

10

Big Nuclear Ideas for the Next President

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November 2016

Edited by Tom Z. Collina
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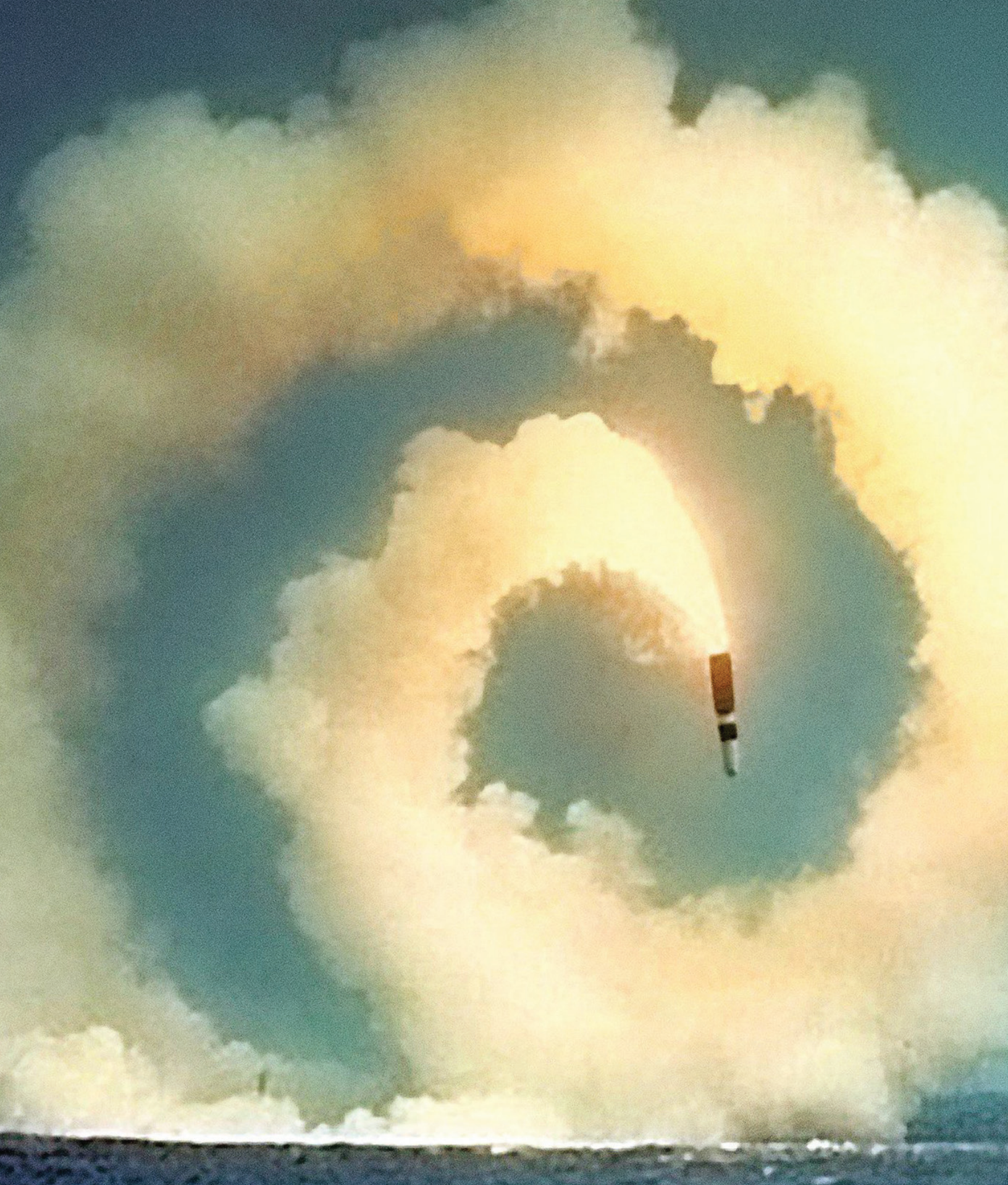
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Foreword

Reduce, Reform, and Restrain: a Nuclear Agenda for the 21st Century

In 2009, President Barack Obama committed in a speech in Prague to “put an end to Cold War thinking,” and to “reduce the role of nuclear weapons in our national security strategy.” During the president’s historic visit this year to Hiroshima, the site of the first atomic bombing, he recommitted to that vision, and called on nations that possess nuclear weapons to “have the courage to escape the logic of fear and pursue a world without them.”

Having traveled to Hiroshima in 1985 to commemorate the 40th anniversary of the atomic bombing, I have seen first-hand this powerful reminder of America’s responsibility to reduce the threat of nuclear war. Unfortunately, as a result of outdated Cold War thinking that no longer reflects today’s security needs, the risk of nuclear catastrophe persists to this day.

One of the central responsibilities of the new presidential administration will be to address that risk, and this invaluable report from Ploughshares Fund provides a blueprint to achieve that critical mission. The diverse perspectives in this report are united around a common vision, one that Ploughshares Fund has embodied and promoted with exceptional clarity — if we want future generations to inherit a safer world, we must end our misguided approach to nuclear armament.

We can see the consequences of that approach in our bloated nuclear arsenal. During the Cold War, the Soviet Union and the United States built tens of thousands of nuclear weapons in an escalating arms race that endangered human survival. Since the end of the Cold War, important progress has been made on arms control. The United States and Russia have both reduced the sizes of their nuclear arsenals. And under the terms of the New START Treaty, an arms control agreement negotiated between the United States and Russia, each country should have no more than 1,550 deployed strategic warheads by 2018.

But this recent progress has come at a cost. In exchange for the support of some Senate Republicans for passage of New START in 2010, President Obama promised to fund a major modernization of America’s nuclear arsenal, encompassing all three “legs” of the nuclear triad — our nuclear forces on air, land and sea.

Since then, the projected cost for modernization has grown substantially. Today, independent estimates suggest that nuclear weapons sustainment and modernization plans could cost American taxpayers nearly \$1 trillion over the next 30 years.

Before taxpayers are saddled with a bill for this nuclear weapons spending spree, the next administration and

Congress must ask serious questions about how nuclear modernization will affect U.S. security and global stability. In light of our changing global security needs, we must reduce our nuclear spending, reform our nuclear posture and restrain our nuclear war plans.

To start with, both Congress and the president should reconsider the Pentagon’s plans to create new nuclear weapons, especially a dangerous new nuclear air-launched cruise missile, which will cost at least \$20 billion over twenty years. This nuclear cruise missile, also known as the Long-Range Stand-Off weapon (LRSO), will provide an unnecessary capability that could increase the risk of nuclear war.

The LRSO is the epitome of nuclear weapons overkill. The Pentagon has already committed to building a new nuclear-capable bomber, the B-21, a modernized gravity bomb, the B61, a new land-based ballistic missile and a next generation nuclear-armed ballistic missile submarine, the Columbia-class. It is unclear what deterrent capabilities the LRSO would provide that these systems do not. Between our existing and planned nuclear capabilities and our massive conventional arsenal there is absolutely no justification for spending billions of dollars on a new and destabilizing air-launched cruise missile.

The LRSO could also undermine U.S. security. Nuclear cruise missiles are

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dangerous because they are difficult to distinguish from non-nuclear varieties. As a consequence, if the United States used a conventional missile in a conflict with Russia or China, it could lead to devastating miscalculation and to accidental nuclear war.

Worse still, the Defense Department has justified the value of this new nuclear cruise missile by asserting that it is needed for purposes “beyond deterrence.” The Pentagon explains that the LRSO could be used to respond “proportionately to a limited nuclear attack.” Nothing embodies dangerous Cold War thinking more than planning for a so-called “limited” nuclear war.

There is no such thing as limited nuclear annihilation. Instead of promoting weapons that enable nuclear warfighting, the United States must reaffirm that a nuclear war can never be won and must never be fought.

The United States should also reconsider whether we need to spend money on retaining all three legs of the nuclear triad. In particular, we should re-examine whether we need ground-based missiles. When these missiles were first built, they were far more survivable, but due to advances in the precision of our adversaries’ nuclear weapons, today they are the least survivable weapon in our arsenal. Because these missiles are vulnerable to being destroyed in a first strike, the president would have

only minutes to decide whether to “use them or lose them” in a crisis, creating pressure for nuclear escalation.

That’s why prominent strategists, including William Perry, a former Secretary of Defense, and General James E. Cartwright, a former commander of our nuclear forces, have called for the United States to gradually phase out these vulnerable and destabilizing ground-based ballistic missiles. Instead, we would continue to rely on bombers and submarines, which would not be vulnerable to destruction in a first strike. Phasing out ground-based missiles would not only reduce the risk of inadvertent nuclear war by reducing pressure for escalation, but it would also save about \$238 billion over the weapon’s lifetime while maintaining a credible deterrent that ensures the security of our homeland and our allies.

These sensible reductions in our nuclear modernization plans can be augmented by reform of our outdated and destabilizing nuclear posture. More than a quarter-century after the end of the Cold War, the United States still maintains the option of using nuclear weapons first in a conflict. Retaining this option exacerbates mutual fears of surprise attack, putting pressure on other nuclear-armed states to keep their arsenals on high-alert and increasing the risk of unintended nuclear war.

In light of our unmatched conventional military capabilities, the United States does not need to rely on the threat of nuclear first-use to deter non-nuclear attacks on our homeland or our allies. By adopting a policy of no-first-use, the United States could reduce the risk of accidental nuclear conflict while deterring both conventional and nuclear threats to our security.

Concurrently, the United States should scrap plans to launch nuclear weapons in response to the mere warning of a nuclear attack. This policy undermines the president’s ability to carefully deliberate in a crisis, and it raises the prospect of devastating mistakes in the event of false alarms. Any choice that could poison the earth for centuries should be deliberated for more than a few minutes.

We must also avoid constructing excessive and provocative missile defense systems. Currently, U.S. law states that our government will pursue a National Missile Defense capable of defending against *limited* ballistic missile threats. This approach is meant to protect our territory against missile attacks by countries such as Iran and North Korea, without threatening Russia or China’s nuclear deterrent.

As recognized by generations of responsible policymakers, constructing missile defenses aimed at Russia or



If we want other countries to reduce their nuclear arsenals and restrain their nuclear war plans, the United States must take the lead.

China would be self-defeating and destabilizing. Expanding our missile defenses could cause Russia and China to fear that the United States seeks to protect ourselves from retaliation so we can carry out a preemptive nuclear attack on their homelands. These fears would result in a new, dangerous nuclear competition. China and Russia could respond to our defenses by building additional nuclear weapons and putting them on high alert.

Unfortunately, the National Defense Authorization Act passed in early 2016 by the Senate and House of Representatives would increase the likelihood of that outcome by calling for an expansive missile defense system. Instead of making Americans more secure, this reckless policy would set us on the path to wasting enormous amounts of money, while exposing Americans to additional danger by triggering a new nuclear arms race. If Congress and the next president wish to avoid that outcome, they should continue to impose prudent limits on our missile defenses.

And if we are fully committed to leading the global effort to reduce the risk of nuclear war, we must strengthen the global nuclear testing moratorium. This year marks the 25th anniversary of the closure of the Semipalatinsk testing site in Kazakhstan, which served as the Soviet Union's primary venue for conducting nuclear tests. Following that closure, the Soviet

Union suspended nuclear testing, and in 1992, the United States followed suit. Four years later, President Bill Clinton signed the Comprehensive Test Ban Treaty (CTBT), a landmark effort to ban all nuclear weapons tests globally.

Since 1992, every American president has maintained the moratorium on U.S. nuclear tests. That consistency across both Democratic and Republican administrations reflects the consensus that the United States can maintain a safe, secure and effective nuclear deterrent without conducting explosive tests. Unfortunately, in 1999, the United States Senate failed to ratify the CTBT and the treaty has yet to enter into force.

Ratifying the CTBT and strengthening the International Monitoring System that allows for the treaty's verification should be top priorities for the United States Senate. Furthermore, the next president should build on President Obama's multilateral efforts by persuading other states, especially India and Pakistan, to sign and ratify the CTBT. This policy would strengthen U.S. national security, boost the global nonproliferation regime and reduce the risk of dangerous confrontation and competition between the world's nuclear powers.

As the next administration considers how to strengthen American national security, reforming our nuclear weapons policy must be paramount. If we want other countries to reduce

their nuclear arsenals and restrain their nuclear war plans, the United States must take the lead.

Instead of wasting hundreds of billions of dollars on dangerous new nuclear weapons that do nothing to keep our nation safe, the next administration should scale back nuclear modernization plans. Instead of increasing the risk of nuclear catastrophe by maintaining an outdated nuclear posture, we should deepen our commitment to reduce the role of nuclear weapons in our security strategy. Instead of retaining the option of conducting unnecessary and destabilizing nuclear tests, we should lead the way to a lasting global moratorium by ratifying the CTBT. And instead of provoking Russia and China with expanded missile defenses that will ultimately fail, we should work toward new arms control agreements.

The lessons of Hiroshima and the past are clear: it is the moral imperative of every responsible nation of the world to ensure that nuclear weapons are never used again.

Senator Edward J. Markey is a United States Senator from Massachusetts. He is the author of Nuclear Peril: The Politics of Proliferation and the co-founder of the Congressional Bipartisan Task Force on Nonproliferation.

Introduction

Big Ideas for Big Challenges

Nuclear weapons will pose major global security challenges for the next president. The new administration cannot just pick up on these issues where the Obama administration left off. In some cases, major course corrections are needed. The Ten Big Nuclear Ideas in this report are intended to address these challenges and to help make America safer and more secure.

Nuclear weapons are still vastly overvalued in U.S. defense policy, with missions they cannot achieve and budgets they do not deserve.

Nuclear dangers abound. On the strategic front, U.S.-Russian relations are at the lowest point since the end of the Cold War. Prospects for continued progress on bilateral nuclear arms reductions are bleak. U.S. plans to rebuild and maintain its nuclear forces, estimated to cost \$1 trillion over 30 years, threaten to rekindle a new arms race, break the Pentagon budget and undermine nonproliferation efforts.

Globally, North Korea's march toward smaller nuclear weapons and longer-range missiles has emerged as a key nonproliferation challenge. Meanwhile, despite international progress in

controlling nuclear materials that could be used by terrorists to make a bomb, those materials are still being produced, increasing risks of theft. And worldwide frustration with the slow pace of nuclear arms control threatens to undermine nonproliferation efforts, with 123 countries voting at the United Nations in October, over U.S. opposition, to launch negotiations toward an international ban on the bomb.

Faced with these stormy atomic seas, what should the new president do?

First and foremost, the White House needs to rethink the bomb. President Barack Obama made progress on key nuclear issues during his tenure, such as the New START Treaty, the Nuclear Security Summits and the Iran nuclear agreement. But, ultimately President Obama was unable to fundamentally change the way the bureaucracy *thinks* about the bomb.

Nuclear weapons are still vastly overvalued in U.S. defense policy,

with missions they cannot achieve and budgets they do not deserve. These weapons do not address the highest priority threats we face, such as nuclear proliferation, terrorism and cyber attacks. We would be safer in a world without them.

If Russia continues to oppose cooperation on arms control, the United States can go its own way, as it has done before. As former STRATCOM Commander Gen. James Cartwright and former Secretary of Defense William Perry argue in this report, Washington can reduce its nuclear forces independently from Moscow. There are no strategic reasons that the United States must match Russia bomb for bomb.

In fact, Washington would benefit by charting its own course: arsenal reductions would limit risks of accidental war, save hundreds of billions of dollars and build support for nonproliferation efforts. The next president should not hand Moscow veto power over U.S. nuclear policy.

Big challenges demand bold ideas. Ploughshares Fund is proud to offer this report in the spirit of fostering public debate on these important nuclear issues as a new president enters 1600 Pennsylvania Avenue. It is time for new thinking at the highest levels.



Break with Cold War Thinking

Dear 45th President, welcome to the White House. You now have an opportunity to make a lasting impact on national and international policy. But whatever your priorities may be — national security, education, immigration, the deficit or the environment — one issue can trump them all: nuclear weapons. Unless you make a definitive break with Cold War thinking, you may undermine everything else you and so many others are striving to accomplish.

The massive U.S. nuclear arsenal, inherited from last century's Cold War era of bipolar military confrontation, is poorly suited to address the alarming challenges posed by today's security threats. Failure to significantly reconfigure our nuclear strategy by keeping the status quo may jeopardize your administration's work because of a nuclear weapon incident; either through mistake, miscalculation, or act of terrorism. You have the ability to restructure our nuclear posture to a configuration that fits our 21st century national security needs. If the outdated thinking on nuclear issues is not addressed, then all your gains for U.S. leadership will be for naught.

Consider the extraordinary cost of our nuclear arsenal that squanders the nation's wealth and impedes our ability to address more pressing priorities. The United States plans to spend about \$350 billion on nuclear weapons over the next 10 years, and up to \$1 trillion over 30 years. As they say in Washington, that's getting to be "real money," in spite of these weapons playing no role in responding to today's highest-priority threats. U.S. nuclear weapons did not keep Russia from taking Crimea. They did not stop the Islamic State from committing atrocities and stealing territory from Syria and Iraq. They cannot fight state-sponsored cyber hacks. And Ebola? Zika? Our nuclear arsenal is like a dinosaur from another age that won't stop eating our national treasure.

Some good news: due to the incredible redundancy of these weapons, we can forgo a large portion of the arsenal, realize significant monetary savings and still keep a strong deterrent.

For example, as General James Cartwright, former STRATCOM commander argues, the United States can reduce its deployed nuclear arsenal by one third and still keep America and its allies safe. Your administration could save about \$238 billion over the next few decades by phasing out all land-based ballistic missiles, as former Secretary of Defense Bill Perry recommends. And we could save \$20 billion by cancelling the planned nuclear-armed cruise missile, as Senator Dianne Feinstein and Representative Adam Smith propose. Consider how far these savings would go toward funding early childhood education in this country. President Dwight Eisenhower was keenly aware of these trade-offs when, in 1953 he said:

Every gun that is made, every warship launched, every rocket fired, signifies in the final sense a theft from those who hunger and are not fed, those who are cold and are not clothed.

If the classic "guns versus butter" argument is insufficient, another truth is that unbridled spending on nuclear infrastructure significantly drains money away from vital conventional military programs. These are the capabilities that we are actually using to blunt the

spread of radical terrorist groups in the Middle East and around the world. There is great irony in the fact that we have the world's most expensive, most sophisticated nuclear deterrent — yet it has no real deterrent effect on the most pressing conflicts we face.

Nuclear weapons are the dinosaurs of military hardware and with your presidency, it is time to overhaul our nuclear strategy. Your administration has a tremendous opportunity to make desperately needed changes before inertia and entrenched bureaucratic interests make creating pertinent nuclear strategies all but impossible.

Two specific changes could immediately improve our nuclear posture and bring it into today's world. They are: "no-first-use" and "no-launch-on-warning." Both would make us more secure.

A no-first-use policy would commit the United States to never *initiating* a nuclear strike. No-first-use is already an unspoken policy within the U.S. security establishment, as there is no realistic scenario today in which a nuclear first-strike would be warranted. If the United States were to strike Russia or China with nuclear weapons, the retaliation would be unimaginable and perhaps not survivable. It is more logical, and more in alignment with our national security reasoning, to pledge ourselves to no-first-use and put our priority on



survivable forces that do not project a first-strike threat.

The current launch-on-warning posture allows the unleashing of nuclear weapons immediately after detecting an apparent nuclear strike in progress, before the incoming weapons reach their targets. But false alarms do happen. As president, you may have only 12 minutes — at most — in such a circumstance to make that horrendous

decision. President Vladimir Putin has an even smaller window of 2-4 minutes because Russia's satellites are outdated. These are decisions that may kill millions of people. It is clear that technological prowess has outstripped our ability to contain these terrible weapons.

Finally, nuclear weapons offend and cause great harm to the American democratic ideals we hold dear. The United States is as much an idea as

a country, predicated on the social contract drawn by our Founders between citizens and their government.

Invented under intense secrecy during World War II, nuclear weapons and their use have never been brought to the public arena for debate. Information about the number of weapons on alert, their capabilities, their targets and their readiness are all classified. In fact, the entire topic



of nuclear strategy is considered so secret and sacred that even our elected representatives do not have the basic information regarding, and are not permitted open debate on, this arsenal that can kill millions in a moment. We are told that this profoundly anti-democratic state of affairs is necessary to protect our freedom. But this secrecy actually strips every American of the freedom to make an informed decision.

As Kennette Benedict of the *Bulletin of the Atomic Scientists* writes:

Americans have continued to cede the right to decide when the nation will launch a nuclear war to a single person. We have no voice in the most significant decision the United States government can make — whether to destroy another society with weapons of mass destruction.

I wish you well as you launch your new administration. It is with great respect that I ask you to consider my concerns that the U.S. nuclear arsenal is outdated, in crisis and in need of new strategies. You can initiate a new era of nuclear arms management that can make our nation and the world more peaceful and secure.

Valerie Plame is a former career covert CIA operations officer and best-selling author.



Reduce the U.S. Nuclear Arsenal, with or without Russia

Speaking in Berlin in 2013, President Barack Obama offered to reduce U.S. deployed strategic nuclear forces to about 1,000 warheads, or one-third below the limits of the 2010 New START Treaty. This is sound policy, as the U.S. military has determined that it can ensure the security of the United States and its allies at this lower level. But the president made the offer contingent on gaining agreement from Russia to follow suit. Moscow balked, and no agreement was reached.

This was a major missed opportunity for the United States and global security that the next administration should not repeat. The United States should reduce its nuclear forces because it serves U.S. national security interests to do so, regardless of Russia. There is no reason to retain unneeded weapons just because Russia does. Moscow does not, and should not, have a veto over U.S. actions.

Our strategic deterrence thinking, policies, strategies and operational and organizational constructs come from the bipolar superpower rivalry of the Cold War. While various strategy reviews have tweaked that approach, mutually assured destruction remains a strategic silo, largely unaffected by the realities of the challenges we face in a multi-polar world. The pace of change, diffusion of power, modern technologies and competition for limited resources require a different security construct and different tools if we are to remain masters of our destiny.

The 20th century bipolar U.S.-Soviet confrontation has rather suddenly changed into a multi-polar world with numerous emerging bases of geopolitical, economic and military power. For the United States, deterring and defeating aggression in today's world depends a great deal less on projecting a nuclear offensive threat, and a great deal more on combined operations and the skilled exercise of all the instruments of power,

both "soft" and "hard." Security, previously organized around bilateral confrontation, increasingly depends upon multilateral cooperation.

Today, U.S. forces are organized into three groupings: special operations forces, general-purpose or conventional forces and strategic forces. General purpose forces have historically been thought of as regional in capabilities, lacking the reach or the scale to act globally, reflected in the various strategy constructs of two major regional contingencies, or two major theater wars, etc. Strategic forces were designed to apply massive destructive power on very short timelines, principally against the Soviet Union and secondarily against emergent nuclear adversaries.

The United States has made a conscientious decision to design a quality general-purpose force over trying to numerically out-scale our adversaries, leveraging technology and operational and organizational constructs to offset scale and capability of any foe. Quality attributes of precision, survivability, communications and mobility continue to outpace those of existing and expected adversaries. Global reach and speed are no longer strictly the domains of strategic forces. Precision in our weapons, survivability of our forces and delivery systems and operational and organizational constructs are challenging the need for

using massively destructive weapons to inflict massively indiscriminate carnage.

These general-purpose force enhancements have allowed us to eliminate our chemical and biological weapons of mass destruction. They have also enabled us to reduce our nuclear stockpile from a reported peak of 31,000 to a reported active stockpile of 4,571 warheads.

Even though our allies are covered by the extended deterrent of our nuclear umbrella, they look to the United States not for the basing of large armies and nuclear weapons on their soil, but for the means to employ active and passive defenses and awareness and warning sensors, which are tailored against the threats they actually face. Allies seek capabilities that allow them to take defensive actions, build in decision time and invoke a diverse set of collective security defenses and alliances. The U.S. nuclear umbrella is becoming less a foundation of their security and is gradually being replaced by tailored defenses and alliances, which are increasingly more relevant.

Despite the false distinction made between strategic and tactical nuclear weapons, differences in the reach or range of the delivery systems are not operationally relevant. Today with long-range airpower used in both conventional and nuclear delivery, and emerging hypersonic flight capabilities,



delivery system reach is no longer a discriminator. We should stop using this characterization to mask the number and destructive power of these weapons.

In sizing our general-purpose conventional forces, we do not strive to attain numerical parity, we strive to maintain a competitive capability overmatch. As mentioned before, while numerical parity is a consideration it is a poor and very expensive substitute for maintaining a competitive capability overmatch. Nuclear reductions can and should be done in consultative, transparent dialogue that seeks to enjoin others to follow a similar approach. However, any reduction in nuclear weapons should be our decision, not our adversary's.

Nuclear reductions have several second and third order effects. A smaller safe, reliable, sure and more survivable stockpile reduces the risk

of mishap, unintentional use, loss and theft. Reductions in on-alert and low survivability nuclear forces address these same risks and reduce the emergent vulnerabilities introduced by the risk of cyber attack. Increases in the safety, security and surety of the weapons, sensors and communications are essential in a contested cyber environment.

The combination of robust active and passive defense systems and resilient and aware warning capabilities buy America and its allies precious decision time. These measures also dramatically reduce the likelihood of decapitating strikes. It was the possibility of decapitating strikes that justified short-fused response options for our nuclear arsenal and reduced decision times to minutes, creating use or lose scenarios for our leaders. These strategies are a terrible legacy of the Cold War. They serve no

operational utility, and as many have articulated they destabilize and reduce the decision time and options in these life-and-death decisions for civilization.

A no-first-use policy that reinforces our deterrent by increasing the range of options and time available is well within our grasp. We should embrace it. If we are to retain any of these weapons of mass destruction, they should only be extreme measures of last resort.

U.S. leadership, with reduced reliance on nuclear weapons and increased security based on non-nuclear alternatives, should reinforce non and counterproliferation efforts. If the significant expense of developing or acquiring a nuclear arsenal no longer equals a total assurance of security, the investment becomes questionable.

The United States must continue to invest in a quality force, but it cannot



and should not strive to be numerically equal or superior to its adversaries across any of its force constructs. Quality attributes of precision, survivability, communications and mobility will continue to outpace existing and forecasted numerically superior adversaries. Leveraging technology as well as operational and organizational constructs, we can more effectively and efficiently offset scale and capability of any adversary. A cornerstone tenet of deterrence is the perceived ability to remove the objective from your adversary. Denying our would-be adversaries the objectives they seek to exploit with nuclear weapons and making it clear we can survive and prevail at a time, place and with means of our choosing, does not require nuclear weapons.

How many nuclear weapons are enough? Various estimates for the size of the U.S. nuclear stockpile have been

postulated. Ranges on the low-end run between 300-500 total operational warheads as part of a total inventory, considering maintenance and hedging against defect, of 1,000-2,000 devices. Against these low-end estimates a plausible starting point would be a total operational inventory of 900-1,000 warheads and a stockpile of 1,500-2,000 devices. This is roughly consistent with President Obama's offer to reduce U.S. operationally deployed strategic warheads by one-third below the New START Treaty limit of 1,550.

Why keep 1,000 deployed? Why not zero? It is my judgment that while the United States has made significant advances in global reach, precision, survivability and command and control, the operational and organizational advances are still in their infancy. A half step to these lower warhead inventories will allow risk management and cultural adaption along with

the allocation of time and resources toward the maturing of these emergent non-nuclear capabilities.

The next administration can revive President Obama's call to reduce U.S. nuclear forces. The new president should direct the Pentagon to phase out land-based ballistic missiles and move 550 warheads from deployed status into storage, reducing the deployed force to about 1,000 strategic warheads. These are surplus weapons we no longer need, and we should not wait for Russia's approval to get rid of them.

Gen. James Cartwright, USMC, Ret. is a former Vice Chairman of the Joint Chiefs of Staff. Previously, he served as the Commander of U.S. Strategic Command. He retired from the Marine Corps on August 3, 2011, after nearly 40 years of service. Today he is the Harold Brown Chair in Defense Policy Studies at the Center for Strategic & International Studies in Washington, DC.



Phase Out America's ICBMs

Russia and the United States have started rebuilding their Cold War nuclear arsenals, putting us on the threshold of a new and dangerous arms race. But we don't have to replay this drama. The U.S. plan to rebuild and maintain its nuclear force is needlessly oversized and expensive, expected to cost about \$1 trillion over the next three decades. This will crowd out the funding needed to sustain the competitive edge of our conventional forces, and to build the capabilities needed to deal with terrorism and cyber attacks.

The good news is that the United States can right-size its plans, save billions of dollars and maintain a robust nuclear arsenal. We simply do not need to rebuild all of the weapons we had during the Cold War. Case in point, the United States does not need to build a new land-based ballistic missile or a new nuclear-armed cruise missile.

The next president should review current U.S. plans, looking for ways to reduce nuclear dangers. If this examination leads to a reduction in presently planned nuclear programs and costs, it would be consistent with the 2016 Democratic Party platform, which states that the party "will work to reduce excessive spending on nuclear weapons-related programs that are projected to cost \$1 trillion over the next 30 years."¹

In addition, ten Democratic senators recently wrote to President Barack Obama, including former presidential candidate Bernie Sanders and Elizabeth Warren, calling on Obama to "scale back plans to construct unneeded new nuclear weapons and delivery systems."² A similar letter from House members warns that the nuclear plan may be "neither affordable, executable, nor advisable."³

The United States is in the very early stages of a program to build a new generation of missiles, submarines and bombers, which is likely to cost

\$30 to \$40 billion dollars a year for the next several decades. Instead of over-investing in nuclear weapons systems and encouraging a new arms race, the United States should build only the levels needed for deterrence. We should encourage Russia to do the same; but even if it does not, our levels of nuclear forces should be determined by what we *need*, not by a misguided desire to match Moscow missile for missile. If Russia decides to build more than it needs, it is *their* economy that will be destroyed, just as it was during the Cold War.

Russia has begun building a new generation of missiles, submarines, bombers, bombs and warheads, for both their strategic and tactical nuclear forces. The Russian state media has embarked on an aggressive program to advertise, and even flaunt, these new weapons. Russia has renounced its former policy of "no-first-use" of nuclear weapons and announced that nuclear weapons could be their weapons of choice in a security crisis.

The Russian program was established during a period when the Russian economy was booming, based on very high revenues from oil and natural gas, which are primary contributors to the Russian federal budget. But oil prices are less than half of what they were a few years ago, and show no signs of an early recovery.

This extensive rebuilding program clearly has been influenced by the significant deterioration of relations between the United States and Russia. This deterioration was a direct result of Russia's annexation of Crimea, incursions into Eastern Ukraine, and threats to the Baltic nations; but it has been heavily influenced by longer-standing disputes over NATO expansion, European ballistic missile defense deployment and American support for the so-called color revolutions.

The tense relations today are a *causative* factor in the present nuclear arms buildup, but they also make it *more dangerous*. I do not believe that a nuclear war would be started deliberately by either Russia or the United States, but it is all too conceivable that a nuclear war could be started accidentally or through miscalculation.

During the Cold War, these theoretical dangers became real dangers several times. The United States had at least three false alarms that could have led to an accidental nuclear war, and I participated directly in one of those, an experience that has deeply influenced my thinking. In each case, tensions between the United States and Russia were low at the particular time of the false