Nuclear Weapons Modernization: A Threat to the NPT?

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Hans M. Kristensen

Nearly half a century after the five declared nuclear-weapon states in 1968 pledged under the nuclear Nonproliferation Treaty (NPT) to “pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament,”[1] all of the world’s nuclear-weapon states are busy modernizing their arsenals and continue to reaffirm the importance of such weapons.

None of them appears willing to eliminate its nuclear weapons in the foreseeable future.

Granted, the nuclear arms race that was a main feature of the Cold War is over, and France, Russia, the United Kingdom, and the United States have reduced their arsenals significantly. Nevertheless, huge arsenals remain, especially in Russia and the United States. China, India, North Korea, Pakistan, and possibly Israel are increasing their stockpiles, although at levels far below those of Russia and the United States. All nuclear-armed states speak of nuclear weapons as an enduring and indefinite aspect of national and international security.

As a result, the world’s nine nuclear-armed states still possess more than 10,000 nuclear warheads combined, of which more than 90 percent are in Russian and U.S. stockpiles. In addition to these stockpiled warheads, those two countries possess thousands of additional nuclear warheads. These warheads, retired but still relatively intact, are in storage awaiting dismantlement. Counting both categories of nuclear warheads, the world’s total combined inventory includes an estimated 17,000 nuclear warheads (fig. 1).

Moreover, many non-nuclear-weapon states that publicly call for nuclear disarmament continue to call on nuclear-armed allies to protect them with nuclear weapons. In fact, five non-nuclear-weapon states in NATO have volunteered to serve as surrogate nuclear-weapon states by equipping their military forces with the necessary tools to deliver U.S. nuclear weapons in times of war—an arrangement tolerated during the Cold War but entirely inappropriate in the post-Cold War era in which NATO and the United States are advocating strict adherence to nonproliferation norms as a foundation for international security.

Thus, although the numerical nuclear arms race between East and West is over, a dynamic technological nuclear arms race is in full swing and may increase over the next decade. Importantly, this is not just a characteristic of the proliferating world but of all nuclear-armed states. New or improved nuclear weapons programs under way in those countries include at least 27 for ballistic missiles, nine for cruise missiles, eight for naval vessels, five for bombers, eight for warheads, and eight for weapons factories (fig. 2).
United States

The United States has embarked on an overhaul of its entire nuclear weapons enterprise, including development of new weapons delivery systems and life extension programs (LEPs) for and modernization of all its enduring nuclear warhead types and nuclear weapons production facilities. Moreover, rather than constraining the role of nuclear weapons, the Obama administration’s 2013 nuclear weapons employment strategy reaffirmed the existing posture of a nuclear triad of forces on high alert. There are currently approximately 4,650 warheads in the U.S. stockpile, down from 5,113 in 2009, and another 2,700 retired warheads awaiting dismantlement.

Unlike other nuclear-armed states, the United States has modernized its nuclear arsenal over the past two decades mainly by upgrading existing weapons rather than fielding new types. The intercontinental ballistic missile (ICBM) force is the final phase of a decade-long, $8 billion modernization intended to extend its service life until 2030. Similarly, beginning in 2017, the Navy will begin to deploy a modified version of the Trident II D-5 submarine-launched ballistic missile (SLBM) on ballistic missile submarines (SSBNs) to extend its service life through 2040. The Air Force has begun LEPs for the air-launched cruise missile and the B-2 and B-52 bombers.

Beyond these upgrades of existing weapons, work is under way to design new weapons to replace the current ones. The Navy is designing a new class of 12 SSBNs, the Air Force is examining whether to build a mobile ICBM or extend the service life of the existing Minuteman III, and the Air Force has begun development of a new, stealthy long-range bomber and a new nuclear-capable tactical fighter-bomber. Production of a new guided “standoff” nuclear bomb, which would be able to glide toward a target over a distance, is under way, and the Air Force is developing a new long-range nuclear cruise missile to replace the current one.

