Considerations for a US Nuclear Force Structure below a 1,000-Warhead Limit

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On 5 April 2009 in Prague, Czech Republic, President Obama committed the United States to seeking "the peace and security of a world without nuclear weapons."[1] This move toward a nuclear-free world is not a new idea. In January 2008, George P. Shultz, William J. Perry, Henry Kissinger, and Sam Nunn authored an article for the *Wall Street Journal* suggesting steps to "dramatically reduce nuclear dangers." More than a dozen former senior US officials from the past six administrations endorsed these suggestions.[2] While these officials offered "suggestions," they realized the challenge of achieving a nuclear-free world would be difficult. In fact, the president recognized this challenge in his Prague speech when he stated, "This goal will not be reached quickly—perhaps not in my lifetime." "Just as importantly," the president added, "As long as these weapons exist, the United States will maintain a safe, secure and effective arsenal to deter any adversary, and guarantee the defense of our allies."[3] In a move toward a nuclear-free world, Obama and Russian president Medvedev signed the "New Strategic Arms Reduction Treaty (START)" on 8 April 2010 in Prague, limiting deployed strategic warheads to 1,550. This is a 30-percent reduction from the 2002 Moscow Treaty, moving the world one step closer to eliminating all nuclear weapons.[4]

As the president moves toward a nuclear-free world, we must ask some very important questions about that journey: (1) Do different negotiation considerations and dynamics come into play when Russia and the United States go below 1,000 strategic warheads? (2) What are the implications of nonstrategic or tactical nuclear weapons in the global security environment? and finally, (3) What are the potential implications for the US nuclear

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force structure and the impact on the role of nuclear deterrence as its national arsenal moves below 1,000 strategic warheads? These questions require a thorough analysis and invite "suggestions" on how the United States should proceed.

New Negotiation Dynamics below 1,000 Warheads

A world free of nuclear weapons is a noble goal and a commitment we have as a nation in accordance with Article VI of the Nuclear Non-Proliferation Treaty (NPT) as ratified by the United States in March 1970.[5] Over the past 40 years, the United States has negotiated directly with the Soviets, and now the Russians, to reduce our nuclear arsenals. While negotiations were difficult, viewed from a distance these talks were very similar to Newton's Third Law of Motion: "For every action there is an equal and opposite reaction."[6] This is not to say there was a one-for-one reduction in warheads between the two nations. But as one nation proposed an action to reduce weapons, the other responded with what it saw as an equal reduction while always maintaining the status quo balance of power. As we move into a period where the United States and Russian arsenals are perhaps reduced below 1,000 warheads, we leave Newtonian physics of equal and opposite reactions and enter a new quantum physics world of negotiations where additional actors affect strategic and crisis stability with implications we do not yet completely comprehend.[7]

In this quantum physics view of nuclear arms reduction, we must look at numerous additional actors and forces—great and small—that will play important roles. These actors include current nuclear weapons states, aspiring nuclear weapons countries, other states with some nuclear technology, and US allies operating under the cover of its "nuclear umbrella."[8] To understand the impact that these countries will have on the negotiation process as we move toward a world free of nuclear weapons, we must first have a general understanding of their current positions in the world security environment and the directions they are moving. While it is impossible to know everything about each of these nations or their complexity, we will look at some important factors to consider as the United States and Russia move toward nuclear arsenals below 1,000 warheads and fewer associated strategic delivery vehicles.

To examine the players in a new world of ever-deeper cuts, we first look at those countries currently possessing nuclear weapons. Only five recognized

nuclear weapons nations have signed and ratified the NPT: the United States, Russia, China, France, and Great Britain. With its large nuclear arsenal, Russia possesses the greatest potential threat to US national security.[9] It is therefore against the Russian threat that US deterrent forces must be capably and properly sized. Likewise, the Russian government is no doubt concerned with deterring what it may perceive as a US threat to its existence.

With this mutual threat in mind, the presidents of the two countries have negotiated and signed the New Strategic Arms Reduction Treaty that the US Senate ratified with amendments on 22 December 2010 by a bipartisan vote of 71 to 26.[10] In response to the US midterm elections, the Russian parliament withdrew its recommendations for ratification, putting the future of the treaty in limbo.[11] While President Medvedev spoke positively about the US Senate ratification, he believed it "could take some time for the Russian lawmakers to study the amendments to the treaty."[12] At issue were two amendments added by the US Senate, one calling for modernization of the US nuclear triad and the other for discussion between the two counties on tactical nuclear weapons.[13] By 26 January 2011 both the Russian State Duma and Federation Council ratified the treaty adding their own amendments which include a provision for Russian withdrawal if the "US upsets the strategic balance with any major missile defense initiative."[14] The exchange of ratified and signed documents by Secretary of State Clinton and Russian foreign minister Lavrov on 5 February 2011 put the new treaty into effect.[15] The new treaty ends the hiatus of verification and inspection protocols that existed under the original START, which expired on 5 December 2009.[16]

