An Arms Control Association Report

The Unaffordable Arsenal

Reducing the Costs of the Bloated U.S. Nuclear Stockpile

October 2014

By Tom Z. Collina and the Arms Control Association Research Staff

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Cover Photo

The USS *Ohio* undergoes an overhaul at the Puget Sound Naval Shipyard and Intermediate Maintenance Facility in Washington state on March 15, 2004. Credit: Wendy Hallmark/U.S. Navy

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Executive Summary

The United States currently plans to spend at least $355 billion to maintain and rebuild its Cold War-era nuclear arsenal over the next decade, according to the nonpartisan Congressional Budget Office (CBO). Over the next 30 years, the bill could add up to $1 trillion, according to another independent estimate.

These eye-popping projections come at a time when the U.S. defense budget is declining along with the role of nuclear weapons in defense strategy.

In 2011, Congress approved the Budget Control Act, which requires significant reductions in Defense Department spending from current projections over the next decade.

With this in mind, an independent Federal commission recently called the plans for modernizing the U.S. nuclear arsenal "unaffordable" and a threat to "needed improvements in conventional forces."

New international security challenges are demanding U.S. military and diplomatic attention around the globe—from Russia's interference in Ukraine, the growing threat of extreme terrorism in Iraq and Syria, and the Ebola virus in Africa.

In response, some are calling to bust the budget caps and increase defense spending. But given that Congress would need to agree to such a major change—an unlikely prospect—it would be wise to plan for fewer defense dollars over the next ten years at least.

Fortunately, there is a sizable chunk of the Pentagon budget that can be safely cut back: the U.S. nuclear arsenal.

None of the highest priority threats facing the United States can be effectively resolved with nuclear weapons or the buildup of nuclear capabilities. And the U.S. nuclear force remains far larger than is necessary to deter nuclear attack against the United States or its allies.

The Pentagon announced in 2013 that it could reduce strategic nuclear forces by one-third below levels set by the 2010 New START Treaty, continuing a historical trend. The U.S. nuclear stockpile has dropped by 80 percent since its peak in 1967, but is still a formidable force of about 4,800 warheads.

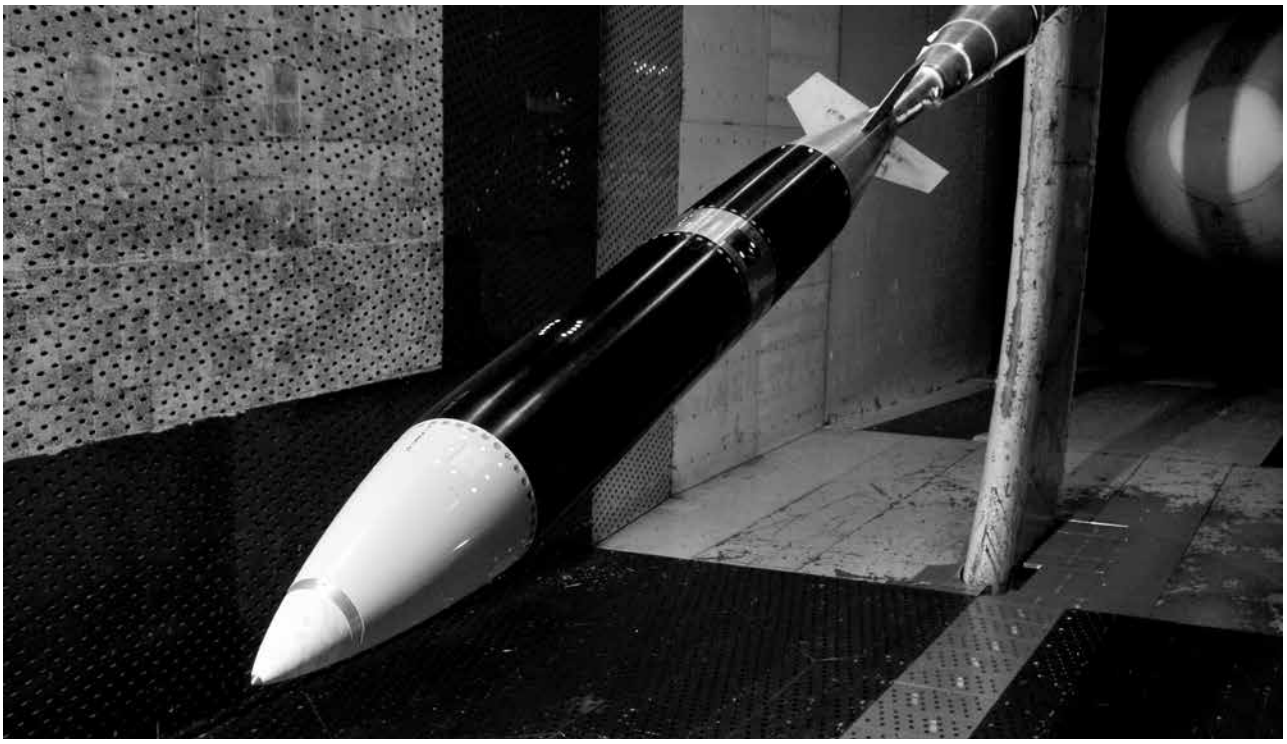
The increasingly high cost of nuclear weapons, combined with shrinking budgets and stockpiles, should compel the executive branch, Congress, and the American public to rethink current plans to rebuild U.S. nuclear forces in the years ahead.

Now is the time to reevaluate these plans before major budget decisions are locked-in. Acquisition programs are just getting off the ground and can be scaled back. The Obama administration is conducting an interagency review of long-term nuclear weapons modernization plans with a view toward finding needed savings.

The current nuclear shopping list is long. The Navy wants to buy 12 new ballistic missile submarines with a total production cost of about $100 billion. The Air Force is seeking up to 100 new, nuclear-capable strategic bombers that would cost about $80 billion, as well as land-based intercontinental ballistic missiles and new air-launched cruise missiles. The Energy Department's National Nuclear Security Administration (NNSA) is pursuing a $60 billion plan to upgrade five nuclear warhead types, including the B61 gravity bomb.

The Navy and the Air Force say that planned budgets will not pay for these systems, and are seeking additional funds. It is not clear where that money would come from.

This report outlines common sense ways to save roughly $70 billion over the next decade across all



NNSA

A mock-up of a B61-12 gravity bomb awaits testing by engineers from Sandia National Laboratories in a wind tunnel at the Arnold Engineering Development Center in Tennessee on February 20.

three legs of the "triad" and the warheads they carry. The Pentagon can scale back or delay expensive new delivery systems and take a more disciplined approach to rebuilding nuclear warheads, as follows:

- Scale-back plans to replace the existing fleet of Ohio-class nuclear-armed submarines by buying eight boats instead of twelve (saves $16 billion over ten years);

- Delay plans for building new nuclear-capable bombers ($32 billion in savings);

- Cancel the air-launched cruise missile ($3 billion in savings);

- Scale-back the B61 bomb life extension program ($4 billion in savings);

- Refurbish existing land-based ballistic missiles rather than build an entirely new system ($16 billion in savings).

Figure A: Current and Planned U.S. Nuclear Forces

Over the next 30 years, the United States plans to replace nearly all of the submarines, bombers, and missiles in its nuclear triad. The effort is estimated to cost at least $30 billion per year, for a total of nearly $1 trillion.

SERVICE	SYSTEM	CURRENT SYSTEM	PLANNED SYSTEM
Navy	*Submarines*	Ohio-class (Trident) submarine	Ohio-class replacement
	Missiles	Trident II (D-5) missile	Trident II life extension
Air Force	*Missiles*	Minuteman III ICBM	Life extension or replacement missile for Minuteman III
Air Force	*Bombers*	B-52 bomber B-2 bomber	Long-range strike bomber
	Weapons	Air-launched cruise missile	Long-range standoff cruise missile
		B61 bomb	B61 life extension

Source: U.S. Department of Defense; U.S. Department of Energy

The United States can save this money while still maintaining the triad of delivery systems and the number of nuclear warheads it plans to deploy under the 2010 New START Treaty by fielding warheads in a more cost-effective way. Additional nuclear stockpile cuts, such as those proposed by President Obama in 2013, would allow for more savings.

To address high priority and emerging threats, the United States does not have to break the congressional budget deal and increase defense spending. Instead, Washington can safely reduce spending on nuclear weapons and redirect funds to where they are needed most.

Introduction

Over the next 30 years, the United States plans to rebuild its "triad" of nuclear delivery systems—land-based missiles, submarines, and bombers—and the warheads they carry. But the expected price tag for this new generation of weapons is rising just as the defense budget is tightening. Current plans to modernize the triad are simply not sustainable in an age of budget constraints.

Faced with increasing pressure to reduce military spending, a bipartisan, independent report commissioned by Congress and the Defense Department recently called the Obama administration's plans to rebuild the nuclear arsenal "unaffordable" and a threat to "needed improvements in conventional forces."[1]

The July report, "Ensuring a Strong U.S. Defense for the Future" by the National Defense Panel, found that current plans to modernize all three legs of the nuclear triad would have a "substantial cost" of $600 billion to $1 trillion over 30 years.

The panel, which supports retaining the triad, states that "the merits of some aspects of this expensive recapitalization can be debated," and calls on the administration and Congress to "urgently and jointly" conduct a nuclear review to "find cost-efficient ways to modernize the force."

The Barack Obama administration is already moving in this direction, and announced in August that it is overseeing an interagency review of its multibillion-dollar plans to modernize the U.S. nuclear arsenal.[2] "This is Obama's legacy budget," a senior administration official told the New York Times. "It's his last chance to make the hard choices and prioritize."[3]

U.S. nuclear weapons do not address today's most pressing security threats, including extreme terrorism, unsecured nuclear material and dangerous pathogens, and the further spread of nuclear weapons. Moreover, the size of the U.S. nuclear force exceeds what the U.S. military believes is necessary to deter nuclear attack against the United States and its allies.

The United States needs to sustain a strong international coalition to secure nuclear materials across the globe and turn back nuclear programs in Iran and North Korea. Continued U.S. and Russian arms reductions are essential to achieving these goals in the future.

Twenty-five years after the end of the Cold War, the United States can ill-afford to spend more than necessary on nuclear weapons, especially if it comes at the expense of other, more urgent defense and national security programs.

Contrary to the claims of some, nuclear weapons are not "cheap." Independent estimates of total U.S. spending on nuclear weapons, which include significant costs borne by the Department of Energy's National Nuclear Security Administration (NNSA), add up to $355 billion over the next decade, according to the nonpartisan Congressional Budget Office (CBO), and may rise to $1 trillion over 30 years as older delivery systems and warheads are replaced.[4]

For example, the U.S. Navy wants 12 new ballistic missile submarines that would cost about $100 billion to build. The Air Force is seeking up to 100 new, nuclear-capable strategic bombers for at least $80 billion, as well as new land-based ballistic missiles and air-launched cruise missiles. NNSA plans to spend more than $60 billion for a new family of "interoperable" warheads for the arsenal.

