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OPINION – Daniel R. DePetris

Forget North Korea: Pakistan Might be the Real Nuclear Threat

Despite all of the attempts from the nuclear non-proliferation community, Pakistan will continue to develop and strengthen its nuclear deterrent as long as the high brass in the Pakistani military continues to have an India-centric mindset in its defense policy. India and Pakistan have fought three wars since Islamabad's independence in 1947, and in each case, the Pakistanis were the either the losers are forced into a stalemate before acceding to a ceasefire (the 1971 breakaway of eastern Pakistan, which would later be named Bangladesh, was an especially embarrassing defeat for the Pakistanis). Islamabad hasn't forgotten these cases ever since. And for the Pakistanis, the lessons of these past conflicts are all the same: we cannot repeat history.

Could Pakistan be more of a nuclear security threat to Israel than Iran? Conventional wisdom suggests that a nuclear-armed Iran is the most pressing potential nuclear threat to Israel. It's a country run by a Shia theocracy espousing invective for Israel on a daily basis. Indeed, Iranian supreme leader Ayatollah Ali Khamenei ranted about the possibility of Israel's forthcoming destruction recently. However, Azriel Bermant, a research associate at the Tel Aviv-based Institute for National Security Studies, offered a different take earlier this year in a column he wrote for the Israeli newspaper Haaretz: the real threat might come from Pakistan.

One could argue that Islamabad poses more of a threat to Israel than Tehran does." It's worth considering because the Pakistani government possesses a fairly large nuclear arsenal. Over the years, President Barack Obama has expressed reservations about the continuing growth and stability of Pakistan's nuclear weapons program.

Bermant postulated that despite the worries of both Israeli and American policymakers alike, Iran may not be the nuclear threat that Israel should focus on. After all, Tehran doesn't have a single nuclear weapon at its disposal. Further, the Joint Comprehensive Plan of Action signed in July will forestall the Iranians from the nuclear threshold for the next fifteen to twenty-five years. Rather, Bermant argues, "one could argue that Islamabad poses more of a threat to Israel than

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Tehran does."

It's worth considering because the Pakistani government possesses a fairly large nuclear arsenal. Over the years, President Barack Obama has expressed reservations about the continuing growth and stability of Pakistan's nuclear weapons program. Only three months into his first term in April 2009, President Obama voiced his concerns: " We have huge…national-security interests in making sure that Pakistan is stable and that you don't end up having a nuclear-armed militant state."

Here is why the United States likely continues to have those worries, nearly seven years later:

1. Pakistan's Growing Arsenal

There are thousands of nuclear weapons in the world today. According to the latest count from the Federation of American Scientists, the five original nuclear powers have a combined 15,465 nuclear weapons between them, most of which are divided amongst the United States and Russia. Yet the fastest growing nuclear arsenal in the world is not included in this number. While Pakistan has a range of 100-120 nuclear weapons in its possession — a figure that pales in comparison to the United States or Russia — Islamabad has devoted a tremendous amount of its military budget to growing its arsenal and procuring the associated delivery systems that are needed to launch them.

The five original nuclear powers have a combined 15,465 nuclear weapons between them, most of which are divided amongst the United States and Russia. Yet the fastest growing nuclear arsenal in the world is not included in this number. While Pakistan has a range of 100-120 nuclear weapons in its possession Islamabad has devoted a tremendous amount of its military budget to growing its arsenal and procuring the associated delivery systems that are needed to launch them.

More alarming than Pakistan's current stockpile is the projected growth of its arsenal over the next decade. In a wide-ranging report for the Council on Foreign Relations, professor Gregory D. Koblentz of George Mason University assessed that Pakistan had enough highly enriched uranium to increase its stockpile to 200 nuclear weapons by 2020 if fully utilized. Percentage wise, this would mean that the Pakistani army would be projected to increase its nuclear weapons arsenal by roughly sixty-seven percent over the next five years. In other words, Pakistan could have as many nuclear weapons as the United Kingdom by 2020. Moreover, Pakistan falls outside the purview of the Nuclear Non-Proliferation Treaty.

To guarantee that they the ability to rapidly expand their stockpile, the Pakistani military is investing in reprocessing plutonium in addition to enriching uranium. In January 2015, the Institute for Science and International Security reported that the Pakistanis opened up their fourth plutonium facility at Khushab, which provides Islamabad with an additional channel to construct nuclear bomb material in a relatively short period of time. "Its expansion appears to be part of an effort to increase the production of weapons-grade plutonium," the ISIS report (not to be confused with the terrorist group) reads. "Allowing Pakistan to build a larger number of miniaturized plutonium-based nuclear weapons that can complement its existing highly enriched uranium nuclear weapons."

2. Pakistani Nukes a Major U.S. Intelligence Priority

To say that the U.S. intelligence community is closely monitoring the development of Pakistan's nuclear weapons program would be an understatement. The U.S. government is doing more than just monitoring: they are actively preparing for a terrible catastrophe and engaging Pakistani officials in the hopes that they will stop pouring resources into the expansion of their program. The last thing Washington wants or needs is a nuclear crisis flashpoint in a dangerous and unpredictable region filled with an alphabet soup of Islamist terrorist groups. The U.S. government under both George W. Bush and Barack Obama has been trying to prevent such a crisis scenario from occurring.

Source: https://nationalinterest.org, 02 August 2018.

OPINION – Stephen Young

Opposition to Trump's New Low-Yield Nuclear Warhead

The Trump administration's program to deploy a new, low-yield variant of the W76 warhead carried by U.S. submarine-launched ballistic missiles has faced relatively strong opposition in Congress, with almost all Democrats and several Republicans supporting legislation to eliminate or curb the program. Indeed, the low- yield warhead is clearly outside the "bipartisan consensus" that supporters have often claimed exists for the Obama administration's 30-year, $1.7 trillion program to maintain and replace the entire U.S. nuclear stockpile and its supporting infrastructure. Importantly, as I'll get to later, such a consensus never really existed in the first place.

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Congressional Roadblocks: Two Pantex production technicians work on a W76 while a co-worker reads the procedure step-by-step. But let's start with the new warhead. The attempts to stop it have been noteworthy. A list of most of the votes and amendments on the low-yield option can be found here. Although the final FY19 National Defense Authorization Act (NDAA) that the Senate passed approves the low-yield warhead, the Appropriations committees—on a bipartisan basis—have generally funded the program but also consistently sought more information on it.

Most recently, on June 28, the Senate Appropriations Committee approved by voice vote an amendment from Sen. Jeff Merkley (D-OR) that would prohibit deployment of the proposed new warhead until Secretary of Defense James Mattis provides Congress with a report that details the implications of fielding it. The DOE would still be able to produce the low-yield variant, work that would take place as a part of the ongoing Life Extension Program for the W76 warhead that is scheduled to be completed in Fiscal Year 2019. The W76 warheads have a yield of 100 kilotons; the lower-yield variant will have a yield of 6-7 kilotons.

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If nothing else changes, Defense Secretary Mattis should be able to produce the required report in time for deployment to proceed. Although the Navy's precise timing for deployment is classified, officials have hinted that it should not take more than a year or two. In other words, if the program proceeds as planned, the new warhead could be deployed while President Trump is still in office. Fielding a new weapon in three years or less would be remarkably fast. But note that phrase "if nothing else changes." An election is going to happen. There is a chance that Democrats could take the House and (less likely) the Senate. If so, then deployment of the low-yield warhead – and perhaps more pieces of the enormous nuclear rebuilding plan – could come into question.

A Rapid Response to Trump's Warhead Plan: The proposal for the low-yield warhead was included in the Trump administration's Nuclear Posture Review (NPR), one of two "supplements" to the

already ambitious program to revamp the entire nuclear arsenal developed by the Obama administration. (The second supplement is a nuclear-armed sea-launched cruise missile that is many years off.) The NPR described the first supplement as a "near-term" effort to "modify a small number of existing SLBM warheads to provide a low-yield option."