As is often the case with modernizations, many of these programs will introduce improved or new military capabilities to the weapons systems. For example, the LEP for the B61 gravity bomb will add a guided tail kit to one of the existing B61 types to increase its accuracy. The new type, known as the B61-12, will be able to strike targets more accurately with a smaller explosive yield and reduce the radioactive fallout from a nuclear attack. Other modifications under consideration, such as interoperable warheads that could be used on land- and sea-based ballistic missiles, could significantly alter the structure of the nuclear warheads and potentially introduce uncertainties about reliability and performance into the stockpile. These uncertainties could increase the risk that the
United States would need to conduct a nuclear test explosion in the future.[2]

All told, over the next decade, according to the U.S. Congressional Budget Office, the United States plans to spend $355 billion on the maintenance and modernization of its nuclear enterprise,[3] an increase of $142 billion from the $213 billion the Obama administration projected in 2011.[4] According to available information, it appears that the nuclear enterprise will cost at least $1 trillion over the next 30 years.[5]

These sums are enormous by any standard, and some programs may be curtailed by fiscal realities. Nevertheless, they indicate a commitment to a scale of nuclear modernization that appears to be at odds with the Obama administration’s arms reduction and disarmament agenda. This modernization plan is broader and more expensive than the Bush administration’s plan and appears to prioritize nuclear capabilities over conventional ones. The Obama administration entered office with a strong arms control and disarmament agenda, but despite efforts by some officials and agencies to reduce the number and role of nuclear weapons, the administration may ironically end up being remembered more for its commitment to prolonging and modernizing the traditional nuclear arsenal.

**NATO**

The new B61-12 is scheduled for deployment in Europe around 2020. At first, the guided bomb, which has a modest standoff capability, will be backfitted onto existing F-15E, F-16, and Tornado NATO aircraft. From around 2024, nuclear-capable F-35A stealthy fighter-bombers are to be deployed in Europe and gradually take over the nuclear strike role from the F-16 and Tornado aircraft.

Slightly more than 180 B61 bombs are currently deployed in underground vaults inside 87 protective aircraft shelters at six bases in five NATO countries (Belgium, Germany, Italy, the Netherlands, and Turkey). About half of the bombs are earmarked for delivery by the national aircraft of these non-nuclear-weapon states, although they all are parties to the NPT and obliged “not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly.” In peacetime, the weapons at the national bases are under the control of a U.S. Air Force munitions support squadron, but in a war, the United States would hand over control of the weapons to the national pilots who would deliver the weapons and effectively violate the NPT at that moment.

The combination of a guided standoff nuclear bomb and a fifth-generation stealthy fighter-bomber will significantly enhance the military capability of NATO’s nuclear posture in Europe.[6] The upgrade contradicts the Obama administration’s pledge that LEPs “will not…provide for new military capabilities”[7] and NATO’s conclusion that its nuclear force posture “currently meets the criteria for an effective deterrence and defence posture.”[8] Neither the administration nor NATO has officially addressed this contradiction, but officials privately insist, incorrectly, that the B61-12 will not add military capabilities to NATO’s posture in Europe. Some NATO countries scheduled to receive the B61-12 have recently begun to ask questions about the B61-12 program via diplomatic channels.[9]

The modernization also undercuts the U.S. goal to seek “bold reductions” in Russian and U.S. nonstrategic nuclear weapons in Europe[10] and NATO’s stated resolve “to create the conditions for a world without nuclear weapons.”[11] Moreover, the modernization sends a clear signal to Russia that it is acceptable to enhance nonstrategic nuclear forces in Europe, effectively removing NATO’s ability to appeal to Russian restraint.

The extension and modernization of the U.S. nuclear deployment in Europe competes with increasingly scarce resources needed for more-important conventional forces and operations. Conventional forces would be much more credible than tactical nuclear weapons in providing security assurance to eastern NATO allies.

**France**

France is in the final phase of a comprehensive modernization of its nuclear forces intended to extend the arsenal into the 2050s. Most significant is the deployment during 2010-2018 of the new
M-51 SLBM on the Triumphant-class submarines. The new missile has greater range, payload capacity, and accuracy than its predecessor, the M-45. Starting in 2015, the current TN75 warhead will be replaced with the new TNO (Tête Nucléaire Océanique) warhead. France currently has a stockpile of roughly 300 warheads.

The modernization of the sea-based leg of the arsenal follows the completion in 2011 of the replacement of the ASMP (Air-Sol Moyenne Portée) air-launched cruise missile, which had a range of 300 kilometers, with the new ASMPA (Air-Sol Moyenne Portée Amélioré), which has a range of 500 kilometers. The missile has been integrated with two fighter-bomber squadrons—Mirage 2000N K3 aircraft at Istres on the Mediterranean coast and Rafale F3 aircraft at Saint-Dizier northeast of Paris. Eventually, the Istres wing will also be upgraded to Rafale aircraft. The ASMPA carries the new TNA (Tête Nucléaire Aéroportée) warhead.

