity.²⁷ However, the South Korean nuclear industry faces an uncertain future, as current Republic of Korea (ROK) president Moon Jae-in announced a policy in 2017 to phase out nuclear power over the next 40 years.²⁸ The phase-out plan allows current reactor construction projects to finish but does not allow new reactors to be planned. The plan also does not allow existing reactors to operate beyond 40 years. South Korea's reactor fleet is relatively young, so the phase-out plan will not have a large, immediate impact on electricity generation. Moon cannot be reelected after his presidential term ends in 2022, and it is uncertain if the next South Korean president would continue with this phase-out plan.

Unlike Japan, South Korea has an open nuclear fuel cycle, and the 123 Agreement between South Korea and the United States does not give Seoul advanced consent to develop enrichment or reprocessing technologies. The US–South Korea 123 Agreement was renewed in 2015, and Seoul pushed for advanced consent in the renewal negotiations. While Washington did not accede to Seoul’s request, the two countries are conducting a joint fuel cycle study in the United States, and the new 123 Agreement formed a High Level Bilateral Commission to discuss nuclear cooperation issues in the future.²⁹

Despite the challenges facing both countries’ nuclear industries, Japan and South Korea possess robust nuclear sectors, developed with close US cooperation. Their nuclear related firms, including Hitachi, Toshiba, KEPCO, and Doosan, are among the leading firms in the world, and both countries’ governments and private firms are active in the global nuclear market. Yet, neither country is truly a great power with the ability to unilaterally set global norms. The next section will explore Japan and South Korea’s nuclear exports and their role as middle powers in spreading nuclear norms.

Middle-Power Diplomacy and Exporting Nuclear Norms

To analyze the roles for Japan and South Korea as middle powers exporting nuclear norms, middle-power diplomacy and the roles that middle powers can play in international affairs must be defined. John Ikenberry and Jongryn Mo simply defined a middle power as “neither super power nor small power.”³⁰ Then–South Korean president Lee Myung-bak also offered a simple definition in 2010 by saying that the “world can be split into two groups: One group sets global rules, the other follows. South Korea has successfully transformed itself from a passive follower into an active agenda-setter.”³¹

With the third-largest economy in the world, it may seem debatable to term Japan as a middle power, but based on these definitions, Japan should be considered a middle power that can participate in setting global rules and agendas. Ikenberry and Mo also state that “traditional middle powers are fully developed countries” and that “many new middle powers are emerging as new developed powers.”³² Japan could be placed in the traditional middle-power category, and South Korea is a new middle power.

Importantly for the context of this article, the United States views itself, China, and Russia as the world’s great powers, which would place Japan and South Korea in the next tier of middle powers. As US allies, Washington should expect Seoul and Tokyo to uphold norms on issue areas, such as nuclear exports and the liberal international order. Ikenberry and Mo argue that “[m]iddle powers, both traditional and emerging, can help the international system stay liberal because it is in their interests to support liberal international order.”³³

A 2015 report from the East Asia Institute (EAI) describes how middle powers can support the liberal international order and uphold nuclear norms. The EAI argues that middle powers “derive their status from being a part of a network” and “function as a collective.”³⁴ Acting as a bridge or connector in the network, middle-power diplomacy “aligns great powers and smaller powers together, and as long as a middle power keeps genuine its intentions of contributing to the greater international good, they cannot be accused of harboring hegemonic intentions . . . a middle power acts as ‘norm diffuser.’”³⁵ In addition, a middle power “needs to possess material capability that places it in a position that is measured as relatively influential enough to attract and establish itself within a wider network or community of like-minded nations.”³⁶ The EAI then describes four identities that middle powers can adopt in pursuing this type of diplomacy:

Early mover: elevating their respective statures in the international society by adopting the “me first” approach and leading by example;

Bridge: mediating between opposing groups and seeking measures that would satisfy all parties involved;

Coalition coordinator: building coalitions of like-minded states to advance shared interests and address common concerns; and

Norm diffuser: contributing to the global diffusion of norms and standards.³⁷

In the global nuclear market, Japan or South Korea could possibly take on any of these four identities individually or in combination. Both countries were early movers in adopting nuclear power and US norms, and other developing countries, in particular, could learn from the example set by the commercial nuclear industries in Japan and South Korea. Seoul or Tokyo could operate as bridges or coalition coordinators between the United States and other nuclear exporters or countries looking to start a nuclear energy program. Finally, arguably the most important role that Japan or South Korea could play in the nuclear export market is that of a norm diffuser, spreading US and IAEA norms on nuclear nonproliferation, safety, and security.

However, Japan and South Korea face limitations in their conduct of middle-power diplomacy on nuclear energy issues. Writing on South Korea as a middle power promoting international cooperation on nuclear security, Scott Snyder states that Seoul's "efforts on nuclear security came about primarily in the context of the US-ROK alliance."³⁸ Snyder also added that South Korea's contributions to international governance and to forming global networks occurred primarily outside of Northeast Asia. Snyder argues that Seoul faces these limitations due to its relatively smaller economy and military compared to other regional powers and to its reliance on the US alliance for security.³⁹ Snyder writes that Seoul is now able to "pursue greater autonomy through self-help but within the context of the country's continued need for the alliance as a bulwark against threats from major powers."⁴⁰ He adds that South Korea is "able to act more autonomously when its policy preferences align with those of the United States and when Seoul has Washington's backing."⁴¹

While Snyder wrote about South Korea, much of the preceding also could apply to Japan's conduct of middle-power diplomacy. Japan's economy is larger than South Korea's economy, but the two countries' defense expenditures are similar. According to the Stockholm International Peace Research Institute (SIPRI), Tokyo's defense budget in 2018 was \$46.6 billion USD, and Seoul spent \$43.1 billion USD on defense in 2018.⁴² Those numbers also do not account for the legal and social restrictions on offensive capabilities for Japan's Self-Defense Forces, which do not constrain South Korea's military. Similar to South Korea, Japan remains relatively weaker than its chief regional rival, China, and relies on the US alliance for security.

Another limitation on Seoul and Tokyo acting as middle powers on nuclear energy issues is the poor state of their bilateral relationship. Lingering tension and disputes related to the legacy of Japan's colonization of Korea in the first half of the twentieth century have persistently plagued bilateral relations. The latest flaring of tensions in 2019 resulted in both countries removing the other from white lists of preferred trade partners, complicating the trade of sensitive technologies between the two countries. While Japan and South Korea hold similar views on nuclear norms and work together in some multilateral forums, bilateral diplomatic and trade tensions and the strategic nature of nuclear technology would make closer cooperation in the nuclear export market more difficult. This would mean that Seoul or Tokyo likely would act individually as a coordinator or bridge, rather than forming a bilateral partnership to act in these roles together.

Overall, Japan and South Korea are each in a strong position to act as a middle power in spreading and enforcing nuclear norms with their export partners, even if they do not explicitly partner with each other to spread and enforce nuclear norms. Either country can act as coordinators in bringing

together like-minded partners to work in concert on enforcing robust norms in nuclear exports, and they can diffuse nuclear norms to their export partners. However, given US sensitivities toward nuclear proliferation and Tokyo's and Seoul's reliance on their alliances with the United States, the two countries would likely need to closely coordinate nuclear export activities with the United States and would have to remain aligned with US nuclear norms. As Snyder argued, middle powers like Japan and South Korea also have benefited from the US-led liberal international order and have incentive to perpetuate this order, including enforcing US nuclear norms rather than allowing China and Russia to revise existing international norms.

Demonstrating their standing to act as responsible, effective middle powers in spreading existing nuclear norms to export partners, Japan and South Korea are parties to the major international instruments related to nuclear nonproliferation, safety, and security. These multilateral commitments are in addition to the bilateral 123 Agreements with the United States that hold Seoul and Tokyo to strict nonproliferation standards. Table 1 summarizes the international instruments that Japan and South Korea are parties to.

Among instruments listed in table 1, China is not party to the Missile Technology Control Regime, Hague Code of Conduct, Australia Group, Wassenaar Arrangement, and the Proliferation Security Initiative, and Russia is not party to the Australia Group or the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.⁴³

In addition, Japanese and South Korean firms have worked with the NRC on reactor design certifications. Even though NRC certification is not required for Japanese or South Korean firms to export reactors to third-party recipients, such importers view NRC design certification as a gold-standard stamp of approval for the highest standards of safety, security, and performance. In 2019, the South Korean-designed APR1400 became the first non-US reactor design to receive standard design approval from the NRC.⁴⁴ GE-Hitachi Nuclear Energy received NRC certification for its Economic Simplified Boiling-Water Reactor in 2014, and General Electric received NRC certification for the Advanced Boiling-Water Reactor (ABWR), which is similar to the international version operating in Japan, in 1997. Mitsubishi also has a design under review for NRC certification.⁴⁵

In interviews that the author conducted in Japan and South Korea in July and August 2019, representatives from government and private sector all expressed their desire to continue partnering with US firms on nuclear export projects, even if Japanese or South Korean firms lead reactor design or construction. A South Korean government official said that Seoul closely follows US government policy and intentions in nuclear exports, and Seoul requires export partners to meet and adhere to IAEA standards on safeguards, safety, and security.⁴⁶ Japanese government and private-sector officials said they want to partner with US firms on nuclear export projects to bolster Japanese firms' competitiveness.⁴⁷

While Japan and South Korea sign bilateral cooperation agreements with their nuclear export partners that have similarities to 123 Agreements, partnering with US firms would require that those export partners sign 123 Agreements with the United States. As Seoul and Tokyo still look to the United States for leadership on nonproliferation, requiring a 123 Agreement with the United States would impose strict nonproliferation requirements on recipient countries.⁴⁸ Norms on safety and security would then be transferred and enforced through cooperation with the IAEA, NRC, and private-sector firms and government organizations from Japan, South Korea, and the United States.