Democratic opposition to the proposal was swift. When a near-final version of the NPR was leaked to the press in January 2018, sixteen senators wrote a letter to President Trump expressing opposition to the low-yield warhead. More recently, in May, broader opposition emerged when more than 30 former officials, including former defense secretary William Perry, former secretary of state George Shultz, and former vice chairman of the Joint Chiefs of Staff Gen. James Cartwright (USMC Ret.) wrote a bipartisan letter to Congress calling the new warhead "dangerous, unjustified, and redundant."

Shortly after that letter was sent, 188 members of the House, including all but seven Democrats and five Republicans, voted in favor of an amendment to the annual NDAA that would have withheld half the funding for the low-yield warhead until Secretary Mattis submitted a report to Congress assessing the program's impacts on strategic stability and options to reduce the risk of miscalculation. While the amendment failed, it is notable that, in addition to overwhelming Democratic support, five Republicans voted for it.

Then in June, an amendment to the House Energy & Water Development Appropriations Act showed even stronger opposition to the low-yield warhead. Rep. Barbara Lee (D-CA) proposed eliminating all the funding for DOE's work on the program, in effect killing it outright. This much more aggressive approach received 177 votes, including all but 15 Democrats. Moreover, this vote came after Rep. Lee succeeded in getting the Appropriations Committee to include language requiring Mattis to submit a report on "the plan, rationale, costs, and implications" of the new warhead.

While the Senate has not had any votes on the low-yield warhead on the floor, several Democrats have attempted to cut or fence money for the program in both the Appropriations and Armed Services Committees, culminating in the successful effort by Senator Merkley to prohibit deployment until Secretary Mattis produces a report about the implications of doing so, as highlighted above. Indeed, both the Senate and House appropriations committees expressed concern that the administration has not provided enough information to make an informed decision about the new weapon.

While the recent vote against the Trump administration's low-yield warhead reflected almost unified opposition to a new weapon by the Democrats, there was similar opposition to the planned Long-Range Stand-Off (LRSO) weapon – the new nuclear-armed air-launched cruise missile – even though it was put forward by the Obama administration.

Will the "Bipartisan Consensus" Unravel?: In the House, it's clear that a "bipartisan consensus" does not exist for the Obama program to revamp the arsenal, at least not for the program in its entirety. While the recent vote against the Trump administration's low-yield warhead reflected almost unified opposition to a new weapon by the Democrats, there was similar opposition to the planned Long-Range Stand-Off (LRSO) weapon – the new nuclear-armed air-launched cruise missile – even though it was put forward by the Obama administration. In 2014, 179 House members voted to eliminate funding for the program, including all but 18 Democrats. More recent votes to cut the program back have also enjoyed strong Democratic support.

On the other side of Congress, it has been several years since the Senate has had a floor vote on any nuclear weapons program, so it is harder to judge the level of support for revamping the entire arsenal. Notably, Sen. Jack Reed, the ranking member on the Senate Armed Services Committee, has generally voiced support for the Obama

administration's plan to date. But this year, he led an attempt in the Armed Services Committee to fence funding for deployment of the low-yield warhead, an effort that failed along party lines but became the model for the successful Merkley amendment in the Appropriations committee, on which Sen. Reed also serves. In addition, Sen. Reed also supported a separate Merkley amendment in the Appropriations Committee to eliminate all funding for the low-yield warhead, an attempt that failed largely along party lines.

Clearly, the low-yield warhead is not a part of any "bipartisan consensus." The question becomes whether the debate over it could be the tipping point that leads to more concerted opposition to some of the new weapons systems in the larger plan, including the LRSO. That question takes on increased salience when one considers the possibility that Democrats could take the House in elections this fall. While the low-yield warhead likely will be produced in Fiscal Year 2019, its deployment could become a major battle in the new Congress. If that is the case, the supposed "bipartisan consensus" in support of the Obama administration's plan to replace the entire U.S. nuclear arsenal with a suite of new warheads and delivery vehicles could potentially come unraveled.

Source: Union of Concerned Scientists, 02 August 2018.

OPINION – Zachary Keck

Israel's Great Weakness: An Attack on its Nuclear Reactors?

Fears about the vulnerability of Israel and other countries' nuclear reactors are likely to grow in the coming years and decades. Although Iran's missiles cannot realistically threaten Israel's nuclear reactors at the moment, the real question is how long will that continue to be the case? It wasn't long ago that a country like China didn't have guided missiles. Now, it is believed that Beijing has missiles that can threaten moving targets like U.S. aircraft carriers at long distances. And history has consistently shown that technology—including missiles—inevitably spreads. Israel's nuclear establishment has been conducting drills simulating attacks against the country's two nuclear reactors.

"The Israel Atomic Energy Commission has been taking numerous steps to protect the nuclear reactors in Dimona and Nahal Sorek in light of assessments that Iran and Hezbollah see the reactors as preferred targets for missile attacks," the left-leaning Israeli daily, Haaretz, reported on June 28, 2018.

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The Nahal Sorek reactor is a small research reactor America supplied to Israel as part of the Atoms of Peace program. The Dimona reactor is a much larger reactor that Israel used to produce plutonium for its nuclear weapons program. The Dimona reactor is still operating, although it's unclear if it is making plutonium. It is widely believed that Israel uses Dimona to produce tritium for boosted atomic weapons.

According to the Haaretz article, members of the Israel Atomic Energy Commission (IAEC) believe that a missile attack is the greatest danger to the reactors today.

The report added that "recently the IAEC held a large training exercise that simulated a missile attack on one of the reactors, and included the evacuation of employees and actions to prevent a leak of radioactive materials." This threat is hardly imaginary, as Hezbollah leader Hassan Nasrallah has repeatedly threatened to attack Israel's nuclear reactors as well as its chemical supplies. "I call on Israel not only to empty the ammonia tank in Haifa, but also to dismantle the nuclear reactor in Dimona. Our military capabilities will strike Israel and its settlements," Nasrallah said in February of last year.

He added: "In Israel, they know that Hezbollah has the possibility of reaching the nuclear reactor, which is antiquated, and it doesn't require major force to hit." In 2016, Nasrallah called for targeting the ammonia stockpiles in Haifa Hezbollah's "nuclear bomb" option. IAEC members downplayed the actual dangers of an attack on one of Israel's reactors. According to Haaretz, the IAEC believes that even if a missile hit one of the reactors the employees inside would be safe.

In 2016, Nasrallah called for targeting the ammonia stockpiles in Haifa Hezbollah's "nuclear bomb" option. IAEC members downplayed the actual dangers of an attack on one of Israel's reactors. According to Haaretz, the IAEC believes that even if a missile hit one of the reactors the employees inside would be safe.

What the commission does fear is that the attack would be extremely useful for propaganda purposes. Indeed, Dimona has long served as a potent symbol of Israeli power ever since Israel's founding father David Ben-Gurion purchased it from France. The IAEC is also concerned that an attack against Israel's reactors would spark panic among the Israeli public, similar to how some observers worry that the use of a dirty bomb in a crowded city would be a "weapon of mass disruption."

Missiles that landed closer to the reactor could cause various types of damage, including (in Haaretz's description) "a breach of the reactor's protective envelope, which could lead to a leak of radioactive gas, as well as a disruption to critical systems, most importantly the reactor's cooling system." The loss of electricity powering the cooling systems of some of Japan's reactors was at the heart of the Fukushima nuclear disaster in 2011.

The IAEC's assessment might be overly optimistic, however. As Haartez's notes, last year four Israeli scientists— including Irad Brandys, an engineer at the Dimona reactor— published an article estimating the damage caused by a Scud missile attack on a nuclear reactor similar to the ones that Israel operates. They concluded that "the monitor and control equipment can resist the in-structure shock both in the horizontal and vertical directions when the missile explodes beyond 35 m." However, missiles that landed closer to the reactor could cause various types of damage, including (in Haaretz's description) "a breach of the reactor's protective envelope, which could lead to a leak of radioactive gas, as well as a disruption to critical systems, most importantly the reactor's cooling system." The loss of electricity powering the cooling systems of some of Japan's reactors was at the heart of the Fukushima nuclear disaster in 2011.