The agreed upon New START limits are "(a) 700, for deployed ICBMs, deployed SLBMs, and deployed heavy bombers; (b) 1550, for warheads on deployed ICBMs, warheads on deployed SLBMs, and nuclear warheads counted for deployed heavy bombers; (c) 800, for deployed and non-deployed ICBM launchers, deployed and non-deployed SLBM launchers, and deployed and non-deployed heavy bombers."[17] This treaty will put the two countries on course to reach the lowest number of strategic nuclear weapons and delivery vehicles since the early 1950s for the United States and 1960s for Russia (see table 1), bringing both arsenals much closer in number to China and other nuclear-armed nations.

While publicly committing to a world free of nuclear weapons, Russia continues to replace its strategic nuclear warheads with new designs and delivery systems.[18] In recent defense budgets, it has allocated resources to

Table 1. Global Nuclear Weapons Inventories, 1945–2010

YEAR	UNITED STATES	RUSSIA	UNITED KINGDOM	FRANCE	CHINA	ISRAEL	INDIA	PAKISTAN	TOTAL
1945–1967									
1945	2								2
1946	9								9
1947	13								13
1948	50								50
1949	170	1							171
1950	299	5							304
1951	438	25							463
1952	841	50							891
1953	1,169	120	1						1,290
1954	1,703	150	7						1,860
1955	2,422	200	14						2,636
1956	3,692	426	21						4,139
1957	5,543	660	28						6,231
1958	7,345	869	31						8,245
1959	12,298	1,060	35						13,393
1960	18,638	1,605	42						20,285
1961	22,229	2,471	70						24,770
1962	25,540	3,322	288						29,150
1963	28,133	4,238	394						32,765
1964	29,463	5,221	436	4	1				35,125
1965	31,139	6,129	436	32	5				37,741
1966	31,175	7,089	380	36	20				38,700
1967	31,255	8,339	380	36	25	2			40,037
1998–2010									
1998	10,732	22,500	281	450	232	68	2	3	34,268
1999	10,685	22,000	281	450	232	70	8	8	33,734
2000	10,577	21,500	281	470	232	72	14	13	33,159
2001	10,526	21,000	281	350	235	74	20	18	32,504
2002	10,457	20,000	281	350	235	76	26	23	31,448
2003	10,027	19,000	281	350	235	78	32	28	30,031
2004	8,570	18,000	281	350	235	80	38	33	27,587
2005	8,360	17,000	281	350	235	80	44	38	26,388
2006	7,853	16,000	281	350	235	80	50	43	24,892
2007	5,709	15,000	225	350	235	80	60	50	21,709
2008	5,273	14,000	225	300	235	80	70	60	20,243
2009	5,113	13,000	225	300	240	80	80	70	19,108
2010	5,000*	12,000	225	300	240	80	80	70	17,995*

***The US column only includes warheads in the DoD stockpile, which was declassified in May 2010. Several thousand additional retired but intact warheads are awaiting dismantlement, probably 3,500–4,500 as of August 2010. (Adapted from R. D. Norris and H. M. Kristensen, "Global nuclear weapons inventories, 1945–2010," *Bulletin of the Atomic Scientists* 66 [2010]: 81–82).**

procure new dual-capable strategic bombers while also attempting to reinvigorate its fleet of nuclear submarines.[19] In addition, it is building new land-based RS-12M1/2 Topol-M intercontinental ballistic missiles (ICBM) with a multiple reentry vehicle (MIRV) capability.[20] Most importantly, Russia is placing more emphasis on its large stockpile of tactical nuclear weapons in its national defense strategy.[21] Its shift to a "first use" strategy is a counterbalance and cost-savings move while it downsizes and modernizes its conventional military forces.[22] With this increased reliance on nuclear weapons in a first-use capacity, it will be difficult for the Russians to reduce their nuclear arsenal below New START levels until they feel their conventional forces are equal or greater in capability to North Atlantic Treaty Organization (NATO) and Chinese nuclear and conventional forces on their borders.