This model of cooperation with the United States was used for South Korea's export of four nuclear reactors to the United Arab Emirates (UAE), which was Seoul's first reactor export project. The UAE selected a KEPCO-led consortium in 2009 to build four APR1400 reactors at the Barakah nuclear

power plant. KEPCO's proposal was selected over proposals from Areva and GE-Hitachi, with the lower cost offered by KEPCO being a major factor for securing the bid.⁴⁹

In addition to KEPCO and several other South Korean companies, the consortium included Westinghouse and other US companies providing engineering services and supplying components. Westinghouse's participation was required because Westinghouse still considers South Korean reactors to be Westinghouse-licensed products, which then necessitated the UAE to sign a 123 Agreement with the US government and subjected the project to US export control requirements.⁵⁰ Toshiba also was originally involved in the consortium as the majority owner of Westinghouse, but Westinghouse's bankruptcy in 2017 forced Toshiba to sell their ownership of Westinghouse.

The UAE also signed a bilateral cooperation agreement with Seoul that included provisions restricting the UAE from enriching uranium above 20 percent or reprocessing any nuclear material transferred through the deal. It prohibits the UAE from using materials or technology transferred through the agreement for military purposes. The agreement also requires the UAE to have a comprehensive safeguards agreement with the IAEA but does not require the Additional Protocol, although the UAE signed the Additional Protocol in 2009.⁵¹ On security, the agreement requires INFCIRC/225/Revision 5, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities, and it calls for consultation and cooperation on safety issues.⁵²

No Japanese firm has led a nuclear reactor export project yet, but Japan has been involved in the nuclear export market in other ways. As mentioned above, Toshiba was originally involved with the Barakah project due to its then-ownership of Westinghouse, and Hitachi has worked with General Electric due to their joint venture (Hitachi-GE Nuclear Energy in Japan and GE-Hitachi Nuclear Energy in the United States). Mitsubishi Heavy Industries cooperated with Areva in the past and is now partnered with French nuclear companies Framatome and EDF.⁵³ Japanese nuclear firms also are pursuing nuclear projects in Europe and Asia, with the intention of partnering with US firms and government agencies on such projects, and Japan would use the IAEA Milestones Approach to ensure that a recipient country is adhering to international nuclear norms.⁵⁴ Japan also has worked with the IAEA to promote nuclear nonproliferation, safety, and security norms and capacity building.

Employing middle-power diplomacy, Seoul or Tokyo can work to diffuse US nuclear norms on their own, but as discussed above, each country also prefers to work as a bridge or coordinator to keep the United States involved in setting global nuclear norms. Given bilateral tensions between Seoul and Tokyo, this likely would take the form of separate Seoul-Washington and Tokyo-Washington partnerships, but Japan and South Korea can work with the United States to maintain international norms on nuclear nonproliferation, safety, and security and counter the rising influence of China and Russia. The next section will go into more detail on the policy implications of this middle-power diplomacy in the global nuclear market.

Conclusion and Policy Implications

The international nuclear power industry is in a much different state today than it was when Washington launched the Atoms for Peace program in the 1950s. At that time, the United States was the global leader in nuclear technology and the most dominant actor in setting international nuclear norms. Washington used bilateral agreements, namely 123 Agreements, and multilateral instruments, mainly the IAEA, to set and enforce nuclear norms with export partners, and US nuclear firms sold their reactor technologies around the world. But as the domestic US nuclear industry declined over the last few decades, other countries have risen to prominence in the global nuclear market, primarily Russia and an ascendant China.

US partners, like Japan and South Korea, also have risen in prominence since indigenizing US reactor technology and now may be in a position to use middle-power diplomacy to continue spreading and enforcing international nuclear norms. Yet, Japan and South Korea also face uncertainties in their domestic nuclear markets, and as middle powers, they still prefer to partner with the United States to set agendas and enforce norms. They also must overcome formidable competition from China and Russia to secure reactor contracts. In this context, this article offers the following policy implications for the United States, Japan, and South Korea to consider when operating in the nuclear export market.

Japan and South Korea can be effective nuclear norms diffusers.

Seoul and Tokyo used nuclear power to fuel their economic growth and transition into developed economies, and they adopted US-origin nuclear technology and norms at the start of their programs. As middle powers, they are committed to preserving the existing system of nuclear norms espoused by the United States and the IAEA. They can spread these norms by building on their existing export practices that stipulate adherence to IAEA norms, establish education and training programs for other countries' nuclear programs, and providing world-class nuclear technologies. Their ability to diffuse norms will be especially important when working with countries starting a nuclear energy program and when exporting new reactor technologies.

The United States can still lead from a supporting position.

While Japan and South Korea can effectively diffuse norms, they are not able to unilaterally set or revise the international system, which is one of the reasons that they still prefer to partner with the United States in nuclear export projects. The domestic US commercial nuclear industry likely will continue to struggle for the foreseeable future, which will make it even harder for US nuclear firms to win future reactor export contracts. But with Seoul or Tokyo acting as a coordinator, Washington can still provide leadership on enforcing strict safety, security, and nonproliferation norms around the world. South Korea's reactor export project with the UAE provides a model for how Washington can work with newcomer nuclear countries, even when US firms do not lead the project. There are legal concerns that still tie Westinghouse with KEPCO, but more importantly, the policy preference for Japan and South Korea is to partner with the United States on their reactor export projects.

The United States also could explore using nuclear norms as an issue of mutual concern and interest to promote Japan–South Korea cooperation. Seoul and Tokyo prefer working with the United States on nuclear exports, and all three countries seek to counter the growing influence of Russia and China. Past efforts to use nuclear energy as an issue on which to improve Japan–South Korea cooperation have not been as successful as hoped, but it is worth continuing such efforts.

Japan or South Korea could be a bridge to nuclear cooperation with Saudi Arabia.

While regions like Southeast Asia and Europe contain the potential for nuclear growth, the strongest and most contentious future reactor importer is Saudi Arabia. A tender for bids for exporting reactors to Saudi Arabia is expected in 2020, and US, South Korean, Russian, Chinese, and French firms are involved in preliminary talks with Riyadh.⁵⁵ Despite the project's projected lucrative nature, the idea of exporting nuclear reactors to Saudi Arabia is controversial due to statements from Saudi officials about wanting to acquire enrichment technology, nuclear hedging against Iran, and the Saudi government's lack of transparency. These concerns have prevented Washington from concluding a 123 Agreement with Riyadh, which has balked at US demands that Saudi Arabia sign the Additional Protocol.⁵⁶ However, Japan or South Korea could act as a bridge between Washington and Riyadh to come up with an agreement that meets the needs of all parties. Seoul, in particular, could build on its experience with the UAE and bring together a coalition to work with Riyadh's nuclear ambitions while still enforcing US and IAEA nuclear norms.

Spreading nuclear norms is only possible with export contracts.

The biggest challenge facing Japan, South Korea, and the United States in the nuclear export market is becoming more competitive with Chinese and Russian state-owned nuclear firms. A 2019 study on nuclear reactor export competitiveness found that the most important criteria for importing countries are the financing package, an existing reference reactor, total capital investment costs, the economic package, and sustainability of the exporter's domestic nuclear industry.⁵⁷ On an individual head-to-head basis, Seoul, Tokyo, or Washington would have a difficult time competing with Beijing or Moscow on those categories, mainly due to the robust financing that the Chinese or Russian government can provide. But working as middle-power coalition coordinators, Japan or South Korea could increase competitiveness by assembling consortia with the United States and other like-minded countries, such as Canada, to make stronger, more cost-competitive supply chains to back reactor export proposals.

French economist Francois Leveque writes that such consortia also could offer other goods and services, such as arms sales or infrastructure development projects, to bolster their reactor export bids. Leveque further argues that the nuclear industry has traditionally been dominated by vertically integrated companies operating under one flag, but firms operating in stagnant domestic markets would be more able to break free from this structure and form multinational consortia, which would more resemble the oil and gas supplies and service industry.⁵⁸

Competitiveness could be increased further by marketing reactor designs that Japan and South Korea have recent experience building, namely the ABWR or APR1400. Two separate studies by French and Japanese scholars both show that design and component standardization and recent construction experience can decrease costs for subsequent construction projects.⁵⁹ For all these reasons, forming consortia led by Seoul or Tokyo would improve competitiveness with China and Russia and help further strengthen international nuclear norms.

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Strategy Bridge (Washington, D.C.)

A Modern Deterrence Theory Case Study: America’s Failure to Deter Japan

By Andrew T. Shattuck

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Everything old is new again. The world is gripped by a pandemic, people believe the Earth is flat, and the United States is trying to suppress the appetite of an expansionist Asian superpower. While China’s rise is undoubtedly less savage than Japan’s conquest of Southeast Asia, the feeling that America has been here before seems unshakeable. Analyzing the U.S. failure to deter Japan from conquering Southeast Asia using a modern deterrence theory framework reveals opportunities to improve contemporary deterrence strategies.