Of course, most missiles are not anywhere near accurate enough to hit a target within 35 meters, at least with any sort of consistency. Arguably Iran's most advanced missile is the Emad, which has a MaRV. MaRVs allow the missile's warhead to maneuver late in flight both to evade missile defenses and achieve pinpoint accuracy. But Iran's Emad missile is believed to have an accuracy (technically a circular error probable) of five hundred meters. That means that fifty percent of the time it would land within five hundred meters of the target. Thus, even if Iran gave Emad missiles to Hezbollah, the Lebanese group would have to get extremely lucky to have one of them land within thirty-five meters of one of Israel's reactors.

Source: https://nationalinterest.org, 13 August 2018.

OPINION – Ramesh Thakur

Japan's Nuclear Options

Hiroshima was the first city in the world to be attacked by an atomic bomb on Aug. 6, 1945. The last time that an atomic weapon was used was to bomb Nagasaki on Aug. 9, 1945. By the end of that fateful year, an estimated 214,000 people had died from the two bombs. Ever since, a dedicated group of people all around the world have devoted themselves to ensuring that Nagasaki does indeed

remain the last place where atomic and nuclear weapons were used.

According to estimates by the SIPRI, there are 14,465 nuclear bombs held in the military arsenals of nine countries: China (280), France (300), India (130-140), Israel (80), North Korea (10-20), Pakistan (140-150), Russia (6,850), U.K. (215), and U.S. (6,450). Considering these numbers, this mission is a huge challenge.

In a survey conducted by Kyodo News and published in these pages on July 28, 81 percent of hibakusha — survivors of the Hiroshima and Nagasaki atomic bombings — urged Japan's government to sign the historic nuclear weapon prohibition treaty (NWPT) adopted by 122 countries at the U.N. General Assembly on July 7, 2017.

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It is worth noting that the treaty explicitly acknowledges the suffering caused to the hibakusha: "Mindful of the unacceptable suffering of and harm caused to the victims of the use of nuclear weapons (hibakusha)," says its preamble. Under 5 percent of the hibakusha did not welcome the NWPT. Because none of the nine nuclear-armed states has signed and all have opposed the treaty, Japan believes its goal of nuclear abolition to be unrealistic and has joined all other U.S. allies in dismissing it.

This presents an acute dilemma for Tokyo. In a policy brief published jointly by the Asia-Pacific Leadership Network and the Toda Peace Institute, former U.N. High Representative for Disarmament Angela Kane noted: "the nuclear umbrella states ... have a long history of domestically advocating nuclear disarmament, but of not openly acknowledging the benefits they derive from the umbrella relationship."

The ban treaty was adopted because the majority of the international community, including two-thirds of the NPT states parties, believe that nuclear threats and risks have risen to alarming levels. The nuclear-armed states have been deeply irresponsible in not cutting back their nuclear arsenals, moderating their nuclear doctrines and deployments, and in other ways taking practical steps toward nuclear disarmament. In rejecting the ban treaty, Japan and Australia are effectively rewarding this rogue behavior.

Into this already unsettled, unstable and dangerous mix has been added the volatile, erratic and strategically challenged US President Donald Trump. His political base remains untroubled by his policy flip-flops and incendiary threats of nuclear attacks against Pyongyang (last year), Iran (this year) and perhaps, in the future, Russia (next year?). A majority of Americans — 60 percent in an opinion poll published in The Washington Post on Jan. 23 — do not trust Trump to handle his nuclear command authority with due responsibility, and are concerned that he may launch a nuclear attack without justification.

Similarly among Canadians — the geographically closest U.S. ally — while 88 percent have faith in the security benefits of NATO, the U.S. is rated the second biggest threat at 16 percent (terrorism tops with 29 percent). Remarkably, more Canadians (5 percent) believe Trump is a bigger threat than Russia (4 percent). This presents a double dilemma for America's allies. On the one hand, the mercurial Trump may provoke a nuclear war that destroys the world. On the other hand, a transactional president constantly berating his European and Pacific allies about not carrying enough of the budgetary and military burden for their own security may refuse to come to their defense if they should be under attack from a nuclear-armed enemy in their neighborhood.

The double dilemma in turn translates into contradictory policy implications. In response to concerns about the unreliability of the U.S. nuclear

umbrella under Trump, some allies have begun to think the unthinkable about independent nuclear defense capability. In Australia several defense analysts have begun to wonder about the circumstances in which the country might want to acquire its own nuclear deterrent as a hedge against an increasingly adverse strategic environment in the Indo-Pacific. Europe began exploring its own deterrent last year in reaction to Trump's unreliability. A review commissioned by the Bundestag concluded that Germany could legally finance British or French nuclear weapon programs in return for their protection.

Each new entrant into the nuclear club will generate fresh pressures to further proliferation and the cascading numbers of nuclear-armed states would multiply nuclear risks and threats exponentially. Moreover, Japan's quest for an independent bomb would violate its legally binding NPT obligations, its own nuclear policy and laws, and also send tremors through the Asia-Pacific region based on historical memories of Japanese aggression.

Unfortunately, the case for nuclear weapons rests on a superstitious belief in the utility of the bomb and the theory of deterrence. The extreme destructiveness makes them qualitatively different in political and moral terms from other weapons, to the point of rendering them unusable. They were not the decisive factor in Japan's surrender in 1945, nor in the territorial expansion of the former Soviet Union across central and eastern Europe during the 1945-1949 years when the U.S. held a monopoly on the bomb. They did not stop Argentina from invading the Falkland Islands in the 1980s nor the Vietnamese and Afghans from fighting and defeating the U.S. and the Soviet Union respectively. We know of no successful case of nuclear blackmail.

Conversely, each new entrant into the nuclear club will generate fresh pressures to further proliferation and the cascading numbers of nuclear-armed states would multiply nuclear risks and threats exponentially. Moreover, Japan's quest for an independent bomb would violate its legally binding NPT obligations, its own nuclear policy and laws, and also send tremors through the Asia-Pacific region based on historical memories of Japanese aggression.

A calculated use of the bomb is less likely than one resulting from system malfunction, faulty information or rogue launch. Which leads us to the alternative: a surge in diplomatic activism to promote measures to reduce the nuclear threat, including how best to harmonize the NPT and the ban treaty. In the case of NATO allies and Australia, it is hard to see how existing security practices could be compatible with the stringent demands of the NWPT. But nothing about Japan's publicly known security practices indicates a fundamental incompatibility with the ban treaty such as to prevent Japan from signing it. Of course, this would put Japan on the wrong side of the US and allies. But, as I argued in the inaugural issue of the *Journal for Peace and Nuclear Disarmament* published by Nagasaki University's Research Center for Nuclear Weapons Abolition, signing the ban treaty would put Japan on the right side of history, geography, legality, morality and humanity.

Source: https://www.japantimes.co.jp, 05 August 2018.

At the end of 2015 the missile branch of the PLA, the Second Artillery Force (‚{ŒN®puQè –), was formally elevated to a full service and renamed the Rocket Force (kp-{›Q; PLARF) part of a sweeping drive to improve the PLA's joint operations, command and control, and combat effectiveness.

OPINION – Adam Ni, Bates Gill

China's New Missile Force: New Ambitions, New Challenges

At the end of 2015 the missile branch of the PLA, the Second Artillery Force, was formally elevated to a full service and renamed the Rocket Force part

of a sweeping drive to improve the PLA's joint operations, command and control, and combat effectiveness.

The establishment of the PLARF signals the increasing importance of conventional and nuclear missiles to PLA warfighting and deterrence capabilities. It also foreshadows continued, substantial investment in missile force modernization at both tactical and strategic levels in the years ahead.