While Russia poses the greatest existential threat to the United States, the next greatest threat comes from China. According to open sources, China possesses approximately 240 nuclear warheads, with perhaps 186 operationally ready for employment on aircraft or ballistic missiles. With such a small force, China appears to have adopted a minimum deterrence strategy. It has approximately 20 CSS-4 ICBMs able to reach the United States. The remaining warheads are programmed to be delivered by aircraft or short- and medium-range missiles.[23] The Chinese have publicly declared a "no first use" policy, with a self-defense nuclear strategy.[24] China defends against attack by developing underground facilities to house its nuclear weapons, providing for maximum survival of its arsenal from a first strike and guaranteeing a robust retaliatory capability.[25] Maintaining a secure second-strike retaliatory force rather than an insecure and vulnerable nuclear force is also more conducive to crisis stability.[26]

When we include the Chinese at the arms control negotiation table, we must consider their strategic situation, surrounded by nuclear-armed countries such as Russia, India, North Korea, and Pakistan and within striking distance of Iran and the United States. While China has formidable conventional forces, as long as surrounding countries have nuclear weapons the Chinese are unlikely to reduce their nuclear arsenal. Indeed, all countries with nuclear arms need to be included in future nuclear arms control treaty negotiations, including the United Kingdom and France.

The UK currently maintains approximately 160 nuclear warheads configured to be delivered only by submarine-launched ballistic missiles (SLBM) from four *Vanguard*-class Trident fleet ballistic missile submarines

(SSBN),[27] Researchers at the Stockholm International Peace Research Institute (SIPRI) believe that some UK missiles only contain one warhead and are configured for a "low yield" using only the "fission primary." The UK Ministry of Defense believes this "provides a 'sub-strategic' role to the Trident Fleet."[28] Britain has reduced its reliance on nuclear weapons since the end of the Cold War, and, from comments made by former Prime Minister Gordon Brown, it appears it is willing to reduce its purchase of new nuclear submarines by 25 percent, from four to three.[29]

France, on the other hand, possesses approximately 300 nuclear weapons widely dispersed on four SSBNs and 84 tactical aircraft.[30] Even though the French have recently rejoined NATO's Integrated Military Command after 43 years, they still pride themselves on a nuclear capability that could be used independently of the NATO command structure.[31]

While the UK, France, Russia, and China are all important nuclear powers and permanent members of the United Nations (UN) Security Council, when the United States goes below 1,000 strategic nuclear warheads, other nuclear weapons states will equally deserve a seat at the negotiating table. These additional countries—India, Pakistan, North Korea, and Israel—are not signatories to the NPT but already have, or in the case of Israel are believed to have, nuclear weapons.

India currently maintains an arsenal estimated at 60–70 tactical nuclear weapons delivered by aircraft along with short- and medium-range missiles.[32] India and its nuclear-armed rival Pakistan have fought three wars and continue to threaten each other, suggesting these two states must, at some point in the near future, be included in multilateral nonproliferation and nuclear arms control talks.

Pakistan is estimated to possess 60 tactical nuclear weapons delivered by missiles, along with enough plutonium and highly enriched uranium to produce 40 more.[33] It sees India's larger and technologically more advanced conventional military as an existential threat and will not give up its nuclear weapons, seen as equalizers, as long as this threat exists.[34] Pakistani leaders and citizens also enjoy the prestige conferred by their status as the only Muslim nation with nuclear weapons. While India and Pakistan should be essential players in future negotiations, we must also consider crafting agreements to take into account and limit states, such as North Korea, Iran, and Israel, that have or are pursuing nuclear weapons.

North Korea has twice demonstrated the ability to detonate a nuclear weapon while it refines its ICBM capabilities. Iran, already with a proven

short- and medium-range missile capability, continues to defy UN mandates as it develops its uranium enrichment technologies. Israel has chosen a nondeclaratory policy toward nuclear weapons, but some analysts estimate that it maintains approximately 100 nuclear warheads.[35] These three states, with their nuclear ambitions, influence and threaten the security of countries around them that either already have some nuclear technology or have the funding to acquire nuclear technology and weapons.

North Korea's nuclear ambitions, for example, affect the Republic of Korea and Japan. These are two of 30-plus countries under the US nuclear umbrella.[36] Japan has the technological knowledge to build nuclear weapons if it chooses.[37] In the Middle East, Iran's drive to acquire nuclear weapons has inspired other Middle Eastern countries, such as Saudi Arabia, Egypt, and Turkey, to consider pursuing enrichment capabilities.[38]

Prestige is an important consideration in future nuclear negotiations. Many countries, including the UK, France, India, Pakistan, Iran, and North Korea, see nuclear weapons not only as part of their national security policy but also as important status symbols, providing them influence in the international community and a seat at the table with the United States, Russia, and China. Asking these countries to give up their nuclear weapons and perceived political status in international relations will complicate all future nuclear arms negotiations directed toward that end.

Ironically, democracy will add one of the biggest unknown variables to all future negotiations. With elections held at periodic intervals throughout the various democratic countries around the world, internal politics of the moment can almost instantly change the direction a country takes regarding nuclear weapons, for example, the change of direction between the Bush and Obama administrations. The various NATO allies can easily change their stance on nuclear weapons and forward deployment of US nuclear weapons within their borders. The recent Japanese election demonstrates how an administration can take a significantly different approach, as demonstrated by its recently launched probe into reported "secret nuclear pacts" with the United States.[39] While all regimes, democratic or autocratic, can change their nuclear ambitions based on an opponent taking power, this is more likely to occur within democracies.

Another potential problem is that verification of compliance by 9–10 different nuclear-armed countries will slow progress and complicate nuclear disarmament talks. Current bilateral US and Russian negotiations have yielded an accepted inspection protocol that works in the current environ-

ment. However, future multinational negotiations may present numerous new questions:

- Can 10 different states agree upon a rigorous and adequate verification regime?
- What kind of international inspectorate can be formed?
- Will each state be willing to open its territory to adequate types of inspections?
- What role will the UN play in treaty execution?
- How does the United States manage and verify stockpiles to ensure other nuclear states do not reweaponize?
- How do we prevent countries from breaking their treaty obligations, thereby gaining strategic advantages denied to others?
- As we disarm further, can we ensure protection for allies currently under the US nuclear umbrella?
- Will these countries pursue their own nuclear weapons as the US nuclear force shrinks?
- Will US allies' foreign policies change in favor of nuclear neighbors, making the United States less secure?
- Is there an alternative other than nuclear protection that the United States can substitute?

This discussion identifies some of the players and future questions that must be considered in forging new nuclear arms reduction agreements, along with the dynamics in play within and among the nuclear nations. It is easy to understand why President Obama does not see a world free of nuclear weapons as happening within his lifetime. With the rapid spread of nuclear energy and weapons technology, we are about to enter a new world of arms negotiations much different from what we have practiced with the Russians. This means we may be on a path to reduce our weapons and delivery systems to levels closer to other nuclear-armed countries in the next decade or so. If this happens, we will then enter an era with multiple countries possessing relatively equal numbers of nuclear weapons, while others still seek to acquire nuclear weapons.

When we negotiate with these multiple nuclear powers in the future to bring our warhead numbers below 1,000 to around 500, we will be

negotiating less from the position of superior numbers and relative strength and more from relative parity. This will require a dramatic shift in the US national security outlook. Indeed, should such deep cuts be taken, we will have fewer warheads and delivery vehicles than we have had since the 1950s, and more countries will possess or be seeking to acquire nuclear weapons.

The Road to Zero

As discussed, the road to zero nuclear weapons is complex, with multiple actors, numerous and varying national security concerns, and dynamic and ever-changing internal national politics. There are many "suggestions" on how the world can get to zero, ranging from immediate unilateral disarmament by the United States to a new nonproliferation treaty where all nuclear countries sign a commitment to eliminate their nuclear weapons. The suggestions in the Shultz, Perry, and Kissinger article are a good place to start, but the discussion must continue and the thought be refined as time and conditions change. President Obama's commitment to "maintain a safe, secure and effective arsenal to deter any adversary, and guarantee the defense of our allies," suggests a graduated strategy of "momentum, to minimize, and marginalize," nuclear weapons.[40]

Momentum in a classical physics sense is mass times velocity. For this discussion the momentum of nuclear disarmament at the start of 2011 was zero, because until the new treaty took effect there was no inspection regime in place to ensure the two major nuclear powers were living by previous agreements. The first step toward returning momentum to the process is the New START. The positive effect of having in place accepted, verifiable inspection protocols is well worth the suggested reduction in nuclear warheads and delivery vehicles for both countries.

To add momentum, the two countries must bring tactical nuclear warheads into their nuclear arms negotiations, as recommended by the US Senate. By agreeing to minimize the number of these weapons through negotiations, we bring the entire nuclear arsenals of both countries to the table. Using established negotiation procedures, the United States and Russia can begin to first clearly define, then count, and ultimately set limits and inspection criteria for these weapons. Once all nuclear weapons are included in future nuclear arms reduction talks, more momentum can be added by including additional countries in the process.

With negotiation and inspection protocols established for all nuclear weapons as a foundational framework, the next two countries added to negotiations would be the United Kingdom and France. As nuclear members of NATO and close to the Russian homeland, these two countries can directly threaten Russia. By bringing in the UK and France, we can build trust with Russia to establish an acceptable balance of tactical and strategic nuclear warheads as we continue to minimize the numbers required by each side to around 1,000. To go below 1,000, the next biggest owner of nuclear weapons, China, would need to be brought into the negotiations.

To gain the trust of the Chinese, we must recognize them as full partners in the negotiations as NATO and Russia minimize their arsenals to approximately 500 tactical and strategic warheads. Momentum has been added to the process by adding the mass of new countries while maintaining velocity by continuing to reduce the overall number of weapons. With the five NPT signatories engaged in negotiations, it is time to start marginalizing the weapons.

The first step of marginalization would be a reaffirmation of the Nuclear Non-Proliferation Treaty with a commitment to move toward zero nuclear weapons, starting with all warheads not delivered by ballistic missile (currently defined tactical nuclear weapons and those delivered by long-range bombers). The next step would be for these countries, including the United States, to ratify the Comprehensive Nuclear Test Ban Treaty. This would prevent testing new capabilities, and over time, each country would begin to lose its nuclear expertise with regard to weapons design. Another move toward marginalization would be to share missile defense technology among these five nations. The advancement of missile defense technology is critical in providing security to our allies currently dependent on the US nuclear umbrella. With a commitment to reduce tactical nuclear weapons to zero, missile defense technology would become more effective, because it is most effective against ICBMs, SLBMs, and shorter-range ballistic missile delivery vehicles. With the five NPT signatories agreeing to acceptable negotiation and inspection standards, it is time to add more momentum by adding more countries.

The next countries to be added should be those with the technology and ability to create nuclear weapons but which have chosen to pursue a zero nuclear weapons policy. Such countries as South Africa, Brazil, and Japan would be brought into the process as monitors, offering nonnuclear countries representation at the negotiation tables to provide accountability and

incentive for those countries not to develop weapons. The next two nuclear countries to be added to the negotiations would be India and Pakistan. They need to be brought into negotiations together. To be part of the negotiations, they must accept the standards already established and become signatories to all previous treaties. India would be motivated to join this group for several reasons: first, the prestige of being recognized as a nuclear power by the world; second, if China has missile defense technology that neutralizes many of India's warheads, then India will want the same capability to protect itself. Pakistan should quickly follow suit for similar reasons. While getting Pakistan and India to negotiate will be a challenge, the addition of the next two countries, Israel and Iran, appears nearly insurmountable.

Through minimization and marginalization of nuclear weapons, the momentum of the major nuclear powers moving toward zero should provide the impetus for aspiring and supposed owners of nuclear weapons to join the negotiations. Because their ballistic nuclear arsenals would be susceptible to neutralization by the missile defense capability of surrounding countries, there would be less motivation to maintain a ballistic nuclear capability. The problem of getting these two countries in the same room will be challenge enough, but even this obstacle appears more achievable than working with the last nuclear power, North Korea.

North Korea will remain a special case until a change in leadership perhaps brings them back to normalized relations with the international community. Until that time, China will continue to have the preponderance of influence on North Korea and its nuclear arsenal. Six-party talks must resume and continue until North Korea can be brought into the greater international discussion of nuclear disarmament. With only a handful of nuclear weapons, North Korea remains part of the world's concerns, but it should not be a roadblock for the rest of the world to move toward zero.

Once all nuclear-armed nations are included in negotiations, efforts can begin to truly move the world to zero. With tactical nuclear weapons eliminated first and the major nuclear countries limited to 200–500 strategic nuclear warheads delivered by ballistic missiles, negotiations would focus on an inflection point. That inflection point is where there is an accepted balance of nuclear weapons that can be reduced to zero by all countries within a short period of time. For instance, if the NATO countries, Russia, and China were to reduce to a level of 250 strategic warheads each, they

may then rapidly agree to retire all their nuclear weapons, with all the other countries, within a couple of days. This would be the inflection point where instead of slowly reducing weapons over years, all weapons would be removed from service quickly. Once this inflection point is reached, inspection protocol and negotiations would need to continue, as it will take years for countries to completely dismantle all warheads. Monitoring and accounting of nuclear material produced by all nuclear powers will also need to continue, ensuring no country refines nuclear materials for weapons.

Compared to unilateral disarmament or a new grand treaty, which are suggested quick fixes to the nuclear disarmament challenge, this approach is a long process that incrementally builds momentum upon previous successes. This momentum is achieved by adding both "mass," or more countries to the negotiations, and "velocity," the deliberate act of reducing nuclear weapons in the world. Velocity is achieved by minimizing nuclear arsenals with an emphasis on eliminating tactical nuclear weapons first. Minimizing the numbers and types of nuclear weapons to hundreds of warheads delivered by ballistic missiles would allow further marginalization through shared ballistic missile defense technology. Additionally, eliminating nuclear weapons tests will reduce reliability and over time the skilled scientific force in nuclear design, limiting each country's capability to build new weapons. Nuclear weapons will also become marginalized by new technologies in warfare that cause less collateral damage, such as cyber warfare and lasers. The process of building momentum while minimizing and marginalizing nuclear weapons takes small but achievable steps toward moving the world to zero while maintaining an acceptable balance of power and deterrence capability among the many nations.

From this discussion it is obvious the concept of "momentum, minimization and marginalization" is not the panacea to solve the nuclear disarmament challenge. This approach does not directly address changing internal politics of each nation, except that the momentum of adding more countries to the process will make it more difficult for nations to renounce a ratified treaty. While it does not directly address all the concerns of allies currently under the US nuclear umbrella, it does confront a most important issue: tactical nuclear weapons.

Significance of Tactical Nuclear Weapons

While implementation of the New START will create momentum in the disarmament process, the first big challenge is minimizing tactical nuclear weapons. To understand this challenge we must understand the context in which we now operate. While other nuclear nations are upgrading their delivery systems and replacing old warheads, the United States has self-imposed a freeze on the replacement of its nuclear stockpile.[41] Also, because of its geographic location and historical context, its stockpile of nuclear weapons is considered strategic, while the preponderance of other nuclear weapons around the world are considered tactical. This is an important factor, as the New START only addresses strategic weapons, allowing Russia to retain an advantage in its tactical nuclear weapons inventory.[42]

As defined by the United States and Russia, the simple difference between strategic and nonstrategic or tactical nuclear weapons is the difference in the range of delivery vehicles. ICBMs, SLBMs, and long-range bombers with the intercontinental range to destroy military, industrial, and leadership targets in each other's homelands are considered strategic nuclear weapons. Those weapons not having the ability to reach the US or Russian heartlands when launched from the other's home soil are considered tactical nuclear weapons.[43] While there are some exceptions to this definition, it is important to realize that under the Strategic Arms Limitation Talks (SALT) I, SALT II, START, START II, the Strategic Offensive Reduction Treaty (SORT), and the New START, only strategic warheads and delivery systems (ICBMs, SLBMs, and long-range bombers) are considered. This excludes Russia's large nonstrategic weapons arsenal, estimated at 2,000 to 6,000 tactical nuclear weapons, from the negotiations.[44]

The actual number of Russian nonstrategic nuclear weapons is difficult to estimate. In its 2009 yearbook, *Armaments, Disarmament and International Security*, SIPRI places Russian operational numbers as few as 2,047 deployed tactical warheads. Of these, 701 are assigned to missile-defense interceptors. The remaining nonstrategic weapons are offensive, including 648 weapons for delivery by land-based bombers like the Tu-22M Backfire and Su-24 Fencer. Further, the Russian Navy possesses 237 tactical nuclear weapons to be delivered by naval aircraft and 276 on sea-launched cruise missiles. Another 185 tactical nuclear weapons are dedicated to antisubmarine warfare and surface-to-air missiles.[45]

These numbers are in contrast to the 400 US operational nonstrategic weapons—all B-61 gravity bombs delivered by fighters and bombers.[46] Excluding missile-defense warheads, the Russians have a three-to-one numerical advantage over the United States in tactical nuclear weapons. However, these shorter-range weapons, if based on Russian soil, cannot reach the continental United States. They would primarily concern states along Russia's periphery in Asia and Europe.

While the United States and Russia have negotiated an understanding and definition of strategic nuclear weapons, it is difficult for most countries in Europe and Asia to distinguish between Russia's strategic and tactical nuclear weapons. To countries like Estonia, South Korea, or Japan, one low-yield "tactical" nuclear weapon delivered by a missile or fighter aircraft would have devastating strategic implications.

These tactical nuclear weapons present additional challenges to negotiations and proliferation. They are, on average, smaller than strategic weapons and present multiple challenges. Smaller weapons are easier to hide, complicating verification of treaty limits. Unlike a bomber, ICBM, or SLBM force, tactical nuclear weapons are easily moved, contributing to counting and verification problems. Finally, the relatively low yield of some of these weapons may increase the likelihood of their use in certain crisis contingencies. This can improve deterrence effects but might also tempt decision makers to use them more readily.

Tactical nuclear weapons spread around the world put the United States in a difficult strategic position. If positioned near US territory, either clandestinely or on mobile platforms, these "tactical" weapons could become in effect, "strategic."

To move the discussion forward and include all nuclear countries, the definition of tactical and strategic nuclear weapons must be streamlined. A suggested modification would be the removal of range or ability to reach each other's homelands from the definition. A streamlined definition based on delivery vehicles would not change current agreements but would make the definition more relevant to all countries in future negotiations. Strategic nuclear weapons would continue to be identified as those delivered by any type of ballistic missile or bomber aircraft. All other nuclear weapons would be considered tactical, with the exception of Russia's nuclear missile defense, which should be included as a missile-defense capability. In follow-on negotiations, the United States must engage Russia on the issue of tactical nuclear weapons (not currently accounted for in

the New START). History demonstrates that when negotiating with the Russians, one must start from a position of relative strength. Unfortunately, the United States is currently at a numerical disadvantage, with some experts advocating an even weaker position.[47]

These experts argue that NATO should reduce its reliance on nuclear weapons and pursue a nuclear posture review ultimately leading toward nuclear disarmament.[48] While the goal is nuclear disarmament, the approach is short sighted. Russians traditionally take a zero-sum-game position in negotiations. If NATO unilaterally reduces its reliance on nuclear weapons, specifically forward-deployed US tactical nuclear weapons, there would be no immediate incentive for the Russians to reduce their arsenal. Conversely, the Russians would view this move as a sign of weakness and demand additional nonrelated concessions as incentives to reduce their tactical nuclear arsenal

Ultimately, the NATO summit in Lisbon last year took a typically multinational political approach of reaffirming its reliance on nuclear weapons for deterrence and defense, while committing to a strategic review of NATO's nuclear posture.[49] By maintaining a strong tactical nuclear capability in Europe, the United States can continue to provide a nuclear umbrella to its allies while presenting a bargaining chip for discussion with the Russians. This commitment to nuclear weapons as a deterrent is needed to engage the Russians in a discussion on reducing tactical nuclear arsenals. These force structure considerations will become critically important as the United States determines how it will configure its forces with an ever-shrinking nuclear arsenal.

Impact of Reductions on the United States in the Near Future

No matter what approach is taken in moving the world toward zero nuclear weapons, the path will be long and challenging. This time period will be dangerous, and the United States must be prepared to ensure its security by maintaining "a safe, secure and effective arsenal to deter any adversary, and guarantee the defense of our allies."[50] To maintain a safe, secure, effective arsenal, we must understand where we are and where we will be in the near future.

Upon implementation of the New START, the United States will find itself in a unique situation. Unlike Russia and China who have chosen to

modernize their nuclear arsenals, or countries like India, Pakistan, and Iran who have recently developed or are developing new weapons, the United States has chosen a path of "life extension" for its weapons.[51] This approach can be complicated, as some components originally developed for these weapons are no longer manufactured.[52] This new paradigm of parity in numbers, more nuclear nations, and an aging US arsenal will present numerous challenges to the United States over the coming decades.

First, moving below 1,000 strategic warheads and toward 500 or fewer delivery systems will require the Department of Defense to make difficult force structure decisions.[53] A reduction to the levels Russian president Dmitry Medvedev proposed in September 2009 would force the United States to look seriously at reconfiguring its current strategic triad of ICBMs, SLBMs, and long-range bombers, while considering the inefficiencies of maintaining three separate weapons systems in small quantities.[54]

There are numerous approaches the United States might take in apportioning its nuclear weapons and delivery systems. An in-depth study will be required to optimize deterrent effects of the US nuclear arsenal following any future arms treaties, but two general approaches will most likely be considered. The first is an across-the-board reduction in all weapons systems to include ICBMs, bombers, and SLBMs. Another more likely approach will be to completely eliminate one leg of the triad. Each leg possesses strengths and weaknesses and adds a certain element of deterrence that translates into retaliatory strength. If we look for guidance from other nations, such as Great Britain, that have trimmed their nuclear arsenals over the years, it appears SLBMs will be the weapons system of choice. The primary advantage of the SLBM force is its likely survivability from a surprise first strike. The downside is the "all of your eggs in one basket" syndrome. Advances in antisubmarine warfare may materialize in the future, threatening the survivability of US submarines. If so, the US preponderance in nuclear capability could be lost. Indeed, a single submarine malfunction might instantaneously bring its 24 missiles off alert.[55] If there were a defect in a missile or warhead type, then all US SLBMs could possibly be rendered useless. Therefore, it would be prudent for the United States to maintain some semblance of diversity in its nuclear arsenal.

Even though the Air Force is revitalizing its nuclear enterprise, the nuclear strategic bombing mission may be lost. While the secretary of defense committed to developing "a long-range, nuclear-capable penetrating bomber" in his 6 January 2011 Statement on Department Budget and

Efficiencies, it will be a while before the efficiencies are realized and the bomber is operational. During that time the aging US bomber fleet and a bomber on the drawing board would be easy force structure modification targets, either for "efficiencies" or negotiations. The loss of bombers would lead to a dyad of US nuclear weapons and eliminate an important signaling capability. Our bomber forces can signal willingness (an important part of deterrence) to use nuclear weapons and unlike other legs of the triad, bombers can be both launched and recalled. Without a bomber force, this traditional signaling mechanism could be lost. A potential solution is for Air Force fighters to assume more of this role.

To maintain some semblance of a triad and provide the necessary deterrence effects and security for our allies, the fighter community could ultimately pick up more of the airborne nuclear weapons delivery mission formerly provided by heavy bombers. With the new joint strike fighter becoming the Air Force's weapons system of choice, its mandated nuclear weapons delivery capability will be a vital part of its mission.[56]

As a joint strike fighter, the F-35 will also be flown by the US Navy. The Navy has maintained a strong nuclear infrastructure through its nuclear power plants and ballistic-missile submarine force. This expertise could be leveraged to provide a mobile tactical nuclear capability in times of crisis through carrier operations. Navy nuclear-capable joint strike fighters, flown from carriers, would eliminate foreign basing challenges. Another alternative in line with the Air Force chief of staff's call to "institutionalizing the thinking of the Air-Sea Battle concept," Air Force F-35 units could maintain tactical nuclear delivery capability and carrier qualifications.[57] In a time of crisis Air Force aircraft and weapons would be moved to carriers to demonstrate resolve and provide a signaling device.

In addition to interoperability between the Air Force and the Navy, many of our closest allies in Europe and Asia plan to purchase and fly the F-35. The ability to show resolve through F-35 nuclear deployment and delivery capability will deter potential adversaries and help provide a flexible, deployable nuclear deterrent critical to our US national defense.

While deterrence is the primary reason to maintain a reliable, visible nuclear force, a secondary effect of using the F-35 in a more robust nuclear role is the ultimate elimination of tactical nuclear weapons. The supportability of nuclear-capable fighters worldwide adds additional impetus to negotiate elimination of tactical nuclear weapons by all nuclear-armed countries. The ability to deploy globally, either to allied F-35 airfields or

onboard Navy carriers, would counterbalance the Russian navy's nuclear capability while also providing another bargaining chip for negotiating with Russia, China, and other countries on the reduction and eventual elimination of tactical nuclear weapons.

If F-35s are to play the nuclear-deterrent role traditionally filled by bombers, it would be wise to continue to deploy most of the estimated 200–350 forward-based nuclear bombs in NATO countries.[58] A firm commitment to this position by NATO would set the groundwork for negotiations with Russia on tactical nuclear weapons. This strategic shift away from a triad of ICBMs, SLBMs, and long-range bombers to one consisting of ICBMs, SLBMs, and deployable new fighters would solve the problem of the aging nuclear bomber fleet while maintaining the same deterrence capabilities inherent in an airborne force. At the same time this move would add momentum to the discussion of tactical nuclear disarmament. Bringing tactical nuclear weapons to the negotiating table is the first real step toward true nuclear disarmament.

Conclusion

In April 2009, President Obama set the nation on the path toward the eventual long-term goal of zero nuclear weapons. Nuclear disarmament has been a worldwide goal since the Nuclear Non-Proliferation Treaty was opened for signature in 1970. Over the years, states have taken numerous positive steps toward that end, with the New START further reducing both the US and Russian nuclear arsenals. Perhaps in later rounds, after the current treaty, the two sides may agree to levels below 1,000 strategic warheads. Crossing the 1,000 threshold will open a new, more complicated era of nuclear arms negotiations.

It will take time to understand the different players, motives, and issues each new country brings to the table. The challenge is to coordinate the step-by-step disarmament of the nine current members of the nuclear weapons club while simultaneously attempting to dissuade others from "going nuclear." New challenges on the path to zero may emerge as allied nations consider acquiring nuclear weapons to make up for a perceived loss of US umbrella protection or as other nations see an opportunity to increase their relative military and political power and prestige.

To counter these unintended consequences, it is important to negotiate with all of the world's nuclear-armed nations through a process of building

momentum on previous successes by minimizing the number of nuclear warheads while ultimately marginalizing their utility. However, even if all nuclear-armed nations begin negotiations today, total disarmament will require a long time. During this protracted period of negotiations, we will find ourselves in a world with a group of countries that possess a relatively large and growing number of nuclear weapons.

The preponderance of weapons in this new environment will be so-called nonstrategic or tactical nuclear weapons maintained primarily by Russia. This imbalance will present a different dimension to the US national security posture and force structure. The United States will have to make tough choices as negotiations further limit delivery vehicles and warheads. With bombers the most likely losses to the strategic retaliatory forces, the Air Force will need to focus more on its tactical nuclear mission. Also, the Navy could pick up an airborne nuclear delivery capability under the new air-sea battle concept that would resolve many of the current bomber and forward land-basing issues.

The United States has embarked on a path to a nuclear-free world. Its challenge is finding a path that maintains an acceptable balance of power between nations while providing an appropriate level of deterrence. Any realistic path will be fraught with unknown challenges, numerous new actors, and dynamics that will yield surprises while moving toward the ultimate goal of national security and total nuclear disarmament. **SSQ**

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