Meanwhile, sequestration limits on defense

spending will force budget trade-offs among various Pentagon programs. For example, the defense budget still needs to be cut by $115 billion from 2016-2019 to meet sequester targets, or about $29 billion per year on average. The actual funding shortfall could be as large as $200-300 billion, according to some estimates.[5]

Now is the time to reevaluate these plans, before major budget decisions are made. This report outlines ways to save roughly $70 billion over the next decade across all three legs of the triad and the warheads they carry. To save needed funds, the Pentagon can scale back or delay expensive new delivery systems and take a more disciplined approach to rebuilding the nuclear warheads that will remain in the arsenal even as deeper nuclear reductions are pursued in the years ahead.

The money-saving approach described here would not require the United States to negotiate new nuclear arms reduction agreements, but only to take advantage of those already in force. Even if the United States stays at nuclear warhead levels set by the 2010 New START Treaty indefinitely, it can save billions by buying fewer delivery systems, delaying procurement schedules, and scaling back warhead rebuilds. Additional nuclear stockpile cuts, such as those proposed in 2013 by President Obama, would allow for more savings.

Over the last 40 years, the United States and Russia have reduced their stockpiles of nuclear weapons to the benefit of U.S., Russian and global security. Successive administrations, on a bipartisan basis, have reduced the U.S. nuclear arsenal as a way to verifiably draw down Russia's arsenal, build international support for nonproliferation, and save money. These rationales still hold true today.

Current tensions between the United States and Russia over Ukraine and Moscow's compliance with the 1987 Intermediate-Range Nuclear Force (INF) Treaty may delay future arms control agreements, but should not reverse the overall trend toward smaller nuclear arsenals. The United States and its allies have responded to Russian moves in Ukraine and Crimea primarily with diplomacy and economic tools and secondarily by shoring up NATO conventional forces. Beyond symbolism, nuclear forces have not played a role in the crisis.

The U.S.-Russian arms reduction process has weathered similar crises, such as the Soviet invasion of Afghanistan in 1979, Russian non-compliance with the Anti-Ballistic Missile (ABM) Treaty in the 1980s, and U.S. withdrawal from the ABM Treaty in 2002. Further U.S. and Russian nuclear arms reductions are likely, with or without treaty negotiations, because they are in the mutual security interest of both nations.

Some members of Congress, however, claim that arms reductions have gone far enough and, despite their long history of success, should not continue.

These arguments ignore the fact that additional arms reductions have important benefits, including the prospect of a smaller Russian arsenal, engaging other nuclear-armed states in the nuclear-risk reduction enterprise, building a stronger international coalition against nuclear terrorism and the spread of nuclear weapons, and saving tens of billions of dollars.

Nuclear arms control has made sense to seven presidents of both parties over five decades. It still makes sense today.

Figure B: Final New START Force Structure

The Defense Department announced its plans in April for nuclear arsenal reductions under the 2010 New Strategic Arms Reduction Treaty (New START) with Russia. New START limits each side to 1,550 accountable strategic nuclear warheads deployed on 700 long-range delivery vehicles, composed of intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and long-range bombers. The treaty also limits each country to 800 deployed and nondeployed missile launchers and bombers. The United States and Russia have until Feb. 5, 2018, to reach these limits.

STRATEGIC DELIVERY VEHICLES	2013 DEPLOYED DELIVERY VEHICLES	2014 DEPLOYED AND NONDEPLOYED LAUNCHERS AND BOMBERS	2018 DEPLOYED DELIVERY VEHICLES	2018 DEPLOYED AND NONDEPLOYED LAUNCHERS AND BOMBERS
Minuteman III ICBMs	448	454	400	454
Trident II D-5 SLBMs	260	336	240	280
B-2A/B-52H Bombers	89	96	60	66
TOTAL	**797**	**886**	**700**	**800**

Source: U.S. Department of Defense, U.S. Department of State

SECTION 1

Nuclear Reductions Save Money

"[A]s we transform our military, we can discard cold war relics and reduce our own nuclear forces to reflect today's needs."

—President George W. Bush, February 2001

"We have every incentive to reduce the number [of nuclear weapons]. These are expensive. They take away from soldier pay. They take away from [operation and maintenance] investments. They take away from lots of things. There is no incentive to keep more than you believe you need for the security of the Nation. "

—Secretary of State Colin Powell, June 2002

The United States plans to spend at least $355 billion to maintain and rebuild its nuclear arsenal over the next decade, according to a Dec. 2013 report by the nonpartisan Congressional Budget Office (CBO). Over the next 30 years, the bill could add up to $1 trillion, according to another independent estimate.

The largest share of the projected costs for nuclear delivery systems would go to strategic submarines. The Navy wants to buy 12 new ballistic missile submarines with a total production cost of about $100 billion. The Air Force is seeking up to 100 new, nuclear-armed strategic bombers that would cost about $80 billion, as well as new intercontinental ballistic missiles and air-launched cruise missiles. The Energy Department's National Nuclear Security Administration (NNSA) is also pursuing a $60 billion plan to upgrade five nuclear warhead types, including the B61 gravity bomb.

These eye-popping projections come at a time that defense budget growth is declining, and spending on these weapons systems at these levels cannot be sustained. And given the declining role of nuclear weapons in U.S. defense strategy, planning to maintain an unaffordable, Cold War-sized force is unnecessary.

It is not too late, however, to chart a different course. The Departments of Defense and Energy are in the process of making long-term, multi-billion dollar decisions about how many new missiles, submarines, bombers and nuclear warheads the nation will build and deploy over the next 30 years. These plans should be reevaluated before major budget decisions are locked in.

Arms Reductions Create Opportunity

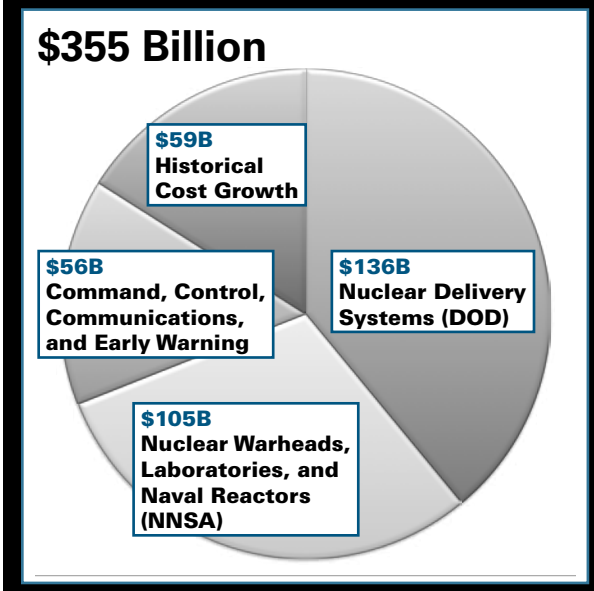
Fortunately, ongoing U.S. and Russian nuclear arsenal reductions under New START open the door to major budget savings at this pivotal time.

The U.S. nuclear stockpile has dropped by 80 percent since its peak in 1967, but is still a formidable force of about 4,800 warheads.[6] The arsenal's high cost, combined with shrinking budgets, stockpiles, and missions, should compel the Pentagon to rethink its oversized plans to rebuild U.S. nuclear forces in the years ahead.

The United States maintained a total nuclear stockpile of 4,804 warheads as of September 2013.[7] This includes a deployed arsenal of about 2,100 strategic and tactical warheads and associated delivery systems--missiles, submarines, and bombers--and the rest in reserve.[8] As of 2014, the U.S. government reported that there are approximately 1,642 New START-accountable deployed nuclear warheads.[9]

New START will take the United States and Russia down to 1,550 treaty-accountable, deployed strategic warheads by 2018. Other than Russia, the only potential U.S. adversary with a long-range nuclear capability is China, which has no more than 75 single-warhead, intercontinental ballistic missiles,

Figure C: Estimated Costs of U.S. Nuclear Forces, 2014-2023



Source: Congressional Budget Office, *Projected Costs of U.S. Nuclear Forces, 2014 to 2023*, Dec. 2013. The $355 billion does not include environmental, arms control, nonproliferation or missile defense costs, which would add $215 billion to the total.

according to the Pentagon.[10]

In June 2013, President Obama announced the United States would pursue a new agreement with Russia to further reduce strategic weapons, as well as to reduce tactical weapons. The U.S. military leadership has determined it can reduce deployed strategic warheads to 1,000-1,100, or about one-third below New START levels.

Renewed U.S.-Russian tensions and domestic political opposition may delay nuclear force reductions for some time. Nevertheless, the United States can maintain New START warhead levels and still achieve significant cost savings over the next decade and beyond by making smarter choices regarding nuclear weapons spending.

A More Cost-Effective Approach

This analysis describes realistic, common sense options for reducing U.S. military spending on nuclear weapons that would save U.S. taxpayers about **$70 billion** from FY 2014-2023 (see Figure D). The baseline for this analysis is the CBO estimate of current plans to maintain U.S. nuclear forces, build a new "triad" of delivery systems (submarines, bombers, and missiles), and extend the service life of nuclear warheads.

These options take advantage of arsenal reductions under New START, but do not assume additional reductions beyond that. They are designed to meet New START warhead requirements in a more cost-effective way and to postpone major procurement decisions where possible. If the United States does implement additional arsenal reductions in the future (either by treaty or reciprocal reductions), further budget savings would be possible.

STRATEGIC SUBMARINES: 10-year savings, $16 billion

The United States Navy currently operates 336 Trident II D-5 SLBMs on 14 Ohio-class ballistic missile submarines (SSBNs) based out of Bangor, Washington (eight boats) and Kings Bay, Georgia (six boats). The Ohio-class submarines have a service life of 42 years, including a four-year, mid-life nuclear reactor refueling. Due to the refueling process and other maintenance, only 10-11 SSBNs are typically available for deployment at any given time. The Ohio-class SSBNs were launched between 1983 and 1996 and will be retired at a rate of approximately one boat per year between 2027 and 2040.

The Navy plans to replace the retiring boats, starting in 2031, with a new class of 12 ballistic missile submarines, referred to as the SSBN(X) or the Ohio Replacement (OR). The Navy is seeking 12 rather than 14 because the new submarine will not need a four-year mid-life refueling, but only a two-year overhaul. This shorter overhaul means that only two SSBN(X)s (rather than three or four Ohio class subs) would be out of service at any given time during the middle years of the sub's life span.[11]

The Navy and NNSA will spend $82 billion on strategic submarines from 2014 to 2023, according to CBO, including $38 billion to operate the current fleet and $44 billion for the Ohio Replacement.

The Navy originally planned to start deploying the replacement boats in 2029, but in 2012 the Pentagon announced a two-year delay to the program, pushing back completion of the first SSBN(X) to 2031. As a result, the Navy will field only 10 ballistic missile submarines in the 2030s, and it is an open question whether the last two SSBN(X)s will be built in 2041-2042.

Current military requirements call for 10 strategic submarines to be operational at all times.[12] The eleventh and twelfth subs would not be needed until the first SSBN(X)s start to undergo extended maintenance after two decades of operation.[13] Such requirements, set by the president, are reportedly under review as part of the nuclear policy guidance issued in 2013.