On a conventional level, China's rapidly developing missile capabilities are giving the PLA more options in planning for regional scenarios, such as those involving Taiwan, the South China Sea, the East China Sea, and the Korean Peninsula. On the strategic level, China's rapid modernizing nuclear forces have substantially increased the credibility of its nuclear deterrent.

Since its creation, the PLARF has made notable progress in upgrading missile capabilities, reorganizing command and control systems, developing realistic combat training for its troops, and growing its pool of talent. However, deep-seated challenges remain in all these areas. This series will examine the rationale for the PLARF's creation, its mission, and the challenges that stand in its way. The challenges are real, and could frustrate the PLARF's aspiration of becoming a world-class missile force if not addressed effectively.

Drivers and Motivations: There are three key drivers behind the creation of the PLARF. One important driver is bureaucratic. The Second Artillery Force has for decades operated in a role similar to the three traditional PLA services (Army, Navy and Air Force) in organizing, equipping and controlling the forces under its command. The creation of the PLARF and the designation of it as a full service should be seen as the formalization of de facto arrangements, responsibilities and relations.

Unlike the Second Artillery Force, which was designated as an independent branch/service arm the PLARF is now considered a fully fledged service, along with the Army, Navy and the Air Force, and has therefore received the designation junzhong (or service). The PLA Strategic Support Force is a force not a service.

Another driver was the need to recognize the increasing importance of missile forces for China's military strategy and national security. On a conventional level, China's rapidly developing missile capabilities are giving the PLA more options in planning for regional scenarios, such as those involving Taiwan, the South China Sea, the East China Sea, and the Korean Peninsula. On the strategic level, China's rapid modernizing nuclear forces have substantially increased the credibility of its nuclear deterrent. Seen in this light, the creation of the PLARF both recognizes the progress of China's missile capabilities and signals its continued importance going forward.

A final driver behind the creation of the PLARF may be the need to formalize the responsibilities of the Second Artillery Force so that it is aligned with the comprehensive overhaul of the PLA command structure that was initiated in late 2015. Under this set of reforms, the PLA formalized and redefined the roles of the services such that they would focus on force development instead of commanding operations. Formalization of the roles and responsibilities of the PLARF was particularly important, given its growing role as part of the overall PLA force posture.

***New Status, Old Grade*:** Unlike the Second Artillery Force, which was designated as an independent branch/service arm, the PLARF is now considered a fully fledged service, along with the Army, Navy and the Air Force, and has therefore received the designation junzhong (or service). The PLA Strategic Support Force is a force not a service.

This change of status is reflected in the way that official Chinese sources refer to the PLARF. The term used when the Second Artillery Force was included along with the three traditional services was "services and branches" indicating that the

missile force was a branch of the PLA instead of a full service. Today, the PLARF is directly referred to as a "service" both when it is referred to individually and in the company of the other three services (*China Military Online*, May 17, 2017). In addition, the PLARF acquired its own uniform design and flag shortly after it was elevated to a service, indicating its new status, distinct from the former Second Artillery Force which used PLA Army uniforms and a generic PLA flag (Ministry of National Defense, June 30, 2016; *China Military Online*, August 18, 2016).

The change in designation, however, does not denote a rise in the bureaucratic status (referred to as "grade") of the organization within the PLA hierarchy. In fact, even before it became the PLARF, the Second Artillery Force was at the same bureaucratic grade as the three traditional services. Just as before, the PLARF has the highest grade within the PLA organization beneath the supreme Central Military Commission (CMC). It is currently a Theater Command Leader-grade organization (Weibo, June 15, 2017).

New Tip, Same Spear: The PLARF is a critical element of China's military power. At the inauguration ceremony for the PLARF on December 31, 2015, CCP General Secretary and CMC Chairman Xi Jinping described it as China's "core force of strategic deterrence ; a strategic support for China's great power status; and an important cornerstone of its national security" (*Xinhua*, January 1, 2016). The strategic requirement for the new force is to be prepared to carry out "comprehensive deterrence and warfighting") operations with "both nuclear and conventional" capabilities. In order to achieve this, Xi ordered the PLARF to enhance "credible and reliable nuclear deterrence and counterstrike capabilities" "medium and long range precision strike capabilities" and the ability to contribute to "strategic balance" between China and its main strategic competitors.

In many ways, as the successor organization of the Second Artillery Force, the PLARF represents continuity as much as change. There is clear continuity in terms of core mission (strategic deterrence, nuclear counterattack and precision strike), capabilities requirements (both nuclear and conventional missiles) and future aspirations.

Organizational reform and technological progress have made what were mere aspirations for the Second Artillery Force into key requirements for the PLARF. The PLARF is expected to prepare for, and carry out if necessary, a diverse range of warfighting and deterrence operations, either independently or as part of a joint effort. According to one PLA source, "[the establishment of the PLARF] will certainly put forward higher requirements with respect to the construction of [China's] strategic missile forces.

However, the elevation of PLA's missile forces has created a more expansive role for PLARF than its predecessor. Organizational reform and technological progress have made what were mere aspirations for the Second Artillery Force into key requirements for the PLARF. The PLARF is expected to prepare for, and carry out if necessary, a diverse range of warfighting and deterrence operations, either independently or as part of a joint effort. According to one PLA source, "[the establishment of the PLARF] will certainly put forward higher requirements with respect to the construction of [China's] strategic missile forces" (*China Military Online*, January 2, 2016).

***PLARF Missions*:** The PLARF has two key missions: strategic deterrence and conventional warfighting. In terms of strategic deterrence, the PLARF is responsible for deterring nuclear attacks or coercion against China by signalling a credible nuclear second-strike capability. This signalling can be delivered through a variety of means, including military exercises, media campaigns, military parades, and force deployments. If strategic deterrence fails and China comes under nuclear attack, the PLARF is responsible for carrying out nuclear counterattack "either

independently or together with the nuclear forces of other [PLA] services." (State Council Information Office, January 2009)

In its conventional warfighting role, the PLARF is responsible for "conducting medium- and long-range precision strikes" with land-based missiles against "key strategic and operational targets of the enemy" (State Council Information Office, January 2009). PLA missile strategy specifies that its conventional missile force is to be used against high-threat and high-value enemy targets, such as reconnaissance, intelligence, command and control electronic warfare, anti-air, and logistics systems.

The strategic requirement for the PLARF to be ready for "comprehensive deterrence and warfighting" operations suggests that the PLARF will have to develop a full spectrum of missile capabilities. This would require advanced missile technologies, appropriate doctrines and key supporting systems, such as command and control, communications, intelligence, reconnaissance, targeting, and tracking platforms.

Nuclear Modernization: The PLARF's establishment marks a milestone in China's nuclear modernization drive, which has made significant progress since the early 2000s. China continues to develop its nuclear forces both in terms of size and quality. However, despite an estimated doubling of its number of nuclear warheads, from around 145 in 2006 to 270 in 2017, China's nuclear arsenal is still dwarfed by the United States' arsenal of 6,800 warheads. The slow but steady growth in the size of China's nuclear arsenal has been accompanied by a rapid modernization of its nuclear delivery capabilities, which are becoming increasingly diversified, mobile and resilient.

To raise the credibility of China's land-based nuclear deterrent, the PLARF has deployed mobile, solid-fueled missile systems to increase the mobility and survivability of its nuclear forces. The most notable recent additions in this regard include the dual-capable DF-26 IRBMs, the off-road-capable DF-31AG ICBMs (Sina, July 24, 2017), and the powerful next generation DF-41 ICBMs. (*People's Daily*, November 28, 2017)

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The solid-fueled DF-26 is designed to perform both nuclear and conventional missions against land and sea targets, including large ships (Ministry of National Defense, April 28). Its deployment highlights the PLARF's growing regional strategic deterrence and conventional precision strike capabilities and options. Both DF-31AG and DF-41 ICBMs are highly mobile and survivable, and are capable of carrying MIRVs. In addition to land-based nuclear missiles, the PLA is also working to develop sea- and air-based nuclear deterrent as part of an emerging nuclear triad consisting of land-based nuclear missile systems, SSBNs, and strategic bombers.