A navy version of the Rafale aircraft is deployed on the Charles de Gaulle aircraft carrier based at Toulon. The wing was upgraded to carry the ASMPA missile in 2010, but the weapons are stored on land under normal circumstance and not deployed on the carrier in peacetime.

The United Kingdom

Of all the nuclear-weapon states, the UK is the country that has progressed furthest toward potential nuclear abolition. Its current stockpile of approximately 225 weapons is scheduled to decline to about 180 by the mid-2020s. After the UK’s elimination of its air- and sea-based tactical nuclear weapons in the 1990s, there has been a lively debate about whether the country any longer needs nuclear weapons. For now, however, the government appears determined to replace the current class of four Vanguard-class nuclear-armed submarines with a new class of three to four submarines in the mid-2020s.

The UK leases its Trident II D5 SLBMs from the United States. These missiles are currently being equipped with the W76-1/Mk4A, a version of the existing warhead that has increased targeting capabilities. The W76-1 is believed to have been modified by UK warhead designers for use on UK missiles.

Russia

Russia is in the middle of a significant nuclear modernization that marks its attempt to transition from Soviet-era nuclear force structure to something more modern, leaner, and cheaper to maintain. Despite continued financial constraints, the regime of Vladimir Putin has prioritized maintenance and modernization of nuclear forces as symbols of national prestige and, to some extent, compensation for inferior conventional forces. The Russian stockpile is estimated at roughly 4,300 warheads, of which approximately 2,000 are for nonstrategic weapons, with another 3,500 retired warheads awaiting dismantlement.

Within the next decade or more, retirement of all Soviet-era ICBMs and SLBMs will be completed, and these systems will be replaced with various versions of the SS-27 ICBM and the RS-26 (possibly another SS-27 modification) on land and the SS-N-32 Bulava SLBM on a fleet of eight new Borei-class SSBNs. Work is also said to be under way on a new “heavy” ICBM known as the Sarmat to replace the SS-18. Putin promised shortly before the election in 2012 that Russia intends to produce more than 400 land- and sea-based ballistic missiles through the mid-2020s. It remains to be seen how much of that production the Russian military-industrial complex can accomplish.

Despite the modernization, the Russian ICBM force already has declined to approximately 300 missiles and is expected to drop further to roughly 250 missiles over the next decade. In order to keep some level of parity with the larger U.S. arsenal, Russia is deploying more warheads on each of its missiles.

With regard to the Russian bomber force, the Tu-160 Blackjack, Tu-95MS Bear, and Tu-22M Backfire bombers are all undergoing various upgrades to extend their service lives and improve their military capabilities. In addition, work is currently under way on the design of a subsonic replacement bomber to enter service early in the next decade. A new nuclear cruise missile, known as the KH-102
air-launched cruise missile, has been under development for a long time and may become operational soon.

As for tactical forces, the new SS-26 Iskander-M short-range ballistic missile is replacing the nuclear-capable SS-21s in 10 brigades, mostly in western and southern military districts. The Su-34 Fullback fighter-bomber is gradually replacing the old Su-24M Fencer in the tactical nuclear strike role, and the Severodvinsk-class, or Yasen-class, SSGN (nuclear-powered, guided-missile attack submarine) is about to enter service with the new long-range Kalibr cruise missile that might have nuclear capability.

The Russian government has repeatedly stated that modernizing strategic nuclear forces is its priority, but this effort competes with the modernization of conventional forces, which are much more relevant for the type of security challenges facing Russia today.

Information on Russian nuclear spending is scarce and contradictory. In 2011, Russian news media and analysts reported that Russia planned to spend $70 billion on new strategic weapons through 2018. That sounds like a considerable amount, but only adds up to $10 billion per year. That is close to what the U.S. National Nuclear Security Administration (NNSA) spends per year on weapons activities.

Likewise, Russian media in 2012 reported that Russia planned to spend 101 billion rubles on nuclear weapons from 2013 through 2015. That also sounds like a very significant sum, but corresponds to only $2.9 billion over three years. This does not appear to be the entire nuclear budget; it apparently covers only the “nuclear weapons complex.” If that corresponds to the U.S. nuclear complex—that is, NNSA facilities—then it would imply that Russia spends less than half of what the United States spends on nuclear weapons infrastructure. The buying power in Russia is probably greater, but so is corruption and inefficiency.