Figure D: Nuclear Weapons Budget Savings Options, 2014-2023

	Current New START	Cost-Effective New START	10-year Savings
	1,550 deployed strategic warheads	1,550 deployed strategic warheads	Estimate, in billions
SUBMARINES			
Current Ohio-Class Sub	12 operational, retire 2027-2040	8 operational	$16
New Ohio-Replacement Sub, SSBN(X)	12 subs by 2042, procure first boat 2021	8 operational, first boat procured 2023	
	Total: $100 billion		
BOMBERS			
Current B-52 and B-2	60 operational into 2040s	60	—
New Bomber	Build 80-100, begin development	Delay development to mid 2020s	$32
	Total: $80 billion		
WARHEADS			
B61 Bomb Life Extension	Upgrade 400 bombs	Scale back scope and number	$4
	Total: $10 billion		
ICBMS			
Current Minuteman III ICBM	400 deployed into 2030s	400 deployed	—
New ICBM	Begin development	Delay development to mid 2020s	$16
	Total: $100-200 billion		
CRUISE MISSILES			
New Air-Launched Cruise Missile (ALCM)	Under review, development delayed	Cancel	$3
	Total: $20 billion		
TOTAL			**$71 billion**

The FY 2015 budget request for SSBN(X) development is $1.3 billion, up from $1.1 billion in FY 2014. Building 12 SSBN(X)s would cost about $87 billion, CBO estimates, an average of $7.2 billion each. That includes $13 billion for the lead submarine and $6.7 billion each for the rest. Research and development would cost an additional $10 to $15 billion, for a total program cost of about $100 billion, CBO estimates.[14] The total lifecycle cost of the SSBN(X) program is estimated at $347 billion.[15]

The Navy now plans to purchase (or procure) the first SSBN(X) in 2021, the second in 2024, and one per year between 2026 and 2035. The first boat is scheduled to become operational in 2031.

Each current Ohio-class submarine serves as a launch platform for up to 24 Trident II D-5 Submarine-Launched Ballistic Missiles (SLBMs) that can hold up to eight warheads each. Under the New START treaty, by 2018 the Navy plans to deploy only 20 SLBMs on each Ohio-class submarine rather than 24. This will result in a total of 240 deployed SLBMs. The new SSBN(X) is expected to carry up to 16 SLBMs, for a maximum of 192 deployed SLBMs across a fleet of 12 submarines.

Budget Pressure

The Ohio Replacement submarine program is the most expensive piece of the nuclear modernization plan and, according to the Navy, the current plan to build 12 submarines and maintain a surface fleet of

300 ships is not affordable.

In its shipbuilding plan for fiscal year 2014, submitted to Congress in May 2013, the Navy warned that, to build the SSBN(X) fleet, it would have to forgo 32 conventional ships it is planning to build. The Navy stated that if it funds the submarines "from within its own resources," the program will "take away from construction of other ships in the battle force such as attack submarines, destroyers, aircraft carriers and amphibious warfare ships."[16]

In the fiscal year 2015 shipbuilding plan, submitted in July 2014, the Navy says its funding plan is "unsustainable," as it will peak at $24 billion in fiscal year 2032, almost twice the historical average of $13 billion per year. The report says that the Navy "can only afford the SSBN procurement costs with significant increases in our top-line or by having the SSBN funded from sources that do not result in any reductions to the [Navy]'s resourcing level."[17]

To preserve the conventional fleet, the Navy said in 2013 that it would have to get an additional $60 billion—an average of $4 billion per year for the 15-year period that the new subs would be built starting in 2021.

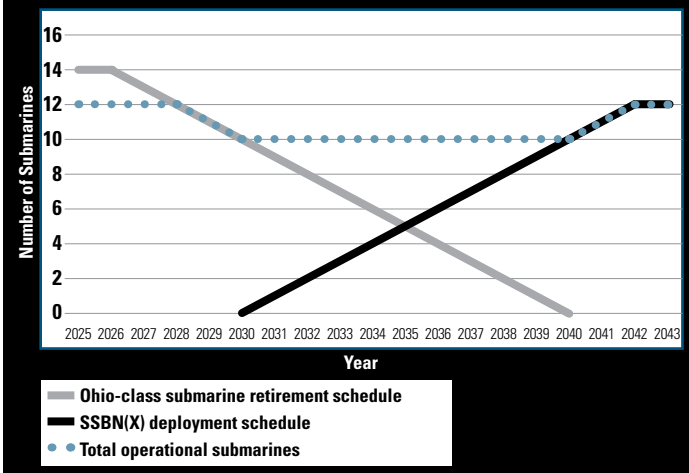
But funding the new submarines from outside the Navy's budget is no solution. This approach would just take resources from other services, like the Air Force, which is also seeking additional funding for its nuclear programs.

Responding to these budget proposals, Undersecretary of Defense Frank Kendall said in September, "at the end of the day we have to find money to pay for these things one way or another, right? So changing the accounting system doesn't really change that fundamental requirement. We still need the money and it has to come from somewhere."[18]

Rather than undermine the Navy's plans for conventional ships, the number of strategic subs could be scaled back. The current fleet of 14 Ohio class submarines and the planned purchase of 12 new replacement subs can both be reduced to eight. This would save $15.7 billion over 10 years and would still allow the Pentagon to deploy more than 1,000 warheads on submarines as planned under New START, according to a Nov. 2013 report by CBO.[19]

CBO's approach would reduce the current Ohio-class fleet from 14 to eight by retiring one per year from 2015 to 2020. A total of eight subs would be sustained through the 2040s by delaying the first SSBN(X) procurement from 2021 to 2024 and stopping at eight new subs. During the 2030s, this plan would save an additional $30 billion by avoiding the purchase of four SSBN(X) subs, according to CBO.

Figure E: Planned Strategic Sub Deployments



Source: U.S. Department of the Navy fiscal year 2014 budget request.

Eight Subs Are More Than Enough

From a national security perspective, a shift to eight strategic submarines would provide a more than adequate nuclear deterrent. Under the New START Treaty, which entered into force in February 2011, the Pentagon plans to deploy approximately 1,000 nuclear warheads on strategic submarines. Eight fully armed Ohio-class or SSBN(X) submarines can meet this requirement. Therefore, a shift to eight operational submarines would not affect the Pentagon's planned warhead deployment levels.

This budget-saving approach takes advantage of the excess capacity that currently exists on each Trident II D-5 missile, which is designed to hold eight warheads but is currently loaded with four or five. Although each missile and submarine would carry more warheads under this plan, the submarines would still be invulnerable to attack when deployed at sea.

Subs On Station

The Navy wants 12 new submarines to meet current military requirements, but the United States can deter nuclear attack with fewer and save money. In 2011 the Office of Management and Budget (OMB) recommended that the number of new submarines be reduced to 10.[20] The Navy reportedly pushed back by claiming that 10 submarines would not be enough to support five submarines "on station" at all times. Submarines on station are deployed far off the U.S. coasts, ready to launch their missiles on a moment's notice.

"It is mandatory that we sustain our survivable sea-based nuclear deterrent with about the same level of at-sea presence as today," Rear Adm. Richard Breckenridge, the Navy's director of undersea warfare, testified at a Sept. 12, 2013 congressional hearing.[21]

For the Navy to operate five submarines on station, it would need 12 submarines in total: five in the Atlantic, with two on station and the rest in transit or in port (such as for maintenance), and seven in the Pacific with three on station and the rest in rotation. Initially, only 10 subs are needed to meet these goals.

The need for on-station submarines is mainly driven by the military's existing requirement to deploy submarine-based nuclear weapons within range of their targets so they can be launched promptly, within an hour or so.[22]

The need for 12 subs, then, has as much to do with where the warheads are deployed and how promptly they could reach their targets as it does with the number of warheads. An eight sub-fleet can carry 1,000 warheads, but it can't support five subs that are forward deployed near Russia and China, ready for quick launch.

However, new nuclear guidance could relax those requirements, which are based on nuclear policy and targeting assumptions that have changed little since the Cold War ended 25 years ago. Instead of forward-deploying subs ready for prompt launch, they could be kept out of harm's way, as an assured retaliatory force if ever needed. If prompt launch is required, land-based missiles can serve that mission.

If the Obama administration determines—as it should—that the United States does not need to hold so many targets in Russia and China at risk with a "prompt" submarine attack, then the requirement for 12 subs can be reduced. And if this administration, or a future one, were to change its New START deployment plan, or achieve additional arsenal reductions, the requirement for deploying as many as 1,000 sea-based warheads could go away too.

Pentagon procurement decisions worth hundreds of billions of dollars should not be based on obsolete nuclear strategy. By the time the first new submarines are launched twenty years from now, they will be sailing into a very different world.

LONG-RANGE BOMBERS: 10-year savings, $32 billion

The Air Force operates a fleet of 159 long-range bombers: 76 B-52Hs built in the 1960s, 63 B-1Bs from the 1980s, and 20 B-2As from the 1990s.[24] Under New START, the Pentagon plans to reduce the nuclear-capable, long-range bomber force to 60 (18

Expensive Empty Space

One argument for deploying extra submarines and missiles is that it would maximize the U.S. ability to "upload" additional warheads if needed. Each Trident II D-5 SLBM can carry up to eight warheads; yet if the Navy spreads 1,000 warheads across 12 SSBN(X) subs and 192 missiles, as it plans to do, each SLBM would carry only 5-6 warheads. Thus each SLBM would have space for another 2-3 warheads, or another 500 warheads across the SSBN(X) fleet. The United States also has extra space for hundreds of additional warheads on ICBMs and gravity bombs on long-range bombers.

However, Russia does not have a comparable ability to upload warheads and has indicated it is interested in reducing the imbalance in this area. Therefore, the United States may want to trade some of its extra storage space for Russian concessions on, for example, consolidating and reducing Moscow's stockpile of tactical weapons.

President Obama has also talked about reducing the number of warheads that the United States keeps in reserve. Known as the "hedge," this reserve force could be used to upload missiles in a crisis or to replace warheads that had unexpected technical problems. It is unlikely that either of these hypothetical situations will arise. With a smaller hedge force, the United States would not need such a large upload capacity.

Moreover, this extra space for warheads comes at a significant cost, as "real estate" on SLBMs is not cheap. Assuming each new SSBN(X) submarine costs $7 billion and can carry 128 warheads, each warhead spot costs an average of $55 million. If each sub has six warheads on each missile, or 96 warheads per boat, then 32 slots go empty. That adds up to $1.7 billion worth of unused warhead capacity on each sub, or $20 billion of extra space across a 12-sub fleet.

However, if the Navy felt it absolutely has to have open space on its missiles for extra warheads, it could design the SSBN(X) to carry more than 16 missiles. For example, if each SSBN(X) carries 20 SLBMs, eight subs could carry 1,000 warheads with 6-7 warheads on each missile, leaving 1-2 open slots on each.

B-2s and 42 B-52s) by 2018. The Air Force plans to continue modernizing the B-2A and B-52H fleets, which are expected to operate into the 2050s and 2040s, respectively.[25] B-52s are deployed at Barksdale Air Force Base, Louisiana, and Minot Air Force Base, North Dakota. B-2s are deployed at Whiteman Air Force Base, Missouri. Although still part of the nuclear mission, none of these aircraft are loaded with nuclear weapons on a day-to-day basis.

The Air Force estimates that production of a new Long-Range Strike Bomber (LRSB) will cost about $55 billion for up to 100 planes, not including development costs which are projected to be at least $25 billion.[26] The Air Force plans to start initial production of the new bomber in the mid-2020s.[27] CBO estimates that the Air Force and NNSA will spend $73 billion on strategic bombers, both current and future, over the next decade.[28]

Given the decades of service left in the current bomber fleet, the new bomber program can be delayed until the mid 2020s, saving $32.1 billion over 10 years, according to CBO.[29] By moving this funding into the future, the Air Force would free up resources for other priorities, such as buying KC-46A tankers and F-35A fighters.

Even with a 10-year delay, a new bomber would still be ready by about the time current bombers are reaching the end of their service life, according to CBO, and the delay would allow the new bomber to incorporate technological advances made during that time. "Taking advantage of future technological developments can be particularly valuable for weapon systems that are expected to be in use for several decades," CBO states.

This would not be the first time this program has been delayed for lack of urgency. The incoming Obama administration initially cancelled the new bomber program in its FY2010 budget request. At the time, the Office of Management and Budget (OMB) decided not to pursue a new bomber "because the current fleet is performing well" and "as a result of ongoing efforts to upgrade the existing bomber fleet with new electronic and weapons systems, current aircraft will be able to meet the threats expected in the foreseeable future." OMB found "no urgent need to begin an expensive development program for a new bomber," and said that the Pentagon would take its time to "develop a better understanding of the requirement and to develop the technologies most suitable for a long-range bomber."[30]

The primary mission for the LRSB is to allow the Air Force to continue to provide a conventional long-range penetrating bomber, and it would not be certified to carry nuclear weapons until two years after it is first deployed. Only a small percentage of the LRSB's costs would go directly to making the bombers capable of carrying nuclear weapons. However, if the bomber did not have a nuclear mission, the overall program could be significantly less expensive. For example, the bombers would not need to operate in a nuclear environment and would not need to use pilots, but could be operated remotely.

The B-2, the last U.S. bomber built, provides a cautionary tale. In the 1980s, plans called for 132 B-2s, and then 75, but the dissolution of the Soviet Union led to growing congressional opposition. In 1992, President George H.W. Bush announced that production would be limited to 20 aircraft. Twenty-one B-2s were ultimately built, at a cost of more than $2 billion each, far above initial estimates. Its predecessor, the B-1, also was never built in the numbers envisioned.

AIR-LAUNCHED CRUISE MISSILE (ALCM): 10-year savings, $3 billion

The new Air Force bomber would carry two types of nuclear weapons: a rebuilt gravity bomb (the B61-12) and a cruise missile, known as the Long-Range Stand-Off (LSRO) weapon or Air-Launched Cruise Missile (ALCM). The current ALCM, carried by B-52 bombers, was first deployed in the 1980s and is scheduled for retirement in 2030.

A new ALCM has no official price tag, but is expected to cost around $20 billion. The Air Force plans to spend $4.9 million on missile development in FY2015 and $221 million over the next five years, down from $1 billion over five years due to a three-year delay in the program. The delay pushes $960 million of program funding into the second half of the decade.[31]

Last year, the Pentagon completed an assessment to determine whether and how to replace the current ALCM. In December, the office of the Secretary of Defense deferred the program for three years "due to concerns over the National Nuclear Security Administration (NNSA) funding profile for the associated warhead as well as other nuclear enterprise priority bills such as the B61 Tail Kit Assembly."[32]

The refurbished nuclear warhead for the ALCM would cost an additional $12 billion, according to NNSA, with about $2 billion to be spent in the next decade.[33] NNSA is requesting $9.6 million in fiscal 2015 to begin work on the warhead.

The program is already in trouble in Congress. In 2014, the Senate Appropriations Energy and Water Development Subcommittee zeroed out the

administration's request of $9.6 million for the warhead, and the Senate Appropriations Defense Subcommittee cut the request for the missile by $3 million, or 60 percent. In the House, the Appropriations Committee cut the request for the missile by $1.5 million, or about one-third.

Twenty-five years after the end of the Cold War, we can no longer remain on autopilot, replacing nuclear systems just because we had them before. Each replacement system must have its mission justified as if it were new. So, if we did not have an ALCM already, would we buy a new one now? That is not likely.

The United States no longer needs a bomber with stand off nuclear missiles that are shot from afar, like the ALCM. The new Air Force bomber will be designed to penetrate enemy air defenses, so it needs bombs that can be dropped from above. In the current arsenal, the B-2 stealth bomber also is a penetrator.

The Pentagon may be concerned that an adversary's air defenses will improve in the future and that U.S. bombers someday wont be able to defeat them. But the United States has other standoff weapons if needed, such as submarine-launched ballistic missiles.

There also are sound security reasons to forgo nuclear cruise missiles. Their dual-use nature makes them inherently destabilizing. Conventional cruise missiles are indistinguishable from nuclear-armed ones. If one is coming at you, there is no way to tell if it is carrying a nuclear warhead or not. It would be better to know that all are conventional.

The United States, Russia and France are the only nations to currently deploy nuclear cruise missiles. However, China, Pakistan and others are working on nuclear-capable cruise missiles, and U.S. security would benefit if they would stop.[34] Chinese nuclear-armed cruise missiles would add to U.S. concerns about Beijing's capabilities and would be able to fly under U.S. missile defenses, which are designed to defend against ballistic missiles. Pakistan's program would add to tensions in South Asia and could motivate India to follow suit.

Rather than spend billions on a weapon that is not needed to deter potential adversaries, the old ALCM might have more value as a bargaining chip to trade for a global ban on all nuclear-armed cruise missiles. This would be a win-win for the military budget and U.S. security.

B61 LIFE EXTENSION PROGRAM (LEP): 10-year savings, $4 billion

NNSA plans to extend the service life of about 400 B61 gravity bombs through a Life Extension Program (LEP) that would consolidate four versions of the bomb into one, called the B61-12. The B61 is the only U.S. nuclear weapon based in Europe, with about 180 tactical (short range) versions, the B61-3 and -4, stored in five NATO countries. A strategic version, the B61-7, is stored in the United States for use on B-2 bombers.

NNSA says it will begin production of the B61-12 in 2020, and that the entire project will cost about $8 billion. The two major cost drivers are the plan to consolidate four versions of the bomb into one and to refurbish some of the nuclear components, such as the bomb's uranium secondary components.

A 2012 Pentagon review estimated that the program would cost $10.4 billion, or roughly $25 million per bomb.[35] In addition, a new tail kit, needed only if the tactical bombs are refurbished, would cost an extra $1.1 billion.

Reflecting congressional concerns over rising costs, in 2013 the Senate Appropriations Committee reduced the FY14 NNSA budget for the program by $168 million, or one third, but it was later restored to $537 million in the omnibus appropriation.

However, the program continues to face budget pressures in Congress. The administration's fiscal year 2015 request for the B61 LEP is $643 million, a

It Pays to Wait

The historic trajectory of nuclear arsenals is down. If the United States can wait to buy new systems, it will likely need fewer of them. As just one example, the U.S. Navy built 18 Ohio-class nuclear-armed submarines from 1981-1997 only to decide later that it needed just 14. Why? The Cold War ended, and U.S. and Russian nuclear arsenals declined under the 1991 START Treaty. These four extra subs and their conversion to non-nuclear missions cost about $16 billion.[23] This is a classic case of over-building for a threat that is declining over time.

Similarly, the United States deployed 50 MX "Peacekeeper" ICBMs, each carrying ten warheads, starting in 1986 at a cost of $20 billion. All MX missiles were retired by 2005, as a result of the 1993 START II Treaty, which banned ICBMs with more than one warhead. The missiles were fully deployed for less than ten years before the U.S. Senate ratified START II in 1996.

Figure F: The B61 Bomb

Modern nuclear weapons have two stages. The primary (fission) stage is composed of plutonium and high explosives and is "boosted" by tritium; the detonation of that stage ignites a uranium-lithium deuteride secondary (fusion) stage. To reduce the possibility of warheads exploding by accident or, if stolen, of being used in an unauthorized way, various safety and security features, collectively know as "surety," are built into today's bombs. All current B61 bombs have permissive action links (PALs) to prevent unauthorized use; enhanced electrical isolation (EEI) to reduce the chance that the warhead will detonate in an accident; and insensitive high explosive (IHE) to lessen the chance of the bomb being detonated by fire or impact. All U.S. nuclear weapons are considered "one point safe," meaning that if the high explosive is detonated at a single point, there will be less than one chance in a million of a significant nuclear yield.

	Year first produced	Estimated number[1]	Surety features	Est. yield (kilotons)
Tactical bombs				
B61-3	1979	100	PALs, EEI, IHE	0.3-170
B61-4[2]	1979	100	PALs, EEI, IHE	0.3-50
B61-10	1990	0	PALs, EEI, IHE	0.3-80
Strategic bombs				
B61-7	1985	215	PALs, EEI, IHE	10-360
B61-11[3]	1997	20	PALs, EEI, IHE	400

1. There are about 435 B61's in the active stockpile, and more than 500 bombs in the inactive stockpile.
2. The proposed B61-12 design is based on the B61-4 and would have the same yield.
3. The B61-11 is an earth-penetrating version of the B61-7 and is not included in the planned life extension program.

Sources: Federation of American Scientists, Arms Control Association

20-percent increase over the 2014 budget.

The B61 is the first of an expensive series of LEPs in the pipeline. According to the FY2014 Stockpile Stewardship and Management Plan, NNSA wants to upgrade four additional warhead types between now and 2038, each of which will cost more than the B61.[36] All told, NNSA plans to spend more than $60 billion on upgrading five warhead types over the next 25 years, requiring a significant increase in annual funding.

To significantly reduce the B61 program's high costs, the NNSA should rescope the current plan and choose a more cost effective option, such as one that does not replace nuclear components or consolidate different types of the bomb.

President Obama said in Berlin in 2013 that he will "work with our NATO allies to seek bold reductions in U.S. and Russian tactical weapons in Europe." As the only U.S. nuclear weapon in Europe, it would be a waste of scarce resources to upgrade B61 tactical bombs that may no longer be deployed by the time the program is completed a decade from now.

Despite the crisis in Ukraine, the Cold War is not resuming, the Warsaw Pact is long gone, and there is no threat of a Soviet land-attack across central Europe. There is no military justification for keeping B61 tactical bombs forward-deployed at NATO bases in Europe. These weapons can and should be returned to the United States and kept in secure storage. The United States can continue to reassure NATO allies and deter any nuclear weapons threat against NATO with nuclear weapons based in the United States and on submarines at sea.

If B61 bombs must stay in Europe for political reasons, then they should be allowed to age out over the next decade and then retired. The tactical B61s in Europe need not be refurbished at enormous cost to the American taxpayer.

Former Air Force Chief of Staff Norton Schwartz recently recommended that the F-35 Joint Strike Fighter should not be made capable of carrying the B61 unless NATO helps pay the bill. He argued that those funds should instead be used to make new long-range strike bomber nuclear-capable. "B61 life extension is necessary independent of F-35 nuclear integration," he said. "It must proceed in any case, in my view, focused on modernization and long range strike bomber."[37]

If the B61 LEP were focused just on the long-range bomber mission, the strategic B61-7 could be refurbished while the tactical versions were not. This would allow for a more cost-effective upgrade of the B61-7 by itself and would not require the expensive consolidation with the tactical bombs.

Without the consolidation, a new tail kit would not be needed. The B61-12 would have a maximum yield of up to 50 kilotons, but would replace a bomb (the B61-7) with a yield of up to 360 kilotons. The tail kit increases the accuracy and thus the effective yield of the B61-12. However, if NNSA were to upgrade the B61-7 on its own and not consolidate it into the B61-12, there would be no need for the new tail kit.

In addition, the number of parts to be refurbished could be scaled back. NNSA's plan involves replacing and modifying hundreds of parts, including the

bomb's uranium secondary. But NNSA has studied other options that would cost billions less.

There is no need to spend $10 billion on upgrading 400 B61 bombs. Instead, the United States could choose to refurbish only the strategic B61-7, eventually retire the tactical bombs, and scale back the LEP, saving up to $4 billion.

INTERCONTINENTAL BALLISTIC MISSILES (ICBMS): 10-year savings, $16 billion

The Air Force currently deploys 450 Minuteman III Intercontinental Ballistic Missiles (ICBMs) located at F.E. Warren Air Force Base, Wyoming; Malmstrom Air Force Base, Montana; and Minot Air Force Base, North Dakota. First deployed in the 1970s, today's Minuteman weapon system is the product of 40 years of continuous enhancement. A $7 billion life extension program is underway to keep the ICBMs safe, secure and reliable through 2030.[38] Under New START, the Air Force plans to reduce the current ICBM fleet to 400.

The Air Force is expected to decide in 2016 whether to continue to extend the life of the Minuteman after 2030 or to replace it with a new missile and, if so, what kind. Recent media reports suggest the Air Force is leaning toward building a new system that would provide a future option for mobile basing.[39]

A detailed 2014 RAND study supports extending the life of the current Minuteman III, which it found to be "a relatively inexpensive way to retain current ICBM capabilities." RAND found that a new missile would be needed only if "warfighting and deterrence demands push requirements for an ICBM system to beyond what an incrementally modernized Minuteman III can offer."[40]

RAND said that the biggest obstacle to simply maintaining the existing ICBM fleet is the inventory of test missiles, which would be depleted by 2030. However, if the number of deployed Minuteman IIIs were reduced to 300, the Air Force would have enough test missiles to last for decades. This smaller ICBM force would still be comparable to Russia's.

The RAND report found that keeping the Minuteman IIIs in silos is the cheapest option, costing $1.6-2.3 billion per year, or $60-90 billion over a 39-year life cycle. In comparison, building a new silo-based ICBM would cost $84-$125 billion and a mobile version (rail or road) would cost $124-$219 billion.

According to RAND, "Any new ICBM alternative will very likely cost almost two times—and perhaps even three times—more than incremental modernization of the current Minuteman III system. The only viable argument for developing and fielding an alternative would therefore have to be requirements driven."

It is hard to imagine what would justify a military requirement for a new ICBM capability beyond that offered by a life-extended Minuteman III.

As the RAND report points out, only Russia is capable of attacking all U.S. ICBMs. Such an attack is highly unlikely, as Moscow could not expect to escape a nuclear response, either from ICBMs or other U.S. nuclear forces, such as submarines. Silo-based Minuteman IIIs are survivable against all other potential nuclear adversaries, including China, and will likely remain so for the foreseeable future.

If the Air Force decides to extend the life of the Minuteman indefinitely, there would be no need to develop a new ICBM and no additional costs to maintain the Minuteman over the next decade. According to RAND estimates, a new missile would cost about $3 billion per year, and more for mobile basing.

Thus, forgoing a new ICBM would allow the Pentagon to save roughly $15 billion by 2023, assuming the program development would have started in 2019. After 2023, avoiding production of a new ICBM would save tens of billions more.

By 2030, the Air Force may want to reduce the number of Minuteman IIIs to 300 to replenish the stock of test missiles. Eliminating one wing of 150 missiles would save about $300 million annually, according to RAND. A 2013 report by the Stimson Center reached a similar conclusion.[41]

The Minuteman III is armed with either a W78 or W87 nuclear warhead, which both have yields of 300 kilotons or more. NNSA is planning to develop an interoperable warhead to replace the W78, which is the older of the two. As described in the section below, the W78 should be retired and replaced by the W87, saving $1 billion that would have been spent on the interoperable warhead over the next decade.

Warhead Life Extensions

In March, the Obama administration announced it would delay key elements of its "3+2" plan to rebuild the U.S. stockpile of nuclear warheads amidst growing concern about the program's high cost and its technically ambitious approach.

Now, the administration and Congress should use this opportunity to reevaluate the program and shift to a more straightforward and affordable path for maintaining the U.S. nuclear stockpile.

Announced last summer by the National Nuclear Security Administration (NNSA), the 3+2 strategy has

U.S. Department of Defense

An unarmed U.S. Air Force LGM-30G Minuteman III intercontinental ballistic missile launches during an operational test at Vandenberg Air Force Base, Calif., Dec. 17, 2013.

a sticker price of $60 billion and calls for extending the service life of five nuclear warhead types, three of which would be "interoperable" on land-based and sea-based ballistic missiles. Two other warhead types would be used on bombers, and two types would be retired.[42]

Congress, on a bipartisan basis, has been skeptical of the 3+2 plan from the start, particularly the proposal for interoperable warheads. The Senate Appropriations Committee wrote last year that the concept "may be unnecessarily complex and expensive, increase uncertainty about certification" and "fail to address aging issues in a timely manner."

The House Appropriations Committee also raised concerns about an interoperable warhead last year, stating that the committee "will not support dedicating significant funding for new stockpile transformation concepts" unless the administration can show "benefits that justify such a large investment." The House cut the budget request by $23 million. The omnibus spending bill agreed to in January 2014 cut the budget for the interoperable warhead almost in half, to $38 million.

In response to congressional concerns and budget pressures, the NNSA budget request for fiscal 2015 delays funding for much of the 3+2 program, putting the future of the plan in doubt.

Speaking at George Washington University in March, former Lawrence Livermore National Laboratory Director Parney Albright, who supports the 3+2 plan, said, "I just don't think it's going to happen."[43]

It is time to rethink the 3+2 plan. It is too expensive to survive in the current budget climate, takes unnecessary risks with warhead reliability, and has no clear military requirement. It is a solution in search of a problem.

The current warhead life extension program (LEP) is successfully refurbishing warheads. There is no need to adopt a more risky and exorbitantly expensive approach. The NNSA can stick with the traditional path to warhead maintenance and save tens of billions of dollars in the coming 25 years.

No Rush to Refurbish

For fiscal year 2015 and beyond, near-term parts of the 3+2 plan remain on track, but future projects have been significantly slowed. The ongoing life extension for the Navy's W76 submarine-launched ballistic missile (SLBM) warhead is on schedule for completion in 2019, and the B61-12 gravity bomb is on schedule for production between 2020 to 2024, which is a slight delay from earlier plans.

However, the next warheads in the 3+2 queue

have been delayed. A rebuilt warhead for a new cruise missile for the Air Force's proposed long-range bomber has been pushed back by up to three years, from 2024 to 2027. The first interoperable warhead, called the IW-1, has been moved from 2025 to 2030. These delays mean that key development decisions have been pushed into the next administration, increasing uncertainty about whether these programs will continue as now envisioned.

These delays will not put the reliability of the stockpile at risk. NNSA Deputy Administrator for Defense Programs Donald Cook testified before the House Appropriations Energy and Water Development Subcommittee on April 3 that the two warhead types IW-1 would replace, the W78 intercontinental ballistic missile (ICBM) warhead and the W88 SLBM warhead, "are aging as predicted." NNSA budget documents also state that the W78 warhead, the older of the two, is "aging gracefully."[44]

Interoperable Warheads

Much of the congressional concern about the 3+2 plan stems from NNSA's proposal to develop interoperable warheads to be used on both ICBMs and SLBMs, which has not been done before and would be prohibitively expensive.

The NNSA's primary rationale for the 3+2 approach is that it would eventually help reduce the number of non-deployed warheads that are stored as a "hedge" in case there is a catastrophic failure with one or more warhead types. Recent NNSA budget documents state that, "Three interoperable ballistic missile warheads with similar deployed numbers will allow for a greatly reduced technical hedge for each system to protect against a single warhead failure."[45]

Reducing the hedge is a worthwhile goal, but we don't need the 3+2 plan to get there.

First, the probability of a technical surprise that would disable an entire class of warheads is exceedingly remote. The NNSA's stockpile surveillance and stewardship programs are designed to prevent such surprises.

Second, the United States maintains—at great expense—a triad of delivery platforms, which allows for an inherent hedge. In the highly unlikely event that any one leg of the triad becomes inoperable or unreliable, the other two legs are there.

Third, given that the 3+2 plan would not be completed for 30 years or more, potential reductions to the hedge stockpile are highly uncertain and would be far in the future if they happen at all. There is no guarantee that promised hedge reductions would ever materialize as a direct result of the 3+2 plan.

"This higher risk, higher cost plan will not lead

Figure G: The '3+2' Warhead Plan

Over the next 25 years, the National Nuclear Security Administration (NNSA), a semiautonomous part of the Energy Department, plans to rebuild the U.S. nuclear arsenal and reduce the number of warhead types from seven today to five. The W78 intercontinental ballistic missile (ICBM) warhead and W88 submarine-launched ballistic missile (SLBM) warhead would be replaced by the first interoperable warhead, IW-1, which could be used on ICBMs and SLBMs. The NNSA has proposed two other interoperable warheads and a rebuilt air-launched cruise missile (ALCM) warhead. All of these projects have been delayed since initial plans were announced last year.

TODAY		3+2 PLAN	ESTIMATED PRODUCTION/ RETIREMENT START DATE	ESTIMATED COST, 2014-2039 ($ BILLIONS)
Delivery Systems	**Warheads/Bombs**			
ICBMs	W87	Replace with IW-2	Delayed from 2031 to 2034	15
	W78	Replace with IW-1	Delayed from 2025 to 2030	11
SLBMs	W88			
	W76	Replace with IW-3	2041	20
Bombers	B61-3/4/7/10 Bomb	Replace with B61-12	2020	8
	W80-1 ALCM	Replace with another warhead	Delayed from 2024 to 2027	7
	B83 Bomb	Retire once B61-12 is produced	2030	--
TOTAL ESTIMATED COST				**61**

Source: National Nuclear Security Administration

to further reduction in the total number of nuclear weapons, according to NNSA's classified plans," wrote Sen. Dianne Feinstein (D-CA.), chair of the Senate Appropriations Energy and Water Development Subcommittee, in an August 2013 letter to President Obama.

Another rationale for interoperable warheads is to have the entire stockpile use insensitive high explosives. Such explosives are in principle a good idea, as they are less prone to accidental detonation than conventional explosives, but they are less energetic and take up more space inside a warhead.[46] Thus, insensitive explosives cannot easily replace conventional ones.

To get around this problem, NNSA is proposing to use parts from two different, existing warheads: a primary from the W87 ICBM warhead, which already has insensitive explosives, and possibly a secondary from the W80 cruise missile warhead.[47] But those parts have never been used together, and such combinations have never been introduced into the nuclear stockpile without explosive nuclear tests, which the United States no longer conducts.

Thus, the IW-1, with a projected price tag of $11 billion, could introduce unwelcome concerns about reliability into an otherwise well-tested and reliable stockpile.

What would be achieved for the added risk and cost? Not much.

The IW-1 would replace the W78 ICBM warhead and the W88 SLBM warhead— neither of which has insensitive explosives. But other warheads on the Air Force's ICBMs and bombers do have insensitive explosives, so this is really a Navy issue. However, the Navy is questioning whether the high cost of insensitive explosives is worth the limited benefit for its warheads, which spend most of their time protected inside missiles, inside submarines, under the sea.

In a September 2012 memo to the Nuclear Weapons Council, a joint Defense and Energy Department group that coordinates management of the U.S. nuclear weapons stockpile, the Navy said it does "not support commencing the [IW-1] effort at this time."[48] In response, the council decided in December 2012 to study an option for the Navy's W88 warhead that would not be interoperable.[49]

NNSA plans to upgrade non-nuclear parts of the Navy's W88 warhead anyway, and once that happens, Livermore's Albright noted that the Navy "almost certainly will argue" that replacing the W88 with an interoperable warhead would cost "too much money." Instead, Albright said the Navy would prefer to simply refurbish the W88, "which is what they did on the W76." The W76 life extension is expected to cost $4 billion, or one-third the price of IW-1.

In turn, doing an independent W88 refurbishment should decrease the Air Force's incentive to refurbish the W78, which could instead be retired and replaced by the W87 as the only ICBM warhead. The Air Force no longer needs two warhead types for ICBMs, and there are enough W87s to go around. IW-1 would thus be unnecessary.

Beyond that, the proposed IW-2 and IW-3 warheads are distant prospects, with no production planned until 2034 or later, at costs of $15 and $20 billion, respectively.

A Better Way

There is a relatively simple alternative to the 3+2 plan. Instead of developing unproven interoperable warheads by mixing and matching parts from different weapons, NNSA could do things the time-tested way. The Navy's $4 billion W76 SLBM warhead life extension program (LEP) does not introduce any new fancy bells and whistles. This should be the model for future life extensions. But first, the Pentagon should reassess the need for warhead types before they are refurbished.

Step 1: Retire Where Possible

For starters, there is no need to rebuild the W78 or W80 warheads, and both should be retired. Twenty years after the end of the Cold War, we can no longer remain on autopilot, replacing nuclear systems just because we had them before. Each replacement system must have its mission justified as if it were new.

For the W78, a smaller ICBM force means there is no need to keep two different ICBM warheads. The W87, also used on ICBMs, is newer and has all modern safety features. In the unlikely event of a problem with all W87 warheads, the United States would still have the submarine and bomber legs of the triad to deter any potential attacks. Enough W87 warheads have been produced (more than 500) to arm the entire ICBM fleet. Retiring the W78 would allow the IW-1 project to be cancelled, saving $11 billion.

As for the W80, there is no need for a new air-launched cruise missile (ALCM), and thus no need to rebuild this warhead. The United States no longer needs a bomber with stand off nuclear missiles that are shot from afar, like the ALCM. The new Air Force bomber will be designed to penetrate enemy air defenses, so it needs bombs that can be dropped from above, like the B61. Moreover, the United States has

other standoff weapons if needed, such as submarine-launched ballistic missiles. Cancelling the ALCM would save $7 billion for the warhead and another $10 billion or so for the missile.

Step 2: Keep it Simple

The remaining warheads would undergo traditional life extensions as needed. Future LEPs should not introduce technical, schedule and cost risks inherent to interoperable warheads, which are just asking for trouble.

Nor should NNSA conduct the $8-10 billion B61-12 LEP as planned. Consolidating four bomb-types into one is overly complex and expensive. NNSA should scale back this program by refurbishing the strategic B61-7, and separately refurbish or retire the tactical bombs, which could save up to $5 billion.

Once the W78 and W80 warheads are retired, the remaining arsenal would include the W87 (LEP completed in 2004), the W76 (LEP to be finished by 2019), the B61 (LEP about to begin), and the W88 (partial upgrade about to begin). This "2+1+1" plan would maintain warheads for all three legs of the triad: SLBMs would carry both the W76 and W88, ICBMs would carry the W87 only, and bombers would carry rebuilt, strategic B61 bombs.

Assuming an average cost of $5 billion per LEP, based on the cost of the W76 LEP plus inflation, refurbishing this four warhead-type stockpile under this approach would cost roughly $20 billion over 30 years or more, or one-third the cost of NNSA's $60 billion plan. Over the next decade, this alternative approach would save roughly $6 billion.

In addition, by taking a more straightforward approach to LEPs, NNSA could reuse existing plutonium parts, know as "pits," rather than producing new ones, and delay the need to spend billions to expand the U.S. pit production capacity.

The NNSA's 3+2 program does not add up. The United States can maintain its nuclear warheads through traditional life extensions without resorting to expensive, risky schemes. NNSA needs to rethink the program and come back to Congress with a proposal better suited to today's fiscal and political realities.

Needed: Fresh Thinking

It's time for a more sensible approach to U.S. nuclear weapons spending. The savings proposed here can be achieved without reducing the number of deployed U.S. warheads below New START levels, so there is no need to wait for Moscow to reduce its nuclear forces any further. Reductions beyond New START would lead to additional budget savings in the years ahead.

Shielding nuclear programs from budget reductions will force deeper cuts into other, higher priority conventional systems. Reducing nuclear weapons spending now is a smart way to trim the budget.

SECTION 2

Nuclear Reductions Make the United States Safer

"Arms control treaties have and continue to reduce the likelihood of nuclear conflict with Russia."[50]

—Admiral C. D. Haney, Commander, U.S. Strategic Command, February 2014

Since the 1960s, U.S. military leaders have determined time and again that nuclear stockpiles are larger than needed to maintain the security of the United States, its allies and friends. These arsenal reductions have encouraged corresponding reductions by Russia, thereby lowering the nuclear threat from the only nation capable of ending the United States as we know it. Moreover, U.S. reductions have helped build international support for stopping the spread of nuclear weapons to other states or terrorist organizations, a growing threat to U.S. security. And by avoiding the production of new weapons, arms reductions save money, a key benefit at a time of fiscal pressures.

Enhancing U.S. national security by verifiably reducing superpower nuclear arsenals—a counter-intuitive idea to some—has a long bipartisan tradition.

Since the late-1960s, U.S. presidents beginning with Lyndon B. Johnson have pursued and signed bilateral agreements mandating verifiable limits and reductions in U.S. and Russian nuclear stockpiles. Presidents Richard Nixon, Gerald Ford, Jimmy Carter, Ronald Reagan, George H.W. Bush, Bill Clinton, and George W. Bush all contributed to reducing the nuclear threat through the negotiation of nuclear arms control agreements with the Soviet Union and later with Russia.

In certain periods of time, the force reductions were very significant. During the George H. W. Bush administration, from 1989 to 1994, the U.S. nuclear stockpile dropped by 50 percent, from about 22,00 to 11,000 warheads, the most rapid nuclear arsenal reduction in U.S. history. During the George W. Bush administration, from 2001 to 2009, the stockpile dropped another 50 percent, from about 10,000 to 5,000.

As Reagan said in 1986, "It is my fervent goal and hope…that we will some day no longer have to rely on nuclear weapons to deter aggression and assure world peace. To that end the United States is now engaged in a serious and sustained effort to negotiate major reductions in levels of offensive nuclear weapons with the ultimate goal of eliminating these weapons from the face of the earth."

President Barack Obama negotiated the New START Treaty with Russia, signed in 2010, and has called for another round of bilateral reductions beyond New START. As President Obama said in Berlin in June 2013, "we can ensure the security of America and our allies, and maintain a strong and credible strategic deterrent, while reducing our deployed strategic nuclear weapons by up to one-third."

Some members of Congress, however, claim that arms reductions have gone far enough, and, despite their long history of success, should not continue. Some even suggest that the United States should halt the implementation of New START.

However, New START establishes predictability regarding U.S. and Russian nuclear forces, which is essential especially during times of tension. The pursuit of additional arms reductions would also have important benefits.

In June 2013 after an extensive interagency review of nuclear deterrence requirements, U.S. military leaders concluded, that the U.S. nuclear arsenal will be "more than adequate" to meet security objectives when New START is fully implemented in 2018, and the force can be reduced by up to one-third, from 1,550 New START-accountable deployed strategic warheads to about 1,000.[51]

Additional U.S.-Russian reductions would draw

down the largest nuclear force that could be directed against the United States. At the same time, the possibility of a nuclear attack from Russia is exceedingly remote, and, as of September 2014, Washington deployed over 200 strategic delivery vehicles more than Moscow.[52] As the new guidance states, "the need for numerical parity…is no longer as compelling as it was during the Cold War…"[53]

Today's most pressing security threat to the United States is not nuclear war with Russia or China, but nuclear terrorism and proliferation. Excessive U.S. nuclear forces have no meaningful role to play in this regard. The United States needs to sustain a strong international coalition to secure nuclear materials across the globe and turn back nuclear programs in Iran and North Korea, and continued U.S. and Russia arms reductions are essential to these goals.

In addition, by clarifying their intentions to achieve further nuclear arms reductions and taking steps in that direction, U.S. leaders can put greater pressure on China to exercise greater restraint and engage more actively in nuclear risk reduction initiatives.

A Steady Decline

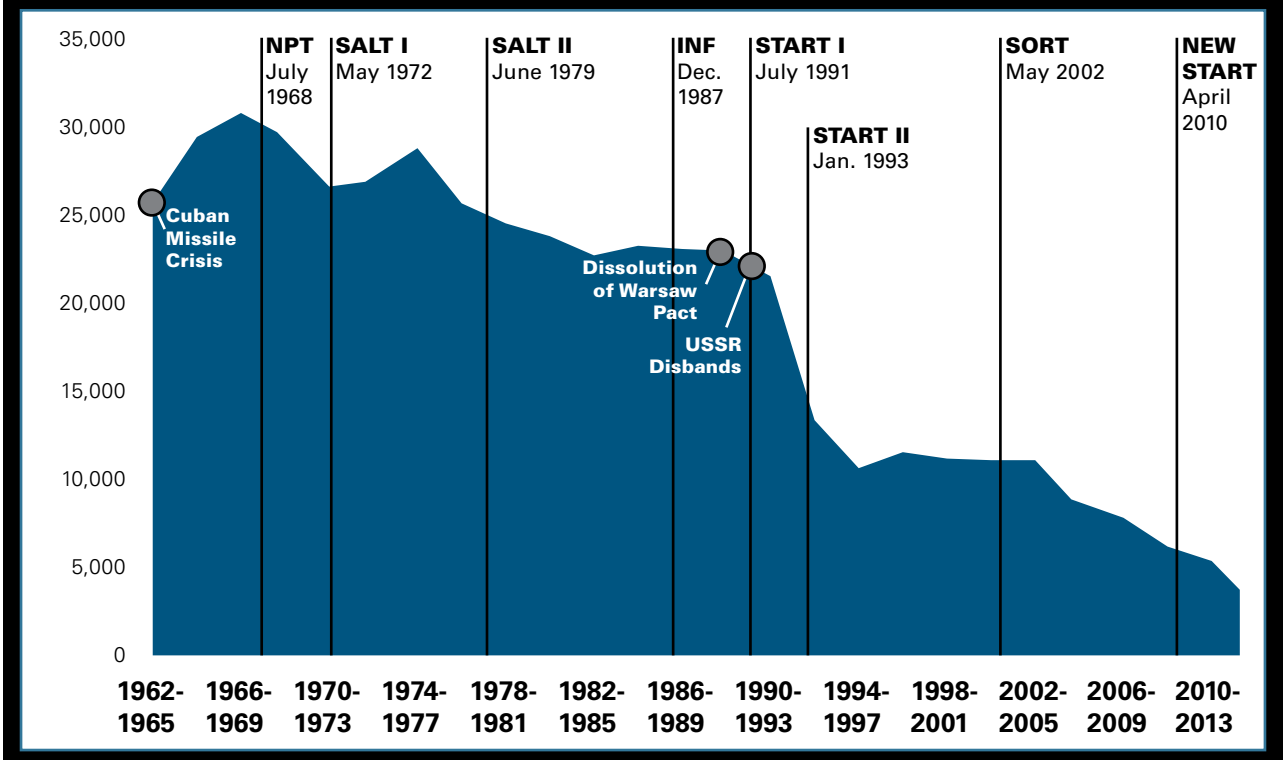
The U.S. nuclear stockpile peaked at 31,255 warheads in 1967, and has come down ever since.[54] President Richard Nixon and General Secretary Leonid Brezhnev took the first step to cap U.S. and Soviet nuclear ballistic missile forces with the Strategic Arms Limitation Talks (SALT I) Interim Agreement. As an executive agreement, it did not require U.S. Senate approval, but it was approved by Congress in a joint resolution in 1972.

The follow-on SALT II treaty was signed by President Jimmy Carter and Brezhnev in June 1979, and was submitted to the U.S. Senate for ratification shortly thereafter. But Carter removed the treaty from Senate consideration in January 1980, after the Soviet Union's invasion of Afghanistan. Nevertheless, the United States and the Soviet Union voluntarily observed the SALT II limits. By this time, the U.S. arsenal had been reduced to about 24,000 warheads.

President Ronald Reagan began talks toward the Intermediate-Range Nuclear Forces (INF) Treaty, which he and Soviet leader Mikhail Gorbachev signed in 1987. Under INF, the two nations agreed to eliminate their stocks of medium-range, nuclear-capable, land-based missiles. It was the first arms control treaty to abolish an entire category of weapon systems, and established unprecedented procedures to

Figure H: U.S. Nuclear Weapons Stockpile, 1962-2013

Since the late-1960s, the United States and Russia have signed a series of nuclear arms treaties that have led to steep cuts in their nuclear warhead stockpiles.



Source: U.S. Department of Defense, Arms Control Association

verify firsthand that missiles were actually destroyed. The U.S. Senate gave its advice and consent to the INF treaty in 1988.

Meanwhile, Reagan and his team pursued negotiations on a strategic nuclear arms reduction treaty (START) with the Soviets. Under START, President Reagan proposed major reductions, not just limitations, in each superpower's stockpile of long-range missiles and bombers. The START I treaty was signed by President George H. W. Bush and Gorbachev in 1991, and the U.S. Senate gave its advice and consent in 1992.

In late 1991, the Soviet Union broke up, creating the independent states of Russia, Belarus, Kazakhstan, and Ukraine. The most significant danger emanating from the former Soviet Union was the loss of control of its nuclear stockpile.

President George H. W. Bush responded with his bold Presidential Nuclear Initiatives (PNIs) in September 1991, which led to the removal of thousands of U.S. tactical nuclear weapons from forward deployment. Days later Moscow reciprocated, reducing the risk that these weapons would fall into the wrong hands. No formal treaty was ever negotiated or signed, nor did the Bush administration seek the approval of Congress. Under the PNIs and subsequent actions, the United States unilaterally reduced its stockpile of non-strategic warheads by 90 percent.[55]

President George H. W. Bush and new Russian President Boris Yeltsin began another round of negotiations and signed the START II treaty in early 1993. The Senate voted in approval of the treaty in 1996, but the treaty never entered into force. In 2000, the Russian Duma linked the fate of START II to the continuation of the 1972 Anti-Ballistic Missile (ABM) Treaty. Following the Bush administration's withdrawal from the ABM Treaty in June 2002, the Duma rejected START II.

Part of the Duma's objection to START II was that the planned reductions were not deep enough. So in March 1997, U.S. President Bill Clinton and Yeltsin agreed to begin negotiating START III, which would have reduced each side to 2,000–2,500 deployed strategic warheads by Dec. 31, 2007. Unfortunately, discussions bogged down over distinctions between

AFP/Getty Images

United States President Jimmy Carter (right) and Leonid Brezhnev, First Secretary of Communist Party of the Soviet Union, shake hands after signing the SALT II treaty limiting strategic arms in Vienna, Austria, on June 18, 1979.

strategic and theater–range interceptors under the ABM treaty, and START III was never concluded.

In May 2002, U.S. President George W. Bush and Russian President Vladimir Putin signed the Strategic Offensive Reductions Treaty (SORT or Moscow Treaty), which limited both sides' strategic warheads to 1,700-2,200. The U.S. Senate gave its advice and consent to SORT in 2003.

It is worth recalling that President Bush initially set out to reduce U.S. forces without a formal agreement. As he said in 2001: "We don't need an arms control agreement to convince us to reduce our nuclear weapons down substantially, and I'm going to do it."[56]

President Bush ultimately agreed to submit SORT to the Senate in part because Russia wanted a treaty, even if it was a very simple one with no verification measures. Had Russia not wanted a formal agreement, Bush would likely have reduced U.S. nuclear weapons without a formal agreement, as his father did before him.

Due, in part, to the fact that the SORT treaty relied indirectly on the verification mechanisms of START I, the United States and Russia both wanted to negotiate a new bilateral agreement before START I expired in 2009. In April 2010, Presidents Barack Obama and Dmitry Medvedev signed the New START treaty to limit each side to 1,550 deployed, treaty-accountable strategic warheads by 2018. The Senate gave its advice and consent to the agreement in December 2010.

The Persistent Logic of Nuclear Reductions

It is no accident that seven U.S. presidents, (Nixon, Carter, Reagan, Bush I, Clinton, Bush II, and Obama) both Republicans and Democrats, and their Soviet/Russian counterparts spent significant political capital on reducing nuclear weapons.

Besides the fact that arms reduction agreements have high public approval ratings, presidents have pursued this path because nuclear arsenal reductions, particularly in the post-Cold War period, have enhanced U.S. national security in the following ways:

The United States Has More Nuclear Weapons Than Necessary to Deter Nuclear Attack

The massive build up during the Cold War and the relatively sudden collapse of the Soviet Union and the Warsaw Pact left the United States and Russia with nuclear arsenals that vastly outsized the threats they needed to deter. As a result, U.S. military leaders have been able to reassure political leaders that nuclear stockpiles are larger than needed to maintain the security of the United States, its allies and friends. As the Pentagon put it in its June 2013 report on nuclear employment strategy, New START force levels "are more than adequate" to meet U.S. national security needs, and can be reduced by one-third.[57]

This conclusion is unlikely to change even if Russia were to build up beyond New START levels, which is unlikely. According to a 2012 Defense Department report to Congress on Russian nuclear forces, the U.S. nuclear force posture can "account for any possible adjustments in the Russian strategic force," including the deployment of additional warheads. The report states that even if Russia were to go "significantly above" New START limits, this would have "little to no effect on the U.S. assured second strike capabilities," including strategic submarines at sea. The Pentagon report concludes that Russia would not be able to achieve a military advantage "by any plausible expansion of its strategic nuclear forces, even in a cheating or breakout scenario."[58]

Russian Reductions Are Good for U.S. and International Security

U.S. arsenal reductions have encouraged corresponding reductions by Russia, thereby lowering the nuclear threat. Arms control agreements have placed limits on the number of deployed strategic nuclear weapons, meaning there are now significantly fewer nuclear weapons in Russia that could be used to target the United States in a nuclear war. For example, each side had more than 11,000 deployed strategic nuclear warheads in 1990. START I, which was signed in 1991, required each nation to reduce to 6,000; the 2002 SORT agreement to no more than 2,200; and the 2010 New START deal limits each side to no more than 1,550 treaty-accountable deployed strategic warheads by the year 2018.[59] In this way, Russia's most threatening nuclear weapons have been reduced by 85 percent.

Moreover, Russia is already below some of New START's limits, with 528 strategic delivery vehicles deployed as of September 2014.[60] Russia's stockpile is expected to decline further as its delivery systems reach the end of their lifetimes and are retired. To discourage Moscow from building back up to New START levels and from deploying new delivery systems, it is important keep the reduction process moving. For example, the United States could accelerate its reductions to complete them before New START's 2018 deadline.[61]

To the extent that treaties have intrusive

IAEA

Opening meeting of the 2010 High-level Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) at the United Nations in New York on May 3, 2010.

verification measures, such as the on-site inspections under New START, they increase transparency and confidence that treaty commitments are being implemented. This creates a more stable U.S.-Russian strategic relationship, with more predictability and less fear of hidden weapons and possible treaty breakout. This allows both sides to plan based on a predictable future, instead of worst-case assumptions.

Despite disagreements, such as over Crimea, arms control has contributed to an increasingly stable U.S.-Russian relationship. As stated by the Pentagon's new nuclear guidance, "Russia and the United States are no longer adversaries, and the prospects of military confrontation between us have declined dramatically."[62]

As just one example of how far the U.S.-Russian relationship has come, consider that over the last 15 years the United States has produced about 10 percent of its electricity from uranium fuel recovered from 20,000 disarmed Russian nuclear warheads.[63] The fact that the United States trusts Moscow to be a reliable energy supplier, and that Moscow trusts Washington to not reconvert this fuel into weapons, speaks volumes. It defies common sense to think there is a realistic possibility that these two nations would intentionally initiate a nuclear war.

Building International Support for Nonproliferation

U.S.-Russian reductions and arms control progress have helped to build international support for stopping the spread of nuclear weapons to other states or terrorist organizations. Today, this is the most serious threat facing the United States and the world. According to the Pentagon, today's "most immediate and extreme danger remains nuclear terrorism," with nuclear proliferation a close second, including Iran and North Korea.[64]

The link between U.S.-Russian arms control and stopping proliferation is crucial and often misunderstood. U.S.-Russian arms control will not, by itself, convince Iran or North Korea to abandon their nuclear programs. But U.S.-Russian actions on arms control are necessary to sustain global cooperation to on proliferation hard cases, like Iran and North Korea.

Under the 1968 Nuclear Nonproliferation Treaty (NPT), the United States and Russia (and China, France, and the United Kingdom) agreed to pursue

arms control and disarmament; all other signatories pledged to forgo nuclear weapons. That basic bargain is a good deal for the United States and has been reinforced repeatedly over time, such as when the treaty was extended indefinitely in 1995.

Therefore, the United States and Russia need to uphold their end of the NPT bargain to build a strong coalition of states to support U.S. efforts to control fissile materials around the world and to enforce sanctions and other measures on countries like Iran and North Korea. According to then-Undersecretary of Defense for Policy James Miller, "as we think about our nonproliferation goals," demonstrating additional progress on arms reductions "is in our interest as we look to put pressure particularly on North Korea and Iran…having a strong coalition in support of us will be vital."[65]

As explained in the 2010 Nuclear Posture Review (NPR) Report, "By reducing the role and numbers of U.S. nuclear weapons—and thereby demonstrating that we are meeting our NPT Article VI obligation to make progress toward nuclear disarmament—we can put ourselves in a much stronger position to persuade our NPT partners to join with us in adopting the measures needed to reinvigorate the non-proliferation regime and secure nuclear materials worldwide against theft or seizure by terrorist groups."[66]

As a clear example of this, the 1995 vote to indefinitely extend the NPT would not have been possible without political commitments from the nuclear powers to negotiate a Comprehensive Test Ban Treaty (CTBT) by 1996.

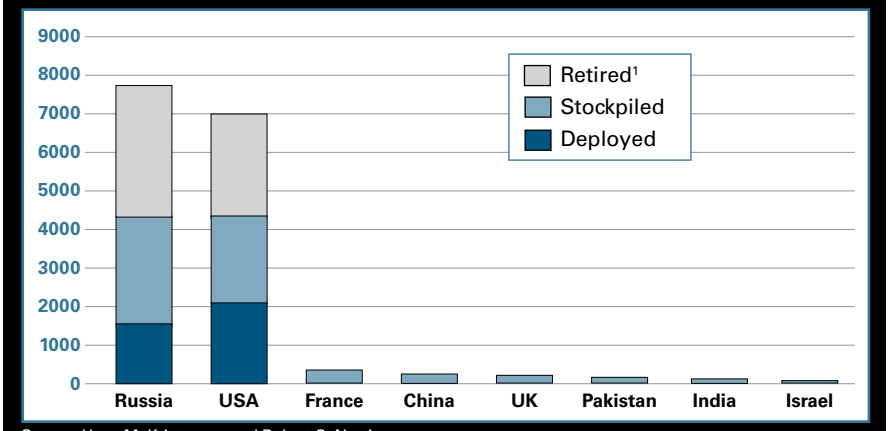
Similarly, the U.S. Senate's failure to approve the CTBT in 1999 had a negative effect on international efforts to strengthen nuclear inspections by the International Atomic Energy Agency. According to Mohamed El Baradei, who headed the agency at the time, the Senate's vote on the CTBT was a "devastating blow" to these efforts.[67]

Nuclear Arms Reductions Save Money

By allowing weapons to be retired and avoiding the production of new weapons, arms reductions save money. It is beyond the scope of this report to add up all the dollars saved through arms control in the past, but consider how much the United States might have spent since 1967 if it still had to support a nuclear stockpile of 31,000 warheads and their delivery systems today. And there are significant savings to be had in the future, as the United States plans to rebuild the triad of delivery systems and warheads over the next 25 years.

Figure I: Estimated Global Nuclear Warhead Inventories, 2014

The world's nuclear-armed states possess a combined total of nearly 17,000 nuclear warheads. More than 90 percent belong to Russia and the United States. Approximately 10,000 warheads are in military service, with the rest awaiting dismantlement.



Source: Hans M. Kristensen and Robert S. Norris.

ENDNOTE

1. Retired warheads are those no longer in the stockpile but intact as they await dismantlement; stockpiled warheads are those assigned for potential use on military delivery vehicles; deployed warheads are those on ballistic missiles and at aircraft bases.

Arms Reductions Still Make Sense

Despite the long, proud, bipartisan history of U.S.-Russian nuclear arms reductions, some now claim that the process has reached a point of diminishing returns, and that additional reductions are not in U.S. interests.

For example, as Senators Bob Corker (R-Tenn.) and Jim Inhofe (R-Okla.) wrote in February 2013, "If anything, reducing the American [nuclear] arsenal is likely to cause the very instability that the U.S. seeks to avoid."[68]

There is no reason, however, to assume that the security logic of arms reductions does not continue to hold true. All of the reasons that arms control made sense in the past are still valid today.

As the Pentagon's revised nuclear guidance makes clear, the United States today has more nuclear weapons than it needs to guarantee its security and that of its allies and friends. There is clear military

support for a smaller stockpile.

It remains in the U.S. interest to reduce Russia's arsenal of nuclear weapons, despite the welcome fact that the threat of nuclear attack from Moscow has decreased. Russian arsenal reductions can still reduce the consequences of possible accidental missile launches, and help serve the goal of providing better security for and ultimately eliminating weapons-usable materials.

Senator Carl Levin (D-Mich.), chair of the Senate Armed Services Committee, said in June 2012: "I can't see any reason for having as large an inventory as we are allowed to have under New START, in terms of real threat, potential threat." He added, "The more weapons that exist out there, the less secure we are, rather than the more secure we are."[69]

Perhaps the most important reason to continue the U.S-Russian arms control process is to strengthen the international coalition against proliferation. This is where the greatest future threats to U.S. security lie. Excessively large arsenals do not stop proliferation, yet arsenal reductions can translate into greater global support for U.S. nonproliferation efforts.

Finally, fiscal pressure on the defense budget makes it unwise to maintain any military program that is larger than it needs to be. A dollar wasted on excess nuclear weapons is a dollar lost to preventing terrorism or proliferation. In 2003, then-Secretary of State Colin Powell noted: "We have every incentive to reduce the number [of nuclear weapons]. These are expensive. They take away from soldier pay. They take away from [operation and maintenance] investments. They take away from lots of things. There is no incentive to keep more than you believe you need for the security of the Nation."[70]

Two arguments that are often made against lowering the U.S. nuclear arsenal are that it would encourage China to build up and would cause such worry to our allies that they may decided to build their own nuclear forces. Neither argument holds water.

For decades now, China has been content with a much smaller nuclear arsenal than the United States or Russia. Beijing has a total estimated stockpile of less than 300 warheads, with about 75 of those on long-range missiles that could reach the United States.[71] Even after dropping to 1,000 deployed strategic warheads, the United States would still enjoy a 10-1 advantage. China poses no roadblock to continued nuclear reductions at this time.

If the United States and Russia reduce their nuclear forces to around 1,000, Washington and Moscow will

Kirill Kudryavtsev/AFP/Getty Images

A Russian Topol-M intercontinental ballistic missile launcher drives at the Red Square in Moscow, on May 9, 2014, during a Victory Day parade.

be in a better position to reach an understanding with China about limiting the further growth of its arsenal.

On the other hand, maintaining unnecessarily large U.S. and Russian nuclear force levels, combined with increasingly capable U.S. ballistic missile defenses, could push China to accelerate its efforts to increase the size and capabilities of its strategic nuclear force.

Some critics claim that further U.S. nuclear force reductions would drive allies that depend on the so-called U.S. nuclear "umbrella" to reconsider their nonnuclear weapon status and seek their own arsenals.

Such concerns are unfounded given the unmatched retaliatory potential of 1,000 strategic nuclear weapons, as well as the overwhelming superiority of U.S. conventional forces. Moreover, for a non-nuclear state, such as South Korea or Japan, to openly build a nuclear arsenal would be a dramatic renunciation of its commitment not to do so under the NPT. The political costs of such a decision would be huge.

Furthermore, rather than express opposition to further nuclear force reductions, U.S. allies in Europe and Japan have consistently and repeatedly called on the United States and Russia to "continue discussions and follow-on measure to the New START to achieve even deeper reduction in their nuclear arsenals towards achieving the goal of a world free of nuclear weapons" and they "urge those not yet engaged in nuclear disarmament effort to reduce their arsenals with the objective of their total elimination."[72]

Military, Bipartisan Support

President Obama's efforts to reduce excess nuclear weapons stockpiles have strong military and bipartisan support. In March 2011, former Secretaries of State George Shultz and Henry Kissinger, former Secretary of Defense Bill Perry, and former Sen. Sam Nunn (D-Ga.) wrote that, "Deeper nuclear reductions... should remain a priority." They said the United States and Russia, which led the build-up for decades, "must continue to lead the build-down."[73]

In April 2012, Gen. James Cartwright, former Vice Chairman of the Joint Chiefs of Staff and commander of U.S. nuclear forces under President George W. Bush, called for reducing U.S. and Russian nuclear arsenals by 80 percent from current levels.

Cartwright, along with others, including former Sen. Chuck Hagel (R-Neb.), now Secretary of Defense, wrote that the current U.S. and Russian arsenals "vastly exceed what is needed to satisfy reasonable requirements of deterrence."[74]

A November 2012 report of the U.S. Secretary of State's International Security Advisory Board (ISAB) on "Options for Implementing Additional Nuclear Force Reductions" suggested that with New START verification tools in place, further nuclear reductions need not wait for a formal follow-on treaty.

The ISAB report, which included William Perry (Chair) and Lt. Gen. Brent Scowcroft (USAF, Ret.), recommended that the United States and Russia could accelerate the pace of reductions under New START to reach the agreed limits before the 2018 deadline. The ISAB report also recommended that "The United States could communicate to Russia that the United States is prepared to go to lower levels of nuclear weapons as a matter of national policy, consistent with the strategy developed in the Nuclear Posture Review, if Russia is willing to reciprocate."[75]

Such an initiative would also allow both sides to reduce the extraordinarily high costs of nuclear force maintenance and modernization and could help induce other nuclear-armed states to exercise greater restraint.

Conclusion

Today, it is clear that the United States can maintain a credible deterrent at lower levels of nuclear weapons than the 1,550 deployed strategic warheads allowed by New START. There is no reasonable justification today for such high numbers.

Further reductions to the U.S. nuclear stockpile would bring a variety of benefits, including the prospect of a smaller Russia arsenal, a stronger international coalition against nuclear terrorism and proliferation, and billions of dollars that could be saved or spent on higher priority defense needs. Nuclear arsenal reductions have made sense to seven presidents over five decades. They still make sense today.

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The United States currently plans to spend some $355 billion to maintain and rebuild its Cold War-era nuclear arsenal over the next decade, even as the overall U.S. defense budget is declining and U.S. military planners and the president have determined that the United States can deter nuclear threats against the United States and its allies with far fewer nuclear weapons.

This report argues that the increasingly high cost of nuclear weapons, combined with shrinking budgets and stockpiles, should compel the executive branch, Congress, and the American public to rethink current plans to rebuild U.S. nuclear forces in the years ahead.

The Unaffordable Arsenal **outlines common sense ways to save roughly $70 billion over the next decade across all three legs of the triad by scaling-back, delaying, and/or deferring expensive new delivery systems and by taking a more disciplined, straightforward approach to nuclear warhead life-extensions and refurbishments.**

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