Historic examples of states attempting to deter unprofitable conflict with their peers are found as far back as 5th century B.C. in Thucydides’ *History of the Peloponnesian War*, when Athens and Sparta exchanged a series of envoys to convince each other that continued violations of a tenuous peace agreement would inevitably lead to war.[1] Today, theories for convincing adversaries to voluntarily limit their pursuit of strategic interests line bookshelves globally. Alexander George’s work on *The Limits of Coercive Diplomacy* takes an abstract model, reliant on the assumption of a rational opponent, and details how policy makers can transform it into a specific strategy for predicting the effects of a deterrence action.[2] In his “Understanding Deterrence” primer, RAND

senior political scientist Michael Mazarr emphasizes that successful deterrence comes from effectively influencing adversaries' perceptions of the situation. Three critical factors play an outsized role in shaping these perceptions and framing adversary calculations about deterrence: the level of aggressor motivation to act in the specified territory, defender clarity about the object of deterrence and threatened response actions, and aggressor confidence in deterring state capacity and credibility to carry out threats.[3] American failed in its efforts to deter Japanese aggression because it failed to perceive the Japanese empire as a legitimate world power, did not communicate clear objectives or specific responses, and lacked local military capacity to deny a Japanese fait accompli.[4]

LEVEL OF AGGRESSOR MOTIVATION

Analyzing challenger motivation is the first step in evaluating the success or failure of deterrence campaigns.[5] "When the motives and tensions of war are slight we can imagine that the faintest prospect of defeat might be enough to cause one side to yield." [6] Conversely, states can find themselves bound to pursue increasingly risky actions if they perceive the benefits of acting outweigh the consequences of compliance. Policy makers need to examine potential deterrent actions through the mental model of an adversary actor. Flaws in this model, like those stemming from embedded cultural racism, can skew predictions of deterrent success or failure. Racism prevented the Roosevelt administration from acknowledging Japan's great power status, making the prospect of a Japanese-initiated war appear unlikely.[7]

Racism towards non-whites amounted to a level of cognitive bias in the minds of American leaders. As early as 1906, California began passing local and state laws segregating Japanese students and forbidding land ownership.[8] In 1922, The U.S. Supreme Court barred immigrants from the Orient from obtaining citizenship and, in 1924, Congress banned all Japanese immigration.[9] Perhaps most famously, President Woodrow Wilson single handedly overturned a Japanese amendment to the League of Nations preamble granting equal status to all participant nations regardless of race.[10] Comparing President Franklin D. Roosevelt's executive order to incarcerate Japanese Americans following the attacks on Pearl Harbor to the liberal treatment of actual German prisoners of war highlights his low opinion of non-whites.[11] Unable to conceive of the Japanese as peer competitors, Roosevelt and his team grossly miscalculated Japan's willingness to progressively defy American sanctions on activity in Manchuria, China, and then Indochina, leading both aggressor and defender to a point of no return.[12] American leadership could not perceive the expanding Japanese empire as a legitimate world power, while Japan's sphere of influence achieved critical mass.

FUELING THE WAR MACHINE HAD THE PERVERSE EFFECT OF ACTUALLY DEEPENING JAPANESE RELIANCE ON AMERICAN EXPORTS...

Japan's burgeoning empire was quickly becoming what Dan Carlin has aptly called a "Supernova in the East," consuming everything around it to fuel an unstoppable chain of events.[13] Japan was exquisitely poised to seize colonial territory in the turbulent years following World War I, but its subsequent conquests fueled a rise in Chinese Nationalism, rapidly turning a fertile field into an inescapable quagmire.[14] Funding the second Sino-Japanese War increased Japan's defense expenditures from 69.2% in 1937 to 75.6% in 1941 and decreased consumer goods production from 43.2% to 28.3%, severely straining the domestic economy and driving national leaders to call for further military conquest to offset expenses.[15] Fueling the war machine had the perverse effect of actually deepening Japanese reliance on American exports, even as the noose of economic sanctions tightened.[16]

The complete economic embargo of Japan and ultimatum to withdraw from China created an existential threat to the Japanese empire and solidified their commitment to war with America. Anti-Japanese hardliners, including Secretary of War Henry Stimson, Secretary of State Dean Acheson, and Secretary of Treasury Henry Morgenthau, conspired to transform Roosevelt's final olive branch, the limited oil embargo, into a complete economic embargo, denying Japanese businesses export licenses and exchange permits required by the Departments of State and Treasury for purchases. "They believed Japan was a paper tiger that would collapse in response to strong U.S. pressure." [17] The Japanese perceived the ultimatum as a declaration of war and set plans in motion to win it, all while continuing the pretense of negotiations over stated objectives and desired outcomes.

CLARITY IN THE OBJECT OF DETERRENCE TIED TO SPECIFIED ACTIONS

Did the U.S. clearly articulate what they wanted Japan to do regarding southeast Asia and how much it mattered to them? Chief of Naval Operations Harold Stark may have put it best while discussing the orders to keep the U.S. fleet at Pearl Harbor in May 1940: "Just remember that the Japanese don't know what we are going to do, and so long as they don't know, they may hesitate or be deterred." [18] Deterrence occurs in the minds of adversary actors, minds that are always calculating risks and rewards, opportunities, and limitations. When a deterrent threat is ambiguous, adversaries are left to their own devices and biases to determine its scope, intention, and credibility. In this case, American messaging and actions left Japan no clear understanding of when the U.S. would use force to back up its threats, and convinced that compliance with U.S. demands would not guarantee the lifting of sanctions. [19]

DETERRENCE OCCURS IN THE MINDS OF ADVERSARY ACTORS, MINDS THAT ARE ALWAYS CALCULATING RISKS AND REWARDS, OPPORTUNITIES, AND LIMITATIONS.

Early U.S. responses to Japanese expansionism left much to be desired regarding objects, intent, and specified actions. In response to the Japanese invasion of Manchuria, President Roosevelt ordered the Scouting Fleet to remain in California. [20] Secretary of State Stimson began circulating his note detailing the U.S. non-recognition of the Manchukuo government and calling on all nations to adhere to the Open-Door policy with China, expressly forbidding any nation impeding the free trade rights of others with the Middle Kingdom. [21] As the Sino-Japanese war unfolded with its attendant atrocities, America responded primarily with public condemnation and rhetoric, and a steady dribble of supplies to Chiang Kai-Shek. [22] In response to the Japanese sinking the USS Panay during the seizure of Nanking, Roosevelt developed aggressive plans to blockade the Japanese Empire from the Aleutian Islands to Hong Kong; however, he kept these plans secret, choosing to accept a Christmas apology over the incident. [23] U.S. Secretary of State Cordell Hull, America's principal negotiator with Japan, admitted that while the Japanese understood the U.S. would continue applying economic pressure to enforce Far East policy, they were never informed under what circumstances the U.S. would employ force. [24] Absent stationing his limited naval assets within a 6,000 mile striking distance of Manchuria, Roosevelt deliberately avoided any allusion to employing force against Japan, and for good reason.

All eyes were focused east in May 1940, when General George Marshall presented President Roosevelt with a memorandum explicitly stating the U.S. should defend no assets west of Hawaii and must not become involved in a war with Japan. [25] The growing conflict in Europe, however, required the U.S. to help keep eastern sea lanes open for its British allies to draw on their colonial resources. Roosevelt ordered the U.S. Navy to remain forward deployed at Pearl Harbor, where they would be within range to respond to Japanese aggression, but American isolationist sentiment prevented him from stating so publicly. The Imperial Japanese Navy quickly perceived the threat but also an opportunity for a *fait accompli* where none had existed before. [26]

The Cordell note, delivered far too late on 26 November 1941, is the clearest effort by the U.S. to communicate detailed deterrence objectives to the Japanese.[27] The complete oil embargo fulfilled its purpose of bringing the Japanese to the negotiating table but under conditions of extreme duress and skepticism over America's ultimate intentions. Mistakenly believing that American support for China was primarily an excuse to pursue general anti-Japanese policies, Prime Minister Tojo saw the negotiations as an ultimatum, the first step in the complete dismantling of the Japanese empire and all the hard-fought gains of the Meiji generation.[28] The Japanese decided to resolve the embargo problem by attacking to secure those resources locally, gambling on the assessment that the U.S. lacked willingness to wage a Pacific war.[29]

AGGRESSOR CONFIDENCE IN DETERRING STATE CAPACITY AND THREAT CREDIBILITY

The U.S. was not the only state trying to dissuade an adversary to protect their own interests. The Japanese deterrence campaign focused on presenting the U.S. with a strategic dilemma. By signing the Tripartite Pact, "The big hope was that the Americans, confronted by a German victory in Europe and weary of the war in the Pacific, would agree to a negotiated peace in which Japan would be recognized as the dominant power in Eastern Asia." [30] With the U.S. now confronted with the possibility of a two-ocean war, the Japanese planned to deter the Americans by denial, hinged on the ability to seize mutually-supporting islands and construct a defense in depth along concentric rings all the way back to Japan.[31] Pre-assessing the credibility of their own defenses, the Japanese believed the U.S. would grudgingly accept the new order, just as Europe accepted American hemispheric hegemony in the 1800s.[32] Efforts to bolster the otherwise haphazard posture of American forces in the region convinced Imperial military planners of the need to strike.[33]

Deterrence strategies focus on either denial or punishment.[34] Deterrence by denial requires sufficient forces in immediate proximity to the adversary's objective to blunt their attack and prevent a *fait accompli*. [35] Deterrence by punishment requires sufficient forces to impose costs after the fact to eliminate any benefit from the attack.[36] The Japanese island defense in depth is an example of denial. The American buildup of forces in the Philippines was a botched attempt at the same.