Russia’s overall defense budget has increased. Over the next 10 years, the plan is to spend 19 trillion rubles ($542 billion) on defense. That is less than the annual U.S. defense budget. Of that amount, strategic nuclear forces are thought to account for about 10 percent, or $54 billion in total over 10 years. It is unclear what categories are included, but it appears to be roughly 20 percent of the $30 billion the United States is estimated to spend on its nuclear triad per year.

The Russian economy seems ill equipped to support such investments in nuclear forces that will only constrain resources available for conventional forces. Since 2008, Russia has scaled back and reorganized its military to save money and shed excess or outdated capacity. Ground forces, armor, and infantry battalions alone have been reduced by about 60 percent since 2008.

The Putin government’s 10-year defense procurement plan adopted in 2010 is intended to replace Soviet-era equipment and bolster deterrence, but U.S. intelligence characterizes the Russian economy as “sluggish” and Putin’s defense plan as being hampered by funding, bureaucratic, and cultural hurdles. The difficulty of reinvigorating a military industrial infrastructure that deteriorated for more than a decade after the Soviet collapse is seen by the U.S. intelligence community as complicating Russian efforts. The 2014 budget is “harsh,” with a projected deficit of 391 billion rubles ($12 billion), rising to 817 billion rubles ($25 billion) in 2015. Additional financial constraints created by the international reaction to the Russian invasion of Crimea would exacerbate this outlook. The Russian nuclear modernization plan therefore seems headed for serious economic and organizational challenges.

China

Chinese nuclear forces are in the latter phase of a two-decade-long upgrade that includes deployment of new land-, sea-, and air-based nuclear delivery vehicles. This effort is occurring in parallel with a broader modernization of China’s general military forces. Unlike the other nuclear members of the NPT, China is increasing the size of its nuclear arsenal, which is currently estimated to be around 250 warheads.

Although China does not seem to plan a significant increase in the size of its nuclear forces, it is
changing the composition of that force and putting more emphasis on mobile systems. The ICBM force is expanding with deployment of the solid-fueled, road-mobile DF-31 and DF-31A in limited numbers to complement the old silo-based, liquid-fueled DF-5A. The DF-31 and DF-31A do not appear to have been very successful; deployment of the DF-31 has stalled, and China may produce a new ICBM to replace the DF-31A.[17]

Another new development is the Jin-class SSBN with the JL-2 SLBM, a significant improvement over the old Xia/JL-1 weapons system, which never became fully operational. It is difficult to understand the role of the small fleet of Jin/JL-2 SSBNs under construction given the reluctance of the Chinese leadership to allow deployment of nuclear warheads on missiles under normal circumstances. Given the geographical constraints and the superiority of U.S. attack submarines, it will be a challenge for China to operate SSBNs effectively. Yet, the navy appears to have received permission to build the fleet at least to some extent because of national prestige.

There are also unconfirmed rumors that China is adding a nuclear capability to ground- and air-launched cruise missiles. If so, it would represent an important addition to the Chinese nuclear posture, particularly in light of Beijing’s stated adherence to a doctrine of minimum deterrence.

Pakistan

For a country with limited resources, Pakistan is spending a considerable amount on modernizing its nuclear forces. New systems under development include the Shaheen II medium-range ballistic missile, Ra’ad air-launched cruise missile, Babur ground-launched cruise missile, and Nasr short-range rocket. Infrastructure upgrades include construction of the third and fourth plutonium-production reactors and upgrades of uranium-enrichment and spent fuel reprocessing facilities. Pakistan’s current arsenal is estimated at around 120 weapons.

At the same time, the Shaheen II missile has been under development for a long time, but might only now become operational, an indication of possible technical difficulties developing the road-mobile, solid-fueled, medium-range ballistic missile. Likewise, although India has embarked on an SSBN program, there is so far no indication that Pakistan is following the example. This is somewhat surprising given the normal tit-for-tat patterns in Pakistani-Indian nuclear competition. Whether this reflects financial constrains is unclear, and it remains to be seen if the Babur cruise missile eventually will be deployed also in a sea-based version.

Development of the nuclear-capable Nasr short-range missile launcher, whose range is estimated to be 60 kilometers, signals a significant and worrisome tactical addition to Pakistan’s nuclear strategy because the weapon is intended for use before a strategic nuclear exchange.