Source: https://jamestown.org, 10 August 2018.

OPINION – Julian Lee

Iran Oil Sanctions will Hurt More Than You Think

The first U.S. sanctions have been reimposed on Iran with little sign of either side softening its position. Curbs on oil exports will follow in early November and the effect will be bigger and swifter than last time around. Oil forecasters don't seem to have grasped that yet. There's no doubt that President Donald Trump will be tougher on Iran than Barack Obama was, with no gradual ratcheting-up of pressure. Importers are expected to have tapered off oil purchases by Nov. 5, when the curbs come into effect.

Any waivers granted to buyers will still require much bigger cuts than they did last time, when a

20 percent reduction every six months was enough to win exemption from retaliation. And this time, Iran's exports of condensates, a light form of crude extracted from gas fields, will be covered by the sanctions. It doesn't matter that European governments oppose Trump's withdrawal from the Iran nuclear deal. Politicians and bureaucrats may work on "the continuation of Iran's exports of oil and gas," but it's companies, not governments, that buy Iran's oil. The threat of exclusion from the U.S. market and banking system is enough to stop them buying it, international shipping companies from moving it and insurers from covering that trade.

In July, crude and condensate exports were already down by 430,000 barrels a day, or 15 percent, from their levels in April, the month before Trump announced the start of the sanctions process – and the curbs haven't even come into effect yet. Royal Dutch Shell Plc and Total SA have stopped buying. Other European refiners will surely follow. By July, EU crude imports from Iran were down by around 220,000 barrels, or 41 percent, from April. Don't be surprised to see them drop to zero by November.

So what would the loss of Iranian oil exports look like? In July, crude and condensate exports were already down by 430,000 barrels a day, or 15 percent, from their levels in April, the month before Trump announced the start of the sanctions process – and the curbs haven't even come into effect yet. Royal Dutch Shell Plc and Total SA have stopped buying. Other European refiners will surely follow. By July, EU crude imports from Iran were down by around 220,000 barrels, or 41 percent, from April. Don't be surprised to see them drop to zero by November.

Turkey shows a similar split between politicians and companies. While Economy Minister Nihat Zeybekci says U.S. sanctions aren't binding, imports of Iranian crude by Tupras Turkiye Petrol Rafinerileri AS are down 45 percent from April. In Asia, Iran's biggest market, South Korea has stopped buying both crude and condensate since late June. This is critical, because the Koreans are the top buyers of its condensate, accounting for more than 50 percent of shipments over the 12 months through June. Condensate deliveries to the United Arab Emirates also appear to have stalled: The last two shipments are still waiting to discharge, and Emirates National Oil Co., the Dubai-based buyer, has been sourcing supplies from places as distant as Algeria, Equatorial Guinea, the U.S. and the Russian Arctic.

Japan won't defy the U.S., either. Its imports of Iranian crude plunged under the Obama sanctions and rebounded only modestly when they were relaxed in 2016. Although officials are still talking to their U.S. counterparts, companies don't expect to receive waivers and imports could fall to zero before November. That leaves India and China. Neither has cut purchases yet – indeed, India has boosted them, with much of the extra apparently going into storage at Mangalore. This may be temporary, though, if refiners are building stockpiles ahead of anticipated shortages. Hindustan Petroleum Corp. is unlikely to buy any more Iranian oil until India gets a waiver from the U.S., and the oil ministry has asked refiners to tread carefully.

Indian officials still hope for at least partial relief, arguing that cutting imports to zero isn't feasible. It's possible to imagine an arrangement in which India could buy a reduced volume of Iranian oil in return for a pledge to take more from the U.S. A halving of its purchases from Iran is possible, and might be enough to secure an initial waiver.

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shipments of crude and condensate were up by 105,000 barrels a day, or 14 percent, compared with April, but they may decline now that U.S. crude has been removed from a list of good targeted by Chinese tariffs.

Where does all this leave us? Under Obama, Iran's crude and condensate exports fell by around 1.2 million barrels a day over a period of about two years. Under his successor it looks like the decline will be bigger and faster, even without the political support of U.S. allies. It's easy to see another million barrels a day disappearing by November on top of the 430,000 barrels already lost. A halt in shipments to Europe, the U.A.E. and Japan, and a halving of flows to India, would reduce Iranian exports by almost 1.5 million barrels a day over six months.

Source: https://www.bloombergquint.com. 13 August 2018.

OPINION – Michael Krepon

5 Things You should Know about Nuclear Weapons Today

The imprint on public consciousness of the atomic bombing of Hiroshima, which occurred 73 years ago, has faded greatly. The hibakusha, or survivors of the atomic bomb attacks on Hiroshima and Nagasaki, Japan, which killed more than 130,000 and left tens of thousands of others with horrendous injuries, have been the most ardent proponents of nuclear abolition. Now they are few in number, and nuclear-armed states seem deaf to their pleas.

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Meanwhile, the competing "arms control enterprise" is unraveling: There are at present no negotiations underway to reduce US and Russian nuclear forces, while China, Pakistan, India, and North Korea are increasing theirs. Yet at the same time, the situation isn't completely bleak. Here are five key points to keep in mind about nuclear weapons on this somber anniversary:

1) *The taboo against using nuclear weapons in warfare has held since 1945 — contrary to expectations.* After Hiroshima and Nagasaki, few were so bold or foolish to predict this. Instead, there was widespread fear and dread after the bomb's surprise unveiling that it would become an instrument for surprise military attacks, a decisive "war winning" weapon, and — the greatest fear — a civilization-ending weapon.

It hasn't turned out that way — so far. The bomb could have been used by the Truman administration to end the Korean War, or by the Eisenhower administration either in Korea or in Indochina (to bail out France from its losing military campaign there), but it wasn't. Mushroom clouds could have appeared by accidents, breakdowns in command and control, or during the Cuban missile crisis.

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Despite close calls, we humans have been extremely fortunate. Sure, the concept of deterrence and the prospect of retaliation have induced caution, but deterrence is all about

threats to use nuclear weapons — and threats generate more threats. Diplomacy was essential to curtail dangerous military practices and, eventually, to achieve deep nuclear arms reductions, such as the 2011 New START, which still permits each side to retain 700 deployed missiles and subs. Overall, US and Russian stockpiles are down around 85 percent from Cold War highs. Such nuclear excess makes it all the more remarkable that, for different reasons at different times, a seven-decade record of non-battlefield use has held. When it comes to the bomb, this taboo is the best thing we've got going for us.

Russia hasn't tested since 1990, the United States since 1992, China and France since 1996, India and Pakistan since 1998. The biggest outlier, North Korea, recently declared a closure of its test site. During the Cold War, there was, on average, about one test per week somewhere in the world at test sites, in the atmosphere or at sea. Each test was a declaration of the bomb's power and utility. Every test demonstrated faith and commitment to battlefield use in the event of a breakdown of deterrence.

2) *Nuclear weapons are becoming too provocative to test.* Russia hasn't tested since 1990, the United States since 1992, China and France since 1996, India and Pakistan since 1998. The biggest outlier, North Korea, recently declared a closure of its test site. During the Cold War, there was, on average, about one test per week somewhere in the world at test sites, in the atmosphere or at sea. Each test was a declaration of the bomb's power and utility. Every test demonstrated faith and commitment to battlefield use in the event of a breakdown of deterrence.

A new generation of deterrence strategists believes in the utility of low-yield nuclear weapons for small forays across the nuclear threshold. The Trump administration is working on two new options to add to existing choices, which include B-61 "dial-a-yield" bombs that could be less than one kiloton.

The absence of nuclear testing conveys a very different message: that nuclear weapons aren't like other instruments of war. They are different, a class apart. All of this is reversible, to be sure, but the longer the moratorium on nuclear testing continues, the greater the uproar should a nation violate the norm, and the greater the pressure on national leaders to abide by it.