Overturning the long-held position that the Philippines were indefensible, Roosevelt's defense team pinned their hopes on a hasty deployment of B-17 bombers, the illustrious General Douglas MacArthur, and a better late than never troop build-up.[37] The Americans thought they had more time to bolster Far East defenses. The Japanese knew time was running out. Resolved to their quest for oil, the Japanese debated the possibility of attacking only the Dutch East Indies, but concluded the U.S. and U.K. were guaranteed to intervene and the loss of strategic surprise would be too costly.[38] The U.S. failed to deter Japan because its leaders failed to perceive Japanese motivations as legitimate, failed to articulate its deterrent objectives until the last possible moment, and failed to present a credible threat to Japan's immediate objectives, thus prompting a *fait accompli* attack.

CONCLUSION

Today, the U.S. confronts a powerful China that continues to expand and secure its dominance over Southeast Asia. China, like 1940s Japan, needs resources to sustain and grow the world's second largest economy, and is willing to use force and coercion to take them.[39] The U.S. promotes a Free and Open Indo-Pacific, challenging Chinese claims to international waters and airspace, but hesitates to take sides in the regional disputes China is exploiting for its benefit.[40] By focusing its military modernization on Anti-access / Area Denial technology, China already holds the advantage in a South China Sea conflict, while USINDOPACOM—the American Combatant Command responsible for overseeing U.S. military interests in the region—still negotiates for better access to the region with partner nations.[41] The U.S. competition with China is strikingly similar to the competition with 1940s Japan, and America appears to be making the same mistakes. Reviewing

the current U.S. deterrence strategy towards China through a modern deterrence theory framework would reveal these weaknesses and highlight opportunities for improvement.

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Air Force Magazine (Arlington, Va.)

F-15E Proves Ready to Fly with New Nuclear Gravity Bomb

By Amy McCullough

June 8, 2020

The F-15E Strike Eagle is the first Air Force aircraft to prove it is compatible with the refurbished B61-12 nuclear gravity bomb, Sandia National Laboratories announced on June 8.

A Strike Eagle took off from Nellis Air Force Base, Nev., and dropped a mock B61-12 from 25,000 feet in March, hitting the desert floor at Sandia National Laboratories' Tonopah Test Range 55 seconds later. Officials also conducted a lower-altitude flight test at Tonopah, 160 miles from Nellis. The jet released a mock weapon while flying "nearly at the speed of sound" at about 1,000 feet. The flights marked the last of six flight tests and wrapped up demonstrations with the full weapon system.

"We were able to test the B61-12 through all operational phases and we have extremely high confidence the B61-12 is compatible with the F-15E Strike Eagle," said Steven Samuels, a manager on the bomb program's team at Sandia. "The results speak for themselves, the tests met all requirements, both in performance and safety. It was delivered with precision accuracy; it worked, and it worked well."

Tonopah Test Range Manager Brian Adkins said forensic analysis of the test data is pending.

Sandia does the design and engineering work on all non-nuclear components of the nation's nuclear stockpile, including the refurbished B61, and is in charge of integrating the complete weapon, according to the release.

The B61 entered service five decades ago and has gone through numerous modifications. The B61-12 consolidates and replaces four legacy bomb variants into one weapon. The 12-foot, 825-pound bomb is designed to be delivered from the air in either ballistic or guided-gravity drop modes using a Boeing-built tailkit, according to the release.

Development for the redone B61-12 began in 2012, and is aimed at improving the safety, security, and reliability of the Air Force's legacy air-dropped tactical nuclear weapon. USAF manages the tailkit's development. The National Nuclear Security Administration had planned to manufacture the first refurbished warhead in 2020, but that has since been bumped to fiscal 2022.

The life-extension program is slated to cost \$8.3 billion, and a top NNSA official said in September refurbishment delays could add \$600 million to \$700 million to that price tag. The Air Force's guidance tailkit is projected to cost more than \$1 billion as well.

In addition to the F-15E, the bomb also will be certified to fly on the B-2 strategic bomber, F-16C/D fighter, and eventually the F-35 Joint Strike Fighter.

<https://www.airforcemag.com/f-15e-proves-ready-to-fly-with-new-nuclear-gravity-bomb/>

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Lawrence Livermore National Laboratory (Livermore, Calif.)

Work Resumes in Support of Stockpile Modernization

By Nolan O'Brien

June 3, 2020

The effort to resume hands-on work in support of stockpile modernization programs reached a major milestone May 7 with the successful execution of a focused experiment at the High Explosives Applications Facility (HEAF) at Lawrence Livermore National Laboratory (LLNL). The experiment is the first using high explosives at the Laboratory since Alameda County issued a shelter-in-place order March 16 and the Laboratory went into "Reduced Mission Critical Operations" in response to the COVID-19 pandemic.

LLNL is the lead design agency for two stockpile modernization programs, the W87-1 Modification Program (W87-1 Mod) and W80-4 Life Extension Program (W80-4 LEP). These two programs were among those deemed as priorities by the National Nuclear Security Administration (NNSA) in the phased, deliberate resumption of work at the Laboratory.

The experiment, dubbed Del Mar, was set for March 17, just a day after the shelter-in-place was ordered. On April 28, the team was given the green light to get back to work on the experiment, after a thorough evaluation of the facility and new work controls to ensure worker safety during the experiment. Experiments similar to Del Mar were a regular occurrence before the pandemic; however, executing Del Mar proved to be anything but business as usual.

"It's not your typical way of doing things," said Fady Najjar, the LLNL physicist who designed the experiment. "We were unable to go on site or into HEAF to meet with the operations team. We couldn't be in the control room to make sure we were getting the data. We couldn't go in the tank to see the setup. You want to see the experiment before the shot is fired. You want to feel it when it goes off. All these things were missing for me. That gave me a lot of angst and concern.

"With that said, the operations team did an amazing job to make sure we stayed connected throughout the process," Fady continued. "We had numerous video conferences to review pictures of the setup and talk through issues as they popped up. It was really a well-oiled machine. The team did an outstanding job."

Del Mar was conducted in the largest steel firing tank vessel at HEAF, which can confine the detonation of up to 10kg of high explosives. Multiple diagnostics were trained on the explosion, all timed to capture key moments of the experiment, which was over in less than 100 microseconds. In the end, the experiment had 100 percent data return, which is an exceptional result even in the best of times.

"We have never operated like this before," said JB McLeod, LLNL Integrated Experiment Team lead. "There's a level of interaction that we're accustomed to between the design and facility teams and that had to change for this experiment. All the setup and testing was completed while wearing extra protective gear and maintaining new distancing requirements. There were different conditions we had to think through and navigate to do this shot. It was a big team effort."

Focused experiments like Del Mar and its predecessor Saturn Scythe provide key data and understanding that benefits programs like the W80-4 LEP and W87-1 Mod.

Since underground nuclear testing ended in 1992, the W87-1 Mod is the first modernization program to involve the complete re-manufacture of all system components. Researchers rely on a wide range of experiments as well as past nuclear test data to validate supercomputer simulations of how the individual components will perform and work together as a whole.

Adding to the complexity of the W87-1 is the fact that the warhead is being designed for a new delivery system, an intercontinental ballistic missile (ICBM) system currently under development by the U.S. Air Force called the Ground-Based Strategic Deterrent (GBSD). GBSD will replace the '70s-era Minuteman III ICBM and the W87-1 Mod will replace the 38-year-old W78 warhead.

The W87-1 Mod is in Phase 6.2 of the nuclear weapons lifecycle, where researchers study the feasibility of design options for the replacement warhead. The program is scheduled to enter Phase 6.2A in 2021, where researchers will develop a thorough cost study for the selected design options. In Phases 6.3 and 6.4, LLNL will complete the engineering design and work closely with NNSA production plants to ensure that the production process delivers parts that meet requirements. Phase 6.5 marks the first production run of the W87-1 Mod, which is scheduled for fiscal year 2030.

“A short pause can cause a much longer delay in the program,” said Juliana Hsu, W87-1 program manager. “This is a critical time to finish the design, and the pause certainly squeezes our timescale, which is a concern. However, the health and safety of the team was an even bigger concern for me. We needed to pause, and we’ve been very cautious and deliberate when taking steps to resume work like this. It really is a tough balance to reach. The nation is relying on us to deliver. At the same time, the W87-1 Mod team is relying on me to ensure that the work environment is safe. I wouldn’t want to continue work and cause people to get sick. When I ask the team to come back in, they’re trusting me. I take that responsibility seriously.

“This experiment is a big deal, considering the past couple months,” Hsu continued. “We’ve improvised, we’ve adapted and, with this Del Mar under our belt, I sense that we’re starting to overcome.”

<https://www.llnl.gov/news/work-resumes-support-stockpile-modernization>

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RAND (Santa Monica, Calif.)

The Serious Side of Gaming: Q&A with Yuna Wong

By RAND

May 8, 2020

Policy researcher Yuna Wong is serious about games. Recently named codirector of the Center for Gaming, she has designed and run wargames to study national defense policy, Marine Corps operations, and the dangers of putting too much trust in artificial intelligence. She wrote her Ph.D. dissertation at the Pardee RAND Graduate School on how to better model the behaviors of noncombatants when simulating urban military operations.

She didn't expect to make gaming a focus of her career. She studied political science, then worked as an operations research analyst for the Marines. She was at a conference when she saw what she describes as BOGGSATs—a Bunch of Guys and Gals Sitting Around Tables—playing a wargame. “They were a particular type of geek that I felt very comfortable with,” she says.

What was it that made you decide to focus on gaming?