India

India’s nuclear modernization is entering a new and complex phase. After the initial introduction of the Prithvi and Agni missiles, India is developing several long-range Agni systems on new launchers. The first SSBN has been launched and is expected to begin sea trials later this year as the first of a class of perhaps three to five boats with a new SLBM. Construction of a new plutonium-production reactor is expected to start soon along with fast breeder reactors, which can produce more plutonium than they consume, as well as upgrades to reprocessing facilities. India’s current stockpile is estimated at around 110 warheads.

Unlike Pakistan’s nuclear posture, which is directed against only India, India’s nuclear posture is directed against Pakistan and China. As a result, most of India’s current missile development efforts are geared toward developing long-range missiles that can reach all of China. There is a prominent internal debate about the need to deploy canistered launchers—a system in which the missile is carried inside a climate-controlled canister—and equip ballistic missiles with the capability to carry multiple warheads. It remains to be seen what, if any of this, the government will approve.

Israel

Israel has a relatively small and steady nuclear arsenal. The nuclear stockpile is thought to include
around 80 nuclear warheads for delivery by aircraft and ballistic missiles. Nonetheless, there are rumors about modernization.

One rumor concerns an upgrade of the land-based ballistic missile force from the current Jericho II to a longer-range Jericho III missile based on the Shavit space launch vehicle.

The air-based leg of Israel’s nuclear force could potentially also face modernization as the Israeli air force acquires the F-35 Joint Strike Fighter from the United States.

There are persistent rumors that Israel may have converted a cruise missile to nuclear weapons capability for its new Dolphin-class attack submarines. The rumors have focused on the Popeye Turbo or Harpoon missiles, but the status of the weapon remains unclear. If this conversion is taking place, the submarines would provide Israel with a new limited-range offensive capability and more-secure retaliatory capability.

**North Korea**

Because the North Korean nuclear arsenal is still in its infancy, most efforts to develop a deliverable nuclear weapons capability can essentially be considered modernizations. Potential nuclear-capable delivery systems include the Scud C and Nodong short-range missiles, the Musudan medium-range missile, and the Hwasong-13 (KH-08) and Taepo Dong long-range missiles. The KH-08 and Musudan have yet to be test-flown; the Taepo Dong has been successfully flown only as a space launch vehicle. After three nuclear explosive tests, there is no authoritative public information that North Korea has yet test-flown a re-entry vehicle intended to deliver a nuclear warhead.

A technically simpler but shorter-range and more vulnerable delivery system would be an aircraft equipped with a nuclear bomb. All other nuclear-weapon states used aircraft as their first delivery system, but there is no known information that North Korea has followed suit.

**Conclusions**

Despite significant reductions in the overall number of nuclear weapons compared with the Cold War era, all of the world’s nine nuclear-armed states are busy modernizing their remaining nuclear forces for the long haul. None of the nuclear-armed states appears to be planning to eliminate its nuclear weapons anytime soon. Instead, all speak of the continued importance of nuclear weapons.

The pace of nuclear reductions appears to be slowing as Russia and the United States shift their focus to sustaining their arsenals for the indefinite future. Three of the nuclear-armed states are increasing their arsenals, and nuclear competition among the nuclear-armed states appears to be alive and well.

Despite the financial constraints facing several of the nuclear-armed states, these states appear committed to spending hundreds of billions of dollars over the next decade on modernizing their nuclear forces.

Perpetual nuclear modernization appears to undercut the promises made by the five NPT nuclear-weapon states. Under the terms of that treaty, they are required to “pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament.” Nearly 50 years after this promise was first made, the non-nuclear-weapon states, who in return for that commitment renounced nuclear weapons for themselves, can rightly question whether continued nuclear modernization in perpetuity is consistent with the NPT.

Without some form of limitations on the pace and scope of nuclear modernization, the goals of deep cuts in and eventual elimination of nuclear weapons remain elusive and appear increasingly unlikely as continued reaffirmation of the value of nuclear weapons, sustained by a global nuclear competition, threatens to extend the nuclear era indefinitely.
### Figure 2: Worldwide Nuclear Weapons Modernization

All nine nuclear-armed states are modernizing their nuclear arsenals, with missiles, bombers, warships, and warheads being produced in what appears to be a technological nuclear arms race.