3) *Unfortunately, the nuclear taboo might be weakening.* Few survivors of the Hiroshima and Nagasaki remain, and memories of mushroom clouds and the close calls of the Cold War are becoming dim. Public opinion polling suggests that many Americans would not think twice if there were a great many casualties against evildoers. For example, a 2017 survey found that 60 percent of Americans would support a nuclear attack on Iran that would kill 20 million civilians, to prevent an invasion that might kill 20,000 American soldiers.

A new generation of deterrence strategists believes in the utility of low-yield nuclear weapons for small forays across the nuclear threshold. The Trump administration is working on two new options to add to existing choices, which include B-61 "dial-a-yield" bombs that could be less than one kiloton. (The weapons dropped on Hiroshima and Nagasaki were 15 to 20 kilotons.) The idea of limited nuclear options and low-yield weapons isn't new, but wiser people have always been skeptical, questioning whether escalation can be controlled once the nuclear threshold has been crossed — especially since Moscow has never shown much interest in escalation control.

4) *Traditional instruments of nuclear arms control are either weakened or have been set aside.* Moscow is disregarding the 1972 Incidents at Sea Agreement and a 1989 agreement to prevent dangerous military practices on the ground or in the air. These executive agreements were designed

to avoid provocative actions that could result in hull scrapes and aircraft collisions.

The George W. Bush administration withdrew from the ABM Treaty in 2002, which had facilitated deep cuts in offensive arms. Moscow then withdrew from a treaty banning the placement of multiple warheads atop land-based missiles in 2002 and is proceeding to build new heavy missiles that can carry 10 or more warheads. Moscow has also violated a treaty prohibiting intermediate-range missiles, a move that ratchets up the perceived (and intended) threat to European members of NATO; the United States is taking steps to violate this treaty, as well, to counter Moscow's leverage.

New START, which caps the longest-range instruments of nuclear war fighting — ICBMs, submarine-launched ballistic missiles, and bombers — is set to expire in 2021 and may not be extended. In short, an era of superpower arms control that helped keep the Cold War from becoming hot is coming to a close.

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5) *International division about nuclear weapons is growing.* A ban-the-bomb movement has picked up steam in states that have foresworn nuclear weapons, while strong pro-bomb constituencies exist in nuclear-armed nations. "Arms control" has lost its appeal to the American public, but arms races aren't popular either. New approaches to reduce nuclear dangers and weapons are not being advanced, even as treaties that have served us well are being cast aside or are unraveling.

The bomb isn't going to be banned anytime soon. So what's our game plan? On this 73rd anniversary, we don't have one. Any sensible plan will protect positive developments since Hiroshima and curtail the downward slide we are in. The taboo against mushroom clouds in warfare is absolutely essential. Any crossing of the nuclear threshold could undo all the hard work of previous generations.

So what's the central organizing principle to prevent cataclysm for this era? Deterrence alone is insufficient and dangerous, while US diplomacy has been either erratic or absent. How can we proceed with friction on the rise with Moscow and Beijing, hyperpartisanship on Capitol Hill, and growing isolationist sentiment among Republican voters? The bomb isn't going to be banned anytime soon. So what's our game plan? On this 73rd anniversary, we don't have one. Any sensible plan will protect positive developments since Hiroshima and curtail the downward slide we are in. The taboo against mushroom clouds in warfare is absolutely essential. Any crossing of the nuclear threshold could undo all the hard work of previous generations. The resumption of nuclear testing by major powers would be a devastating development; extending the moratorium against testing is crucial to devaluing nuclear weapons.

It's also essential to affirm codes of responsible conduct when US and Russian or Chinese ships, aircraft, and troops are operating at close quarters, to prevent sparks that could lead to military confrontations. Many treaties have lapsed. Only New Start and its onsite inspections governing long-range missiles and bombers remains in force. At a minimum, it would be wise to extend it and further reduce their capacities for nuclear overkill. Hiroshima and Nagasaki were targeted to end a world war that cost between 50 million and 80 million lives. If nuclear weapons are used again in warfare, the costs could be higher, because no one knows how such a conflict would end. This is the most important lesson to absorb on this 73rd anniversary of Hiroshima.

Source: https://www. vox. com,06 August 2018.

NUCLEAR STRATEGY

GERMANY

Germany's Dangerous Nuclear Flirtation

As in a game of chess, there are geopolitical moves through which a country can, unwittingly, checkmate itself. Opening a debate on German nuclear weapons would be such a move. Yet, this is exactly what some Germans have recently proposed. Supporters of a nuclear-armed Germany contend that NATO's nuclear umbrella has lost all credibility because of statements made by US President Donald Trump.

There are at least three good reasons why considering a nuclear option would be foolhardy for Germany. For starters, Germany has repeatedly renounced it, first in 1969 by signing, and later ratifying, the Treaty on the Non-Proliferation of Nuclear Weapons, and then in 1990 by signing the so-called Two Plus Four Treaty, which paved the way for German reunification. Casting doubt on these commitments would severely damage Germany's reputation and reliability worldwide. Germany would call into question the credibility of NATO's nuclear deterrence, and thus the alliance itself, along with the entire nuclear non-proliferation regime.

It is worth noting that since its creation in 1949, NATO has been one of the world's most successful instruments of proliferation prevention. Not a single NATO member state, apart from the United States, the United Kingdom and France, has found it necessary to acquire nuclear weapons of its own. If Germany were now to break out of its non-nuclear power status, what would keep Turkey or Poland, for instance, from following suit? Germany as a gravedigger of the international non-proliferation regime, who could want that?

Second, a German nuclear bomb would damage the strategic environment in Europe, to Germany's disadvantage. Russia would interpret German steps towards a nuclear arsenal as a direct threat to its own national security and would likely adopt military countermeasures. That, in turn, would make it even harder to pursue the vision of a pan-European order of peace and security, a core foreign-policy goal of all German governments since that of Konrad Adenauer. Moreover, a German nuclear ambition might jeopardise the delicate balance of power in Europe, including between Germany and France, for example, with incalculable consequences for the long-term cohesion of the European Union.

It is not hard to predict that the pursuit of nuclear weapons would draw significant public opposition, especially given that such a move would be a complete about-face for German Chancellor Angela Merkel's government, which, just a few years ago, moved to phase out nuclear energy altogether. It is difficult to imagine a greater fiasco for German foreign and security policy than proposing a nuclear strategy.

Finally, it is not hard to predict that the pursuit of nuclear weapons would draw significant public opposition, especially given that such a move would be a complete about-face for German Chancellor Angela Merkel's government, which, just a few years ago, moved to phase out nuclear energy altogether. It is difficult to imagine a greater fiasco for German foreign and security policy than proposing a nuclear strategy and then failing to obtain parliamentary approval.

There are smarter long-term ways to bolster Europe's nuclear defence than introducing a German bomb. For example, France might be willing to consider playing an extended nuclear-deterrence role, along with the roles of the US and the United Kingdom within NATO. While this would require a fundamental reorientation and Europeanisation of France's nuclear strategy, Germany and other European partners could offer financial contributions to such an initiative, in the context of a future European defence union with a nuclear component. But these are, at best, long-term options.

In short, no matter what Trump says, Germany will remain dependent on the US nuclear umbrella for

the foreseeable future. The best way to maintain NATO's credibility and be taken seriously by the US is to work seriously towards the alliance's 2 per cent-of-GDP target for defence spending and to invest more heavily in conventional military capabilities. Not to satisfy US demands, but to protect our own security and defence interests. But this is not simply about spending more; it is about spending more intelligently, particularly by pooling and sharing capabilities, and by systematic joint procurement with France and other European partners, including through the recently established EU Defence Fund.

None of this will work if Germany will not start defining military strategy, security and defence as top political priorities. Only then will the Bundestag be able to give the Bundeswehr, often referred to as a "parliamentary army", what it needs to do its job. The alternative, considering the development of nuclear weapons, would be a game-losing move.

Source: http://jordantimes.com, 12 August 2018.

BALLISTIC MISSILE DEFENCE

INDIA

India's AAD Interceptor Shoots Down Ballistic Missile Target in Test

On August 2, the DRDO, the Indian Ministry of Defense's (MoD) research and development wing, conducted a successful test of its indigenously designed and built Advanced Air Defense (AAD)/ Ashvin Advanced Defense interceptor missile from Abdul Kalam Island, home to the Indian military's principle missile test facility, the Integrated Test Range, off the coast of Odisha in the Bay of Bengal.

The AAD missile, a hit-to-kill interceptor, successfully destroyed an incoming medium-range ballistic missile target amid multiple electronically simulated dummy warheads used as decoys. It was the first time that the AAD was tested against multiple targets, and it constitutes a major milestone in India's quest to develop a homegrown ballistic missile defense system. It appears that this was the first successful live fire test of a new indigenous imaging infrared (IIR) seeker, developed by DRDO, to distinguish between incoming warheads and decoys.

"The endo-atmospheric missile, capable of intercepting incoming targets at an altitude of 15 to 25 km was launched against multiple simulated targets of 1500 km class ballistic missile," the Indian MoD said in an August 2 statement. "One target among simultaneously incoming multiple targets was selected on real time, the weapon system radars tracked the target and the missile locked on to it and intercepted the target with a high degree of accuracy."

The test was tracked by a number of electro-optical tracking systems, radars and telemetry stations. According to the MoD, "all the mission objectives were successfully met." DRDO last test fired the AAD in December 2017. Other tests were conducted on March 1 and February 11 2017 as well as in May 2016 and November 2015. In past tests, Prithvi-II or III tactical surface-to-surface short-range ballistic missiles stood in as ballistic missile targets. It is unclear what type of missile was used for the August 2 test. (One possibility is the Agni-II medium to intermediate range ballistic missile.)

Both PAD and PDV are designed for mid-course interception in other words intercepting the incoming ballistic missile in space after the rocket burns out. AAD constitutes the second-tier defense against ballistic missile threats. India is in the process of supplementing its indigenous BMD shield with an additional weapon system to bolster air defenses over New Delhi: the upgraded version of the Kongsberg Defense & Aerospace/ Raytheon National Advanced Surface-to-Air Missile System (NASAMS), designated NASAM-II. Acquisition costs are estimated at around $1 billion.

Source: https://thediplomat.com, 03 August 2018.

JAPAN

Japan Launches New Guided Missile Destroyer Capable of BMD

Japanese ship maker Japan Marine United (JMU) Corporation launched the first of two Improved Atago-class (aka 27DD- or 27DDG-class) guided

missile destroyers on order for the Japan Maritime Self-Defense Force (JMSDF) at its facility in Yokohama on July 30, the Japanese Ministry of Defense (MoD) said in a statement.

The new and improved 8,200-ton Atago-class destroyer, christened Maya (PN 179), will be the seventh JMSDF surface warship to be equipped with the Aegis combat system, an automated command-and-control (C2) and weapons control system that enables improved Atago-class destroyers to attack and defend against land targets, submarines, surface warships, as well as ballistic and cruise missiles.

The future JS Maya, which cost about $1.5 billion to build, will be fitted with the Aegis Baseline J7 combat system and the Northrop Grumman AN/SPQ-9B radar system capable of detecting and tracking low-flying, supersonic, low observable anti-ship missiles. The Aegis Baseline J7 combat system is the Japanese equivalent to the U.S. Navy's Baseline 9/BMD 5.1 standard Aegis combat system.

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The heart of the Aegis combat system constitutes the AN/SPY-1D an automatic detect and track, multi-function phased-array radar system. "This high-powered radar is able to perform search, track, and missile guidance functions simultaneously, with a track capacity of more than 100 targets," according to the U.S. Navy. "When paired with the MK 41 Vertical Launching System, it is capable of delivering missiles for every mission and threat environment in naval warfare," Lockheed Martin claims.

The Aegis Baseline 9/BMD 5.1, jointly funded by the U.S. and Japanese governments, has been specifically designed for ballistic missile defense and can engage in simultaneous air and ballistic missile defense. The U.S. Naval Sea Systems Command awarded Lockheed Martin a $135.8 million contract for work on the development and integration of the Aegis Baseline 9 systems for the improved Atago-class of guided missile destroyers in December 2017.

Earlier that year in February, the United States and Japan successfully tested the Aegis Baseline 9/BMD combat system with a SM-3 Block IIA missile, the most advanced version of the SM-3 "hit-to-kill" interceptor, successfully destroying an incoming ballistic missile target in midcourse. The SM-3 interceptor is designed to destroy short- to intermediate-range ballistic missiles.

Another test of the Aegis Baseline 9 combat system in August 2017 involved a SM-6 intercepting a medium-range ballistic missile target at sea in its final seconds of flight. The main objective of the test firing was test to a new targeting software that enables the SM-6 to intercept a ballistic missile descending from the upper atmosphere at extreme speed.

While, the new improved Atago-class will be armed with the SM-3 Block IIA, which has been under joint development by U.S. defense contractor Raytheon and Japan's Mitsubishi Heavy Industries since 2006, but not the SM-6 for budgetary reasons. As I reported, Japan's Aegis Ashore batteries will also likely not be equipped with the SM-6 interceptors for the same reason. Next to the SM-3 (and once operational the SM-3 Block IIA), the new improved Atago-class will carry the RIM-66 SM-2 surface-to-air missiles and the RIM-162 Evolved Sea Sparrow Missile (ESSM). All these missiles can be fired from the Maya's 96 Mk 41 vertical launch system cells.

Like Australia's new Hobart-class of Air Warfare destroyers, the improved Atago-class will also be fitted with the so-called cooperative engagement capability (CEC), "a new wide-area integrated air defense system, which permits the real-time

sharing of sensor data on air targets, including incoming enemy aircraft and cruise missiles, among CEC-equipped ships," as I explained. The ship also boasts multifunction towed array (MFTA) sonar systems and electronic warfare (EW) capabilities.

The Maya will be the 7th of Japan's 8th anticipated Aegis destroyers to be put into service with the JMSDF in the next three years. The improved Atago-class is based on the JMSDFs older Kongô-class which in turn is a derivative of the U.S. Navy's Arleigh Burke-class of guided missile destroyers. Powered, by an improved combined diesel-electric and gas, or CODLAG, propulsion system, the ship has a crew of about 300 and can reach a top speed of up to 30 knots.

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Source: https://thediplomat.com,01 August 2018.

NUCLEAR ENERGY

SAUDI ARABIA

IAEA Assesses Saudi Nuclear Infrastructure Development

A delegation from the IAEA visited the headquarters of the King Abdullah City for Atomic and Renewable Energy (KA-CARE) between 15 and 24 July. The mission was conducted at the request of the Saudi government. During its visit, the team was received by KA-CARE President Khalid bin Saleh Al-Sultan, as well as the heads of the organisation's various departments and representatives from other concerned authorities. The delegation was briefed on the efforts of Saudi Arabia to prepare the necessary infrastructure for the introduction of nuclear energy.

Integrated Nuclear Infrastructure Review (INIR) missions are designed to assist IAEA member states in assessing the status of national infrastructure needed for the introduction of nuclear power. They are based on the IAEA Milestones Approach, with its 19 Infrastructure Issues, three Phases and three Milestones. Prior to the mission, Saudi Arabia submitted a self-evaluation report covering all infrastructure issues and submitted this and supporting documents to the IAEA.

...The IAEA team said that Saudi Arabia has made "significant progress" in the development of its nuclear power infrastructure. It noted the country has established a legislative framework and is carrying out comprehensive studies to support the next steps of the programme. The team made recommendations and suggestions, including: coordination and development of outstanding nuclear-related policies and strategies; finalisation of the readiness of key organisations; and, completion of studies to prepare for future stages of the nuclear power programme.

The team presented a preliminary report on the conclusion of the mission. The IAEA publishes each INIR mission report on its website 90 days after its delivery to the member state, unless the state requests that the IAEA not do so. In July last year, the Saudi government announced that it intends to add nuclear power to the country's energy mix with the objective of diversifying and boosting its production capacity. KA-CARE announced last year that it was soliciting proposals for 2.9 GWe nuclear capacity from South Korea, China, Russia and Japan.

Saudi Arabia earlier announced plans to construct 16 nuclear power reactors over the next 20 years. A 2010 royal decree identified nuclear power as essential to help meet growing energy demand for both electricity generation and water desalination while reducing reliance on depleting hydrocarbon resources. ...

Source: http://world-nuclear-news.org, 31 July 2018.

NUCLEAR COOPERATION

USA–JAPAN

Deputy Secretary Brouillette Hosts Fifth Meeting of the U.S.-Japan Bilateral Commission on Civil Nuclear Cooperation

The fifth meeting of the US-Japan Bilateral Commission on Civil Nuclear Cooperation (the Bilateral Commission) was held in Tokyo on August 8, 2018. Deputy Secretary of Energy Dan Brouillette and Senior Deputy Minister for Foreign Affairs Takeo Mori led the discussions as co-chairs. The delegations included participants representing a wide range of governmental agencies.

Participants from the US included officials from the Department of Energy, the Department of Commerce, and the Nuclear Regulatory Commission. The Japanese side included officials from the Ministry of Foreign Affairs, the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of the Environment, the Agency for Natural Resources and Energy, the Nuclear Regulation Authority, and the Cabinet Office.

... Following the meeting, the United States and Japan issued a joint statement reaffirming their intention to continue bilateral cooperation in the advancement of shared nuclear nonproliferation objectives, continuing joint efforts which will be reported on at the next Bilateral Commission meeting to be held in the United States.

This joint statement notes the continuation of the Agreement for Cooperation between the Government of Japan and the Government of the United States of America concerning Peaceful Uses of Nuclear Energy, and is extremely important as a foundation for peaceful use of nuclear energy and for the U.S.-Japan relationship. Both countries will continue close collaboration and cooperation for stable implementation of this agreement.

Brouillette and Mori also discussed Japan's new policy guidelines to cap its plutonium stockpile at the current level and reduce from there, demonstrating Japan's steadfast commitment to a strong and transparent nonproliferation policy. "This new policy is further evidence of the responsible, leadership role that Japan continues to play on global nonproliferation issues," said Brouillette. "The United States and Japan share the same values of safety, security, transparency, and nonproliferation, which are the foundation of our strong nuclear partnership."

Source: https://www.energy.gov, 08 August 2018.

NUCLEAR NON-PROLIFERATION

GENERAL

UN Chief Urges Nuclear Powers to Lead Non-proliferation Efforts

Stressing that many countries continue to spend "vast sums to modernize their arsenals", slowing down the disarmament process, Guterres said that countries possessing nuclear weapons have a special responsibility to lead non-proliferation efforts "There can be no more Hiroshimas, no more Nagasakis.

UN Secretary General Antonio Guterres urged countries possessing nuclear weapons to lead non-proliferation efforts, during the commemoration of Nagasaki bombing's 73rd anniversary, Guterres delivered a speech during the ceremony paying homage to the victims of the nuclear attack and expressed his respect for the residents of Hiroshima and Nagasaki, Efe news reported. "The cities are a beacon of hope and strength, and a monument to the resilience of its people but fears of nuclear war are still with us. Millions of people live in a shadow cast by the dread of unthinkable carnage," he said, referring to the fears of a possible nuclear conflict on the Korean Peninsula.

Stressing that many countries continue to spend "vast sums to modernize their arsenals", slowing down the disarmament process, Guterres said that countries possessing nuclear weapons have a special responsibility to lead non-proliferation efforts "There can be no more Hiroshimas, no more Nagasakis" he said. The US had dropped two nuclear bombs on the Japanese cities of Hiroshima and Nagasaki on August 6 and 9, 1945,

respectively. The explosions immediately killed around 1.2 lakh people and its radiations were felt till much later.

Source: https:// www.business- standard. com,09 August 2018.

NUCLEAR SAFETY

JAPAN

Safety Review Sought for New Japanese Reactor

Construction of Shimane 3, in Japan's Shimane prefecture, started in December 2005. In February 2011 - a month before the accident at the Fukushima Daiichi plant - Chugoku announced that fuelling and start-up of the reactor had been delayed by three months, from March 2011 until June 2011, owing to a fault with the control rod drive mechanism. Commercial operation had correspondingly been put back from December 2011 to March 2012.

Under Japan's revised nuclear regulations, plant operators are required to apply to the NRA for: permission to make changes to the reactor installation; approval of its construction plan to strengthen the plant; and, final safety inspections to ensure the unit meets new safety requirements. Operators are required to add certain safety-enhancing equipment within five years of receiving the NRA's approval of a reactor engineering work programme.

Following the Nuclear Regulation Authority's (NRA's) approval of the basic design earthquake ground motion for unit 2 at the Shimane site, Chugoku announced in February this year that it would seek to start up unit 3. Under Japan's revised nuclear regulations, plant operators are required to apply to the NRA for: permission to make changes to the reactor installation; approval of its construction plan to strengthen the plant; and, final safety inspections to ensure the unit meets new safety requirements. Operators are required to add certain safety-enhancing equipment within five years of receiving the NRA's approval of a reactor engineering work programme.

In May, Chugoku requested permission from the Shimane prefectural government and the Matsue city government to apply to the NRA for safety conformity inspections of Shimane 3. Having received those consents, Chugoku announced it has submitted its application to the NRA for those checks, initiating the regulatory process for starting up Shimane 3.

Chugoku becomes the second Japanese utility to apply to the NRA for pre-operation safety inspections for a new nuclear power reactor since the Fukushima Daiichi accident. The first was Japan Electric Power Development Corp (J-Power), which applied in December 2014 for inspections of unit 1 at its Ohma nuclear power plant, also an ABWR, being built in Aomori prefecture. However, with construction of Shimane 3 more advanced than Ohma 1, Shimane 3 is likely to be the first new reactor to begin operating in Japan.

Source: World Nuclear News, 10 August 2018.

NUCLEAR WASTE MANAGEMENT

JAPAN

Japan Pledges to Cut Plutonium Stocks Amid Growing Concern from Neighbors

Japan pledged to reduce its controversial stocks of plutonium, the world's biggest inventory of the highly toxic material held by a state without nuclear weapons, following pressure from the United States, China and other countries. The government did not outline by how much and when it will cut the stockpiles of plutonium it holds. … Japan held 47 tonnes of plutonium at the end of 2017, including 21 tonnes stored in Britain and 15 tonnes in France, enough to make thousands of atomic bombs.

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it will cut the stockpiles of plutonium it holds. ... Japan held 47 tonnes of plutonium at the end of 2017, including 21 tonnes stored in Britain and 15 tonnes in France, enough to make thousands of atomic bombs.

Local media reported in June that the U.S. government had asked Japan to cut its stockpiles ahead of an extension in July of a nuclear cooperation agreement that allows the country to reprocess spent nuclear fuel and extract plutonium for further use in reactors. ... Most of the reprocessing is done in France but Japan is building its own site to produce plutonium for reactor fuel at Rokkasho in northern Honshu.

Rokkasho has been hit with repeated delays and cost overruns and is now scheduled to start operations in the early 2020s. Once it does it will add to the plutonium stockpiles unless the fuel produced can be used in reactors. ... Only a limited number of reactors in Japan can use MOX, a blend of uranium and the plutonium recycled from spent nuclear fuel. Four out of six reactors currently operating can use MOX and consume about 2 tonnes of plutonium a year. Reactors need a special license to be able to use MOX fuel and experts say it is an expensive method of fuelling reactors compared to using enriched uranium. Japanese utilities also have large amounts of spent fuel held in reactor buildings, a source of concern after the Fukushima disaster.

Source: https://www.reuters.com, 31 July 2018.

Centre for Air Power Studies

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Marshal Vinod Patney, SYSM PVSM AVSM VrC (Retd).

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