It was the whole idea of living out a story and really surfacing different perceptions people can have. It was so different from a study or experts expounding on some topic in a static and impersonal way. With games, you can get experts shouting at each other. It was just fascinating to me, the human drama.

You recently looked at deterrence and artificial intelligence. Walk me through that game.

We had a future scenario where China was the dominant power in the region; the United States, Japan, and South Korea were all trying to balance against it; and everyone had autonomous systems and artificial intelligence. We asked the question, If you make decisions at machine speeds, can things escalate at machine speeds?

Did any moments stand out as the game unfolded?

We had speculated that maybe you could get a world where only robots destroy each other and nobody even cares or notices. But our game escalated to the point that there were human casualties. The first time humans were killed, that really raised the temperature. It was a different game after that.

Did you come away with any insights that you wouldn't have otherwise?

In our scenario, the machines escalated in ways that humans didn't expect and couldn't manage. We really need to think about that as we develop these systems and concepts. The United States and China both seem very committed to investing in artificial intelligence and autonomous systems, but we need to ask whether some of those systems are inherently more escalatory. We need to avoid a future where the first time we're asking those questions is after we've fielded these systems and we're in a crisis.

You also have a board game named Hedgemony coming out soon.

A good game really surfaces questions about what just happened and leads you to insights that you hadn't thought of.

It's a version of the game that we developed for the Pentagon that supported the 2018 National Defense Strategy. We thought a commercial, boxed version could help inform people who are trying to think strategically—graduate students, War College staff and students, people in the services. You play the Department of Defense and you make different choices about posture and modernization, force structure. Other players can be China, Russia, Iran, and North Korea. How do you balance your resources when you have living adversaries who are also trying to think about the strategies they want to pursue?

It sounds like the market would be professionals, not necessarily families playing on a Sunday afternoon?

Right—although we don't want to underestimate some families.

So what makes a good game?

It's got to be easy for participants to be active, to really get immersed in the game. A good game really surfaces questions about what just happened and leads you to insights that you hadn't thought of. Thomas Schelling, the famous RAND wargamer and Nobel laureate, once said no matter how intelligent people are, they can't make a list of the things that had not occurred to them. That's what games can be good for.

Do you have a favorite board game?

Quartermaster General, a World War II game. I really appreciate how elegant that game is in recreating some of the dynamics of World War II—not just the forces, but the geopolitical logic and some of the choices those countries had to make. Having done something like Hedgemony, creating a game of strategy for the entire world, I really appreciate how well that one is done.

<https://www.rand.org/blog/rand-review/2020/05/the-serious-side-of-gaming-qa-with-yuna-wong.html>

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US COUNTER-WMD

Space News (Washington, D.C.)

Space Development Agency to Deploy Hypersonic Missile Defense Satellites by 2022

By Sandra Erwin

June 7, 2020

WASHINGTON — The Space Development Agency is soliciting bids to integrate a missile-warning sensor with a satellite bus and launch it to low Earth orbit by late 2021.

The June 5 solicitation is for a “tracking phenomenology experiment” to develop sensor algorithms for a future missile detection network in space. Proposals are due July 6.

The experiment is an initial step in the SDA’s plan to deploy a large constellation of low orbiting satellites in 2022 to detect and track maneuvering hypersonic missiles that the Pentagon predicts China and Russia will field in the near future.

The tracking experiment is central to the development of sensors that can accurately identify missile signals in background noise and clutter, according to SDA. “It will characterize scene backgrounds for a range of satellite viewing conditions to optimize algorithms, concepts of operations and wavebands for advanced missile detection and tracking,” said the June 5 request for proposals.

The contractor in this project will be responsible for taking a sensor payload provided by SDA, integrating it with a satellite bus and putting in on a launch vehicle.

Derek Tournear, the director of the SDA, said the missile defense phenomenology experiment will supplement two other satellites being developed by the Defense Advanced Research Projects Agency under the Blackjack program.

“There will be at least three LEO OPIR [overhead persistent infrared] satellites flown,” Tournear said June 4 during a Missile Defense Advocacy Alliance webcast.

These experiments will collect data “so that we can really justify that we’ve chosen the correct bands, that we understand some of the phenomenology,” Tournear said.

In parallel to the experiment, SDA will start soliciting proposals from contractors to build the first eight satellites of the missile tracking constellation. A final request for proposals will be out by June 15, Tournear said.

Tournear said satellites in different orbits will be needed to detect and track fast-flying hypersonic missiles. SDA’s eight satellites will provide a “wide field of view” from orbit but more detailed tracking data will be provided by another “medium field of view” layer of satellites that is being designed by the Pentagon’s Missile Defense Agency but has not yet been funded. The MDA program, known as the Hypersonic Ballistic Tracking Space Sensors, or HBTSS, would provide the so-called “fire control” data needed to be able to target an interceptor weapon to shoot down the hypersonic missile.

By 2022 or 2023, SDA plans to field an early version of a missile warning network with about 70 wide-field-of-view and medium-field-of-view satellites. “That will give us enough coverage in LEO so that we can have essentially regional persistence,” said Tournear. “We’ll have to determine which areas of the globe we want to focus on. That’s the first time we’ll have enough satellites up there to

where we could actually fight a war with those satellites.” By 2025, “we’ll have more satellites up to where it we’ll be able to have full global coverage.”

Congress has questions

Rep. Doug Lamborn (R-Colo.), of the House Armed Services Committee, said DoD’s missile defense programs are likely to be a topic of discussion in the upcoming markup of the 2021 National Defense Authorization Act. Subcommittee debate is scheduled for June 22 and the full committee markup on July 1.

During the Missile Defense Advocacy Alliance webcast, Lamborn asked Tournear and MDA officials on the panel to explain why the HBTSS space sensor layer was not funded in the Pentagon’s 2021 budget.

Tournear said there were “funding constraints” in the 2021 budget. If Congress decided to add money to the program, he said, that would help close the gap between the deployment of the wide-field-of-view and the medium-field-of-view systems.

Some lawmakers have questioned why SDA is moving forward with a tracking sensor layer if there is still no plan to deploy the HBTSS system that would be needed to shoot down an enemy missile.

“You start to get into this chicken and the egg issue that we want to head off at the pass,” said Tournear. “We want to move both of them at the same time. And I would contend that one of them is not more difficult than the other, both are necessary.”

Tournear also pushed back on criticism that SDA and MDA are doing overlapping work. “We’re doing a hybrid architecture together,” he said. Tournear noted that both agencies are under the office of undersecretary of defense for research and engineering Mike Griffin. “As far as making sure that that SDA and MDA are tied closely together, well, for one thing, we’ve got the same boss. That’s a start that helps a lot.”

<https://spacenews.com/space-development-agency-to-deploy-hypersonic-missile-defense-satellites-by-2022/>

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US ARMS CONTROL

Defense One (Washington, D.C.)

Russia Puts Defensive Face on Its Nuclear Doctrine Ahead of Arms-Control Negotiations

By Patrick Tucker

June 6, 2020

Russia’s new strategic-arms decree adds a bit of ambiguity and defensive flavor, but its main task is positioning Moscow for a critical round of arms-control talks, experts said.

On its face, the document reiterates key points in Russia’s doctrine on the use of strategic nuclear weapons, as opposed to its smaller nukes. Strategic nukes, it says, may be maintained to ensure “sovereignty, territorial integrity, deter direct aggression against Russia or allies, and in the event of aggression preclude escalation,” according to Michael Kofman, a senior research scientist at CNA, a nonprofit research and analysis organization in Arlington, Virginia.

However, Kofman notes some ambiguity in the language, particularly around the idea of using nuclear weapons during a war to bring about a resolution.

“Notably, the standard formulation of ‘cease hostilities on terms favorable to Russia’ (or Russian interests), was changed to ‘conditions acceptable’ to Russia & allies, which is a more fair reading of the escalation management strategy,” Kofman wrote Thursday on his blog.

“Paragraph 5 states that Russia sees nuclear weapons exclusively as a means of deterrence, that they are to be used in extreme circumstances and as a forced measure. I think that’s not a very honest portrayal of how nuclear weapons are viewed by the Russian military,” he wrote. “But the purpose of this document is to position Russian views as defensive only...and to counter the claims of those who say Russia has an escalate-to-de-escalate strategy.”

A country with such a strategy would consider using nuclear weapons — likely tactical ones — at the beginning of a conflict, aiming to press its adversary into quick negotiations.

The document also adds drones to its list of threats, mirroring recent changes to Russian military doctrine generally, says Kofman

Some Russian officials have expressed concerns about high-altitude, long-endurance drones like the U.S. Global Hawk, which are not limited by WMD or deterrence agreements. Their inclusion in the new document here “points to Russia’ recognition that it is vulnerable to such weapons, and to its desire to restrict its use,” said Sam Bendett, an adviser to the Russia Studies Program at CNA.

The document is significant mostly because of its timing. The United States has indicated indirectly that it will abandon the New START Treaty, which limits the number of nuclear warheads and strategic launch platforms each country can deploy, and pursue instead a new agreement that covers new drones, missiles, and other submarines in development or production by Russia and China. The man that President Trump has selected to lead that negotiation is Marshall Billingslea, the current nominee to be undersecretary of state for arms control. But Senate Finance Committee Chairman Sen. Chuck Grassley, R-IA, has put the nomination on hold as he waits for an explanation from the White House for the firing of two inspectors general. That suggests that Billingslea, once confirmed, will have precious little time to negotiate an incredibly ambitious trilateral arms deal.

Russia may be using the delay to its advantage.

“This is a Russian effort to shape the conversation in a critical year for arms control, counter what they see as malicious narratives about their nuclear doctrine, and position the country in terms of declaratory policy in the event New START expires,” said Kofman.

Patrick Tucker is technology editor for Defense One. He’s also the author of *The Naked Future: What Happens in a World That Anticipates Your Every Move?* (Current, 2014). Previously, Tucker was deputy editor for *The Futurist* for nine years. Tucker has written about emerging technology in *Slate*, ...

<https://www.defenseone.com/technology/2020/06/russia-puts-defensive-face-its-nuclear-doctrine-ahead-arms-control-negotiations/165974/>

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AP via VOA (Washington, D.C.)

EU Rejects Any US Attempt to Invoke Iran Nuclear Deal

By AP

June 9, 2020

BRUSSELS - The European Union's top diplomat said Tuesday that since the United States has already withdrawn from an international agreement curbing Iran's nuclear ambitions, it can't now use its former membership of the pact to try to impose a permanent arms embargo on the Islamic Republic.

The accord, which Iran signed with the U.S., Britain, Germany, France, China and Russia in 2015, has been unraveling since President Donald Trump pulled Washington out in 2018 and reinstated sanctions designed to cripple Tehran under what the U.S. called a "maximum pressure" campaign.

U.S. Secretary of State Mike Pompeo and U.S. Ambassador to the United Nations Kelly Craft have said that extending a permanent U.N. backed arms embargo against Iran is now a top priority for Washington.

But speaking to reporters Tuesday after talks with Chinese Foreign Minister Wang Yi, EU foreign policy chief Josep Borrell insisted that since the U.S. has pulled out of the nuclear deal, known as the Joint Comprehensive Plan of Action, it can no longer claim to have a role in it.

"The United States has withdrawn from the JCPOA, and now they cannot claim that they are still part of the JCPOA in order to deal with this issue from the JCPOA agreement. They withdraw. It's clear. They withdraw," Borrell said.

On Monday, Russian Foreign Minister Sergey Lavrov accused the Trump administration of unleashing a politically motivated campaign against Iran and he called for "universal condemnation" of the U.S. attempt to get the U.N. Security Council to impose a permanent arms embargo.

The EU sees the nuclear deal as a key pillar of regional and world security and has struggled to keep the pact alive despite U.S. pressure. Borrell is tasked with supervising the way the pact is applied and to help resolve disputes between the parties.

<https://www.voanews.com/middle-east/voa-news-iran/eu-rejects-any-us-attempt-invoke-iran-nuclear-deal>

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Japan Times (Tokyo, Japan)

Kim Raises Pressure on South Korea's Moon to Split with Trump

By Kanga Kong, Jeong-Ho Lee and Jon Herskovitz, Bloomberg

June 10, 2020

Both North Korea and left-leaning supporters of South Korean President Moon Jae-in want him to restore economic ties broken by security tensions. But pleasing them would mean angering U.S. President Donald Trump.

On Tuesday, North Korea said it was closing down communication links set up two years ago between Moon and Kim Jong Un, jeopardizing the South Korean leader's 2017 campaign promise to move the heavily armed rivals toward a permanent peace. It's bad timing for Moon: His ruling bloc

secured a historic supermajority in National Assembly elections in April, boosting calls within his Democratic Party to mend ties with North Korea.

The problem for Moon is that he doesn't have much he can offer North Korea without prompting a blowup from the Trump administration, which has repeatedly rejected South Korea's calls for sanctions relief. The U.S. has refused to relax United Nations penalties and other measures against the regime without greater commitments on arms reduction from Kim.

Woo Won-shik, a senior lawmaker and a former Democratic Party floor leader, said Tuesday there was an "urgent need" to revive inter-Korean cooperation, arguing that failure to act now could further isolate North Korea and bring about a return to the brinkmanship of three years ago. Kim earlier this year said he would soon debut a "new strategic weapon" — part of a bid to pressure Trump, who faces an election in November, back to the negotiating table.

"There are many inter-Korean projects that can proceed without breaching the existing U.N. sanctions regime," Woo said.

The latest dust-up — triggered by South Korean activists who sent anti-Pyongyang messages in balloons across the border — comes ahead of the 20th anniversary of the first meeting between top leaders of the divided Koreas. The summit beginning on June 13, 2000, was the biggest moment of then-President Kim Dae-jung's reconciliation effort that led to stepped up trade and joint projects and helped earn the South Korean leader the Nobel Peace Prize.

While that "Sunshine Policy" helped cool tensions, it was also criticized for providing Pyongyang's leaders with cash needed to build up its nuclear weapons program. Smaller measures that might allow only a trickle of foreign currency back into cash-starved North Korea also risk disappointing Kim Jong Un and Moon's allies, who see their current strength in parliament as their best chance to secure lasting change.

North Korea's relations with Moon haven't been the same since Trump walked out of a summit with Kim in February 2019 in Hanoi. The North Korean leader was pushing a plan backed by Seoul to give up his antiquated Yongbyon nuclear facility in exchange for sanctions relief — an offer that came nowhere near the Trump administration's demand for the "final, fully verified denuclearization of North Korea."

"It is a sense of betrayal and disappointment," said Rachel Minyoung Lee, a former analyst for the U.S. government specializing in North Korea. "Kim Jong Un feels South Korea has misled him into believing that Yongbyon facilities were going to be enough for a deal with Trump in Hanoi."

After that, North Korea has effectively ignored Moon's requests for talks, shunned his offers for aid and test-launched new ballistic missiles capable of carrying a nuclear payload to all parts of South Korea, where about 28,500 U.S. military personnel are stationed.

North Korea didn't answer South Korea's calls made on the military line Tuesday for the first time since the inter-Korean communication link was restored in 2018, defense ministry spokeswoman Choi Hyun-soo told a briefing in Seoul. "Inter-Korean communication lines are a basic means for communication and should be kept in line with inter-Korean agreements," South Korea's Unification Ministry said in a text message to reporters.

A State Department spokesperson said the U.S. urges North Korea to return to diplomacy and cooperation. "The United States has always supported progress in inter-Korean relations, and we are disappointed in the DPRK's recent actions," the spokesperson said, referring to North Korea by its formal name.

Kim Jong Un may follow up his move to cut communications links with more missile tests, but making sure to avoid the wrath of Trump. The American president has brushed off shorter-range

tests and credited his own diplomacy for stopping Kim from further tests of intercontinental ballistic missiles capable of hitting the U.S. mainland.

“Provocations like missile launches will follow, but nothing as serious as an ICBM test,” said Cho Han-bum, a senior research fellow at the Korea Institute for National Unification, a state-run think tank. Cho added that North Korea also didn’t want to push Moon too far: “The South is well aware that ending the inter-Korean relations is not something that the North wants.”

Moon’s government said in late May said that it wanted to try to again ease travel restrictions and inter-Korean exchanges. A similar attempt in 2018 led Trump to bluntly tell Seoul that it couldn’t do anything regarding sanctions “without our approval.”

Members of the Moon administration have hinted that Seoul could act unilaterally to resuscitate inter-Korean cooperation, but that would come with the enormous risk of cleaving Seoul from its alliance with Washington, said Soo Kim, a Rand Corp. policy analyst who specializes in Korean Peninsula issues.

“President Moon can promise the North Koreans the earth, but realistically, he remains constrained in the way of practical measures South Korea can take — if Seoul were to be conscious of and concerned about its relations with the U.S.,” she said.

South Korean proposals blocked by the Trump administration included resuming operations at a joint factory park in the North Korean border city of Kaesong and a separate resort at North Korea’s Mount Kumgang. Both were opened in the spirit of the Sunshine Policy and later shut due to political turmoil.

While South Korea was able to win a U.N. sanctions waiver that led to the ceremonial sending of trains across the border about two years ago, its humanitarian assistance has dried up under Trump’s maximum pressure campaign. South Korea has sent more \$3 billion of aid since 1995, but little of it has come under the Moon government, which sent just \$12 million in 2017 and 2018, government data shows.

Trade between the two nations has dropped to virtually zero from \$2.7 billion in 2015, or about 10 percent of North Korea’s economy. The regime took a further hit this year when it sealed off its borders in January at the start of the COVID-19 pandemic, which slammed the brakes on other trade with countries like China.

Kim Jong Un believes he doesn’t have much of anything to lose by increasing pressure on Moon, according to Duyeon Kim, a senior adviser for Northeast Asia and Nuclear Policy at the International Crisis Group.

“North Korea is raising the ante, trying to further punish, scare, and force Seoul to work harder to meet Pyongyang’s demands,” Kim said. “Kim Jong Un feels he bent over backwards for Moon, but believes Seoul has not reciprocated, has betrayed North Korea and the Korean race, and has no influence over Washington to deliver on its promises.”

<https://www.japantimes.co.jp/news/2020/06/10/asia-pacific/politics-diplomacy-asia-pacific/kim-jong-un-north-korea-pressure-south-korea-moon-jae-in-donald-trump/#.XuDkFkVKg2x>

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COMMENTARY

Bulletin of the Atomic Scientists (Chicago, Illinois)

The Trump Administration Thinks It Can Win an Arms Race. Time for a History Lesson.

By David Cortright

June 5, 2020

It is impossible to respond to every distortion of reality emanating from the Trump administration, but sometimes a statement is so outrageous that it demands comment and correction. Such was the remark of Marshall Billingslea, the Special Presidential Envoy for Arms Control, during a recent online interview with the Hudson Institute. He was promoting the administration's dubious plan for three-way nuclear arms negotiations with China and Russia, which critics have called a disingenuous ploy to avoid extending the New Strategic Arms Reduction Treaty with Russia, which will expire next year, furthering the administration's assault on arms control.

When asked about Trump's previous comment that, if there is to be an arms race, the United States will win it, Billingslea spoke of a "three-way arms racing context." The president has made it clear, he said, "that we have a tried and true practice here. We know how to win these races. And we know how to spend the adversary into oblivion."

The reference to winning an arms race by spending the adversary into oblivion recalls one of the misconceptions of Cold War history. Many believe that it was the US military buildup, especially President Reagan's cherished Strategic Defense Initiative, that broke the back of Soviet power and forced the Kremlin to yield to American military might. "Ronald Reagan won the Cold War without firing a shot," Margaret Thatcher famously declared.

It's a plausible argument, but the real story is more complicated.

First, look at the numbers. Soviet arms spending grew at a steady pace during the Cold War and did not rise or fall in response to American expenditures. Estimates based on CIA figures indicate that the growth of Soviet military expenditures remained constant during the 1980s, or may have declined. The Reagan arms buildup and the announcement of the Strategic Defense Initiative did not cause a major increase in Soviet military spending.

Excessive military spending certainly imposed a burden on the Soviet economy, but this was not the imperative driving Gorbachev and the reformers to introduce their program of perestroika. They sought to overcome their country's economic backwardness by ending Stalinist centralization and creating a more open society. Demilitarization was part of that agenda, but it was motivated by domestic considerations, not external pressure.

Far from being outpaced by the American nuclear arsenal, the Soviets had a big lead in the total number of nuclear weapons in the 1980s. Their stockpile rose dramatically from the 1970s, reaching a peak of nearly 40,000 weapons by 1986, as illustrated in the chart below.

Second, many top officials who experienced the collapse of the Soviet Union firsthand reject the notion that the United States spent the Soviet Union into oblivion. George Kennan considered the triumphalist interpretation "ridiculous." The general effect of hardline policies, he wrote, was "to delay rather than hasten the great change that overtook the Soviet Union at the end of the 1980s." Gorbachev himself said it was "a very big delusion." His politburo ally Alexander Yakovlev said that

American pressures “played no role” in the determination of the reformers to transform the Soviet system. “Gorbachev and I were ready for changes in our policy regardless of whether the American president was Reagan, or someone more liberal.” The US military buildup and push for missile defense only complicated the Soviet reform process.

The real “tried and true practice” of the past is not that one can win an arms race—no one can. It’s that negotiated steps toward mutual denuclearization can reduce tensions and enhance security. Let’s send the whole idea of arms racing into oblivion.

<https://thebulletin.org/2020/06/the-trump-administration-thinks-it-can-win-an-arms-race-time-for-a-history-lesson/>

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The Hill (Washington, D.C.)

The Case for a Layered Missile Defense of the US Homeland

By Robert Soofer

June 4, 2020

During this time of uncertainty, Americans should be confident knowing our country already has protection against a very different type of threat: every hour of every day, 44 Ground Based Interceptors (GBI) split between Alaska and California are ready to defend all 50 states against incoming intercontinental ballistic missile (ICBM) attacks by rogue states. Inside U.S. command and control centers, military operators dutifully stand watch, ready to carry out a high-stakes defense of the homeland – a mission often described as “hitting a bullet with a bullet.”

While we are confident in our ability to defend the homeland against current missile threats by rogue states, the risks are anything but static. Launch-after-launch, our adversaries are learning and adapting through trial and error. The United States must constantly stay ahead of this threat to keep our homeland from becoming vulnerable to foreign coercion or attack. Letting our guard down would threaten U.S. alliances and limit options during a crisis, while stronger defenses give our leaders a margin of safety that enables them to more effectively negotiate disputes.

To stay ahead of these threats, the Department of Defense (DoD) is taking a number of steps, now and in the future. For starters, DoD is ensuring the reliability of the existing 44 GBIs, extending their service life through regular testing and performance upgrades. We’ve also initiated a new program to develop a Next Generation Interceptor (NGI) to improve homeland missile defense performance against evolving threats. When fielded between 2028 and 2030, at least 20 new NGIs will sit alongside the existing GBI fleet for a total mix of 64 defensive interceptors.

To complement these capabilities and provide extra layers of protection between now and 2028, DoD is also exploring near-term options to augment the GBIs and future NGIs. Later this year, the Missile Defense Agency (MDA) will conduct an intercept test of a “Standard Missile” (SM)-3 Block IIA – originally designed to engage medium or intermediate range threats – in order to verify its ability to successfully engage a longer range, ICBM-class threat. MDA is also evaluating the technical feasibility of employing interceptors from another system – the Terminal High Altitude Area Defense (THAAD) – as a possible homeland defense against incoming long-range missiles in their final (terminal) phase. These additional homeland defense layers, should they prove feasible, could be available by mid-decade and reinforce America’s protection against a rogue state missile attack.

But missile defense involves more than just shooting interceptors at incoming targets. It’s also about using sensors to detect the threat early in the launch cycle and communicating data

seamlessly between sensors and interceptors. That is why DoD is simultaneously investing in the development of a new generation of advanced ground- and space-based sensors. Having the ability to detect, track and “discriminate” (i.e., differentiate a real warhead from a decoy) accurately allows precious time and is what truly enables missile defense interceptors to hit their targets. Our capabilities will be significantly upgraded later this year with the completion of a ground-based long-range discriminating radar in Alaska, and we are also actively developing a new defensive network of space-based sensors to track more sophisticated missile threats. A comprehensive network of space-based sensors is particularly important because it offers an “over the horizon” perspective of in-flight missile trajectories, something geographically fixed ground sensors cannot provide.

A layered homeland defense, however, is not only useful when the missiles are flying, it also plays a role in deterring potential adversaries. Having multiple missile defense options at our disposal complicates missile attacks being contemplated by adversaries, creating uncertainty about the potential success of their plans. Although avoiding conflict will always be our preferred approach, a layered homeland missile defense offers contingency in a worst-case scenario and gives our leaders leverage to negotiate from a position of strength, safe from the specter of coercion.

Despite these advantages and the relatively limited quantity of interceptors we possess, critics claim that U.S. efforts to diversify its homeland missile defense are destabilizing and causing an arms race with China and Russia. This critique is routinely promoted by officials in Beijing and Moscow despite understanding that U.S. missile defenses are built to defend against comparatively limited rogue state attacks, not against China and Russia which possess much larger strategic arsenals. To address the threat of a comprehensive and technologically sophisticated strategic attack by China or Russia, the United States relies on the same strategy it has employed for more than half a century – nuclear deterrence, not missile defense.

These well-known facts don’t prevent Beijing and Moscow from engaging in political doublespeak to pursue their national interests. While China and Russia claim without blushing that only U.S. missile defenses represent a threat to world order, both countries are actively building their own missile defense systems against all types of threats. For example, Russia is in the process of upgrading its ballistic missile defenses around Moscow. Even more disturbingly, the dozens of ballistic missile interceptors making up Russia’s defenses have nuclear-armed tips, rather than the conventional interceptors employed by the United States. The goals of this international disinformation campaign are clear: sow domestic and international division, while leaving the U.S. homeland more vulnerable to coercion and attack. The United States has the sovereign right, and duty, to defend itself – and we will do nothing less.

At the end of the day, the question we must ask ourselves is whether the U.S. homeland is safer with or without a layered missile defense system designed to counter an ICBM arsenal under the “control” of an unstable, rogue adversary. Since there is only one real choice, it is critical for the United States to stay ahead of current and future threats, which multiply in scope and complexity each year. With the support of Congress, we can meet this challenge.

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<https://thehill.com/blogs/congress-blog/politics/501231-the-case-for-a-layered-missile-defense-of-the-us-homeland>

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National Defense (Arlington, Va.)

Editor's Notes: Creating a Robust Biosurveillance Network

By Stew Magnuson

June 2, 2020

The Central Intelligence Agency reportedly knew as early as January that a potentially devastating pandemic was on its way to the United States.

Gee, thanks for telling us.

That bit of sarcasm isn't entirely fair to the CIA or the intelligence community writ large. It doesn't have a mandate to communicate to the public about what it does or doesn't know. Its responsibility is to report its knowledge — or its best guesses as to what's going on in the world — to the president and the intelligence committees in Congress.

Which is a crying shame in this case as the U.S. death toll from the COVID-19 pandemic continues to mount, along with the economic and psychological devastation. Maybe some of it could have been mitigated with more advanced notice.

There is of course those who fall back on the “public doesn't need to know everything” belief. And that is true. Some things need to be classified. But that is in matters of national security.

A pandemic is not a matter of national security but a matter of public health.

Let's break down the term “public health.” The first and most important word in this case is “public.”

No individual or entity should have the right to withhold information in matters of public health from the public.

In last month's “Editor's Notes” column, I wrote of the need for a real and robust biosurveillance system that spans the globe. There have been attempts to create such a network, but none that truly got off the ground. The effort has been likened to the global system of predicting weather.

Imagine for a moment that a hurricane was forming in the Atlantic and headed straight for the East Coast, but the federal government withheld that information from the general public. Absurd, of course, but why should knowledge of a possible pandemic be any different?

And that goes for manmade bioweapons, which do fall into the realm of national security. We had an example of this shortly after 9/11 when anthrax was being sent through the U.S. mail. The public servants who handled the mail had a right to know what they were encountering and the public needed to be aware of what a suspicious letter or package might look like.

The May column called for work on a global biosurveillance network to get underway as soon as the current crisis subsides, if not sooner.

Not being an expert in public health, it was satisfying to receive in my inbox a commentary written by four knowledgeable scientists deeply involved in biosecurity, who all agreed with this assessment. They are affiliated with Georgetown University, National Defense University, Army Futures Command, and the Advanced Regenerative Manufacturing Institute.

“Early recognition of infectious disease threats like COVID-19 requires a globally distributed array of interoperable hardware and software, fielded in sufficient numbers to create a network of linked collection nodes,” they wrote. The full piece can be found on page 11.

Another example exists in the oil and gas industry. There is a global intelligence-gathering network constantly on the lookout for any policy or incident that might have any impact on the price of a barrel of oil. If rebels pop their AK-47s off near a well in Nigeria, or a pipeline in Canada springs a leak, the oil traders in Houston, Texas, hear about it in minutes.

As the years after 9/11 showed, the United States has a propensity to throw money at problems. And if that is to be the case again, a biosurveillance network should be the first and foremost place to invest in response to COVID-19.

Defense contractors needn't feel threatened as they have a lot to offer, and may have a lot of software and some hardware that can be taken off the shelf: sensors, artificial intelligence to crunch data, advanced manufacturing of medical equipment, and so on.

The Defense Department already has biodefense capabilities to thwart weapons of mass destruction, which is another sector worthy of a budget boost.

After this, it's hard to imagine even the worst nation-states developing contagious bioweapons. It should now be obvious that these bugs don't discriminate. They are equal opportunity killers and destroyers of economies. But terrorist organizations may still be motivated to unleash them. The apocalyptic Aum Shinrikyo cult in Japan would have gladly done so.

And it should also be clear, the U.S. military — just like everyone else — needs to know if a deadly pathogen is on the march — whether it is manmade or not.

Money will only go so far when it comes to building the biosurveillance network. All nations will have to participate: rich or poor, run by liberal democratic governments or unrepenting despots, the network will only be as strong as its weakest link. Diplomacy and a strong State Department will be needed to ensure all nations participate. Rising public anger at China — justified as it is — would only hurt the chances of a robust biosurveillance network if it is left out.

Most importantly, the information the network gleans cannot be filtered through politicians, authoritarian governments or intelligence agencies.

It needs to be operated by, through and for the benefit of the public.

<https://www.nationaldefensemagazine.org/articles/2020/6/2/creating-a-robust-biosurveillance-network>

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Defense News (Washington, D.C.)

Russia's New Nuclear Policy Could Be a Path to Arms Control Treaties

By Sarah Bidgood

June 9, 2020

Russia recently published a new document, titled "Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence." Its release marks the first time that Russia's official policy on deterrence has been made publicly available. As others have observed, this document is an example of declaratory policy aimed primarily at a foreign audience — and should be read with this orientation in mind. Still, it contains information that helps readers better understand how Russia thinks about nuclear weapons, and this certainly makes it worth a close examination.

Some of the more useful insights this document offers pertain to Russia's threat assessments and what it sees as likely pathways to nuclear use. A number of these threats line up with American

declaratory policy as reflected in the 2018 Nuclear Posture Review. These overlaps are noteworthy, since the U.S. and Russia have traditionally been able to work together to mitigate mutual threats even when their bilateral relationship is in crisis. As such, they can point toward ways to get arms control back on track at a time when it is in deep trouble.

One such area of overlap appears in section 19C, which covers the conditions that could allow for nuclear use. This list includes an “attack by [an] adversary against critical governmental or military sites of the Russian Federation, disruption of which would undermine nuclear forces response actions.”

The similarities between this language and that which appears in the 2018 NPR are considerable. That document identifies “attacks on U.S., allied, or partner civilian populations and infrastructure and attacks on U.S. or allied nuclear forces, their command and control, or warning and attack assessment capabilities” as a significant non-nuclear strategic attacks that could warrant the use of nuclear weapons.

These parallels suggest that an agreement prohibiting attacks on nuclear command, control and communications systems could be of interest to both Washington and Moscow. A treaty along these lines would help to shore up crisis stability while rebuilding trust and confidence between the U.S. and Russia. It could also become a multilateral approach involving the five nuclear weapon states, which have been meeting regularly to discuss risk reduction and other topics. This would represent one of the few concrete outcomes of these discussions, which have been met with cautious enthusiasm but have so far failed to bear much fruit.

Another example of mutual U.S.-Russia threats appears in section 12E of the Russian document. Here, the “uncontrolled proliferation of nuclear weapons, their delivery means, technology and equipment for their manufacture” are described as risks that nuclear deterrence is meant to neutralize. Preventing the spread of nuclear weapons seems to remain a focus of U.S. nuclear policy, too, and the 2018 NPR commits to strengthening institutions that support “verifiable, durable progress on non-proliferation.” This ongoing shared interest is an argument for renewed U.S.-Russian cooperation in this area, especially as it relates to strengthening the Nuclear Non-proliferation Treaty.

There is a long history of engagement between the two largest nuclear weapon states on nonproliferation, even at times of major discord in their relationship. Successful outcomes of this cooperation include the Nuclear Non-proliferation Treaty itself, which the United States and the Soviet Union concluded 50 years ago to stop additional countries from acquiring nuclear weapons.

Despite decades of joint work toward this shared goal, the rift between Washington and Moscow has now brought most bilateral efforts in this area to a halt. As some in Iran, Turkey and Germany contemplate the pursuit of nuclear weapons, it’s time for the U.S. and Russia to shore up the credibility of the regime they built.

Other sections of Russia’s document offer additional glimpses into Moscow’s perceived threats, although not all find ready analogs in U.S. declaratory policy. Many relate instead to the possibility that an adversary will carry out a conventional attack on Russia. Sections 12 and 14, for instance, reference the risks posed by adversary deployments of medium- and shorter-range cruise and ballistic missiles, non-nuclear high-precision and hypersonic weapons, strike unmanned aerial vehicles, and directed-energy weapons. They also mention the deployment of missile defense systems in space; military buildups by would-be adversaries of general-purpose force groupings that possess nuclear weapons delivery means in territories neighboring Russia; and the placement of nuclear weapons on the territories of non-nuclear weapons states, among others.

There is little here that would surprise most Russia-watchers, but if the U.S. is serious about pursuing “next generation” arms control, it is useful to have a list of potential topics for discussion that go beyond ballistic missile defense. This list might also prove helpful in negotiating asymmetric treaties or in identifying confidence-building measures that cross domains.

Overall, this short document does provide greater clarity with respect to Russia’s deterrence strategy, but it is ambiguous on many points as well. Olga Olikier, the International Crisis Group’s program director for Europe and Central Asia, noted, for instance, it does not settle the debate over whether Russia has an “escalate-to-deescalate” policy, and it is (unsurprisingly) vague about the precise circumstances under which Russia would consider using nuclear weapons.

Still, despite leaving some questions unanswered, the document offers a valuable window into Russia’s strengths and vulnerabilities as they appear from Moscow. While likely not the intended signal this document was meant to send, it nevertheless points to possible opportunities for engagement when other good alternatives are hard to see.

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<https://www.defensenews.com/opinion/commentary/2020/06/08/russias-new-nuclear-policy-could-be-a-path-to-arms-control-treaties/>

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ABOUT THE USAF CSDS

The USAF Counterproliferation Center (CPC) was established in 1998 at the direction of the Chief of Staff of the Air Force. Located at Maxwell AFB, this Center capitalizes on the resident expertise of Air University — while extending its reach far beyond — and influences a wide audience of leaders and policy makers. A memorandum of agreement between the Air Staff's Director for Nuclear and Counterproliferation (then AF/XON) and Air War College commandant established the initial personnel and responsibilities of the Center. This included integrating counterproliferation awareness into the curriculum and ongoing research at the Air University; establishing an information repository to promote research on counterproliferation and nonproliferation issues; and directing research on the various topics associated with counterproliferation and nonproliferation.

In 2008, the Secretary of Defense's Task Force on Nuclear Weapons Management recommended "Air Force personnel connected to the nuclear mission be required to take a professional military education (PME) course on national, defense, and Air Force concepts for deterrence and defense." This led to the addition of three teaching positions to the CPC in 2011 to enhance nuclear PME efforts. At the same time, the Air Force Nuclear Weapons Center, in coordination with the AF/A10 and Air Force Global Strike Command, established a series of courses at Kirtland AFB to provide professional continuing education (PCE) through the careers of those Air Force personnel working in or supporting the nuclear enterprise. This mission was transferred to the CPC in 2012, broadening its mandate to providing education and research on not just countering WMD but also nuclear operations issues. In April 2016, the nuclear PCE courses were transferred from the Air War College to the U.S. Air Force Institute for Technology.

In February 2014, the Center's name was changed to the Center for Unconventional Weapons Studies (CUWS) to reflect its broad coverage of unconventional weapons issues, both offensive and defensive, across the six joint operating concepts (deterrence operations, cooperative security, major combat operations, irregular warfare, stability operations, and homeland security). The term "unconventional weapons," currently defined as nuclear, biological, and chemical weapons, also includes the improvised use of chemical, biological, and radiological hazards. In May 2018, the name changed again to the Center for Strategic Deterrence Studies (CSDS) in recognition of senior Air Force interest in focusing on this vital national security topic.

The Center's military insignia displays the symbols of nuclear, biological, and chemical hazards. The arrows above the hazards represent the four aspects of counterproliferation — counterforce, active defense, passive defense, and consequence management. The Latin inscription "Armis Bella Venenis Geri" stands for "weapons of war involving poisons."

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