<table>
<thead>
<tr>
<th>Country</th>
<th>Weapon Category</th>
<th>New or Modernized Weapon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RUSSIA</strong></td>
<td>Strategic Land</td>
<td>Sarmat ICBM (silo)</td>
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<td></td>
<td></td>
<td>SS-27 Mod 2 (RS-24) ICBM</td>
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<tr>
<td></td>
<td></td>
<td>(silo)</td>
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<tr>
<td></td>
<td>Strategic Sea</td>
<td>Borei SSBN</td>
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<td></td>
<td></td>
<td>SS-N-32 (Bulava) SLBM</td>
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<td></td>
<td>Strategic Air</td>
<td>PAK-DA bomber</td>
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<td></td>
<td>Tactical</td>
<td>Su-34 fighter-bomber</td>
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<td>Severodvinsk (Yasen) SSM</td>
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<td></td>
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<td>SS-N-30 (Kalibr) SLCM</td>
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<td></td>
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<td>SS-26 Iskander-M SRGBM</td>
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<td></td>
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<td>S-400/SA-21 SAM (?)</td>
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<td></td>
<td></td>
<td>Interceptor for A-135 ABM system</td>
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<tr>
<td><strong>UNITED STATES</strong></td>
<td>Strategic Land</td>
<td>ICBM</td>
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<td></td>
<td>Tactical</td>
<td>F-35A fighter-bomber</td>
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<tr>
<td><strong>NATO</strong></td>
<td>Strategic Sea</td>
<td>SSBNX</td>
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<td></td>
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<td>Trident IIDSLE SLBM</td>
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<td></td>
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<td>W76-1/Mk4A warhead</td>
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<tr>
<td><strong>BELGIUM</strong></td>
<td>Tactical</td>
<td>(F-35A fighter-bomber)</td>
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<tr>
<td><strong>ITALY</strong></td>
<td>Tactical</td>
<td>F-35A fighter-bomber</td>
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<tr>
<td><strong>NETHERLANDS</strong></td>
<td>Tactical</td>
<td>F-35A fighter-bomber</td>
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<tr>
<td><strong>FRANCE</strong></td>
<td>Strategic Sea</td>
<td>M51.2 SLMB</td>
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<td>M51.3 SLMB</td>
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<td></td>
<td></td>
<td>TNO warhead</td>
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<tr>
<td><strong>CANADA</strong></td>
<td>Strategic Land</td>
<td>DF-31 ICBM</td>
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<td>DF-31A ICBM</td>
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<td>(DF-41 ICBM)</td>
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<td><strong>UNITED KINGDOM</strong></td>
<td>Strategic Sea</td>
<td>New SSBN</td>
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<td></td>
<td>Tactical</td>
<td>Hatf-2 Abdali SRBM</td>
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<td><strong>PAKISTAN</strong></td>
<td>Strategic Land</td>
<td>Agni III IRBM</td>
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<td>Agni IV IRBM</td>
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<td>Strategic Sea</td>
<td>Arihant SSBN</td>
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<td><strong>INDIA</strong></td>
<td>Strategic Air</td>
<td>Jericho III MRBM</td>
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<td><strong>ISRAEL</strong></td>
<td>Strategic Land</td>
<td>Musudan IRBM</td>
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<tr>
<td><strong>NORTH KOREA</strong></td>
<td>Strategic Land</td>
<td>Hwasong-13 (KN-08) ICBM</td>
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<tr>
<td></td>
<td>Tactical</td>
<td>Rafale-3 fighter-bomber</td>
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**ENDNOTES**

1. The fielding of some of these weapons already has started, but is scheduled to continue for several years.
2. Belgium has not yet selected its next-generation fighter-bomber, but is likely to follow the Netherlands.
3. France considers its 500-kilometer cruise missile delivered by short-range fighter bombers a strategic weapon, but it has capability similar to that of Russian tactical nuclear aircraft.
4. China may be developing a new mobile ICBM, possibly to supplement or replace the current ICBMs.
7. None of Pakistan’s land-based ballistic missiles have intercontinental range, but they are considered strategic weapons in the deterrence relationship with India.
8. Despite three nuclear tests, there is no public confirmation that North Korea has developed and test-fired an operational nuclear warhead for its ballistic missiles.
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ENDNOTES


2. The fiscal year 2015 National Nuclear Security Administration budget request delays the design and production of the first Interoperable Warhead (W78/W88-1) by five years because there are considerable cost and design uncertainties and no urgent aging-related issues affecting the current warheads.


4. James Miller, Statement before the Senate Committee on Armed Services Subcommittee on Strategic Forces, May 4, 2011, p. 5.


15. Ibid., p. 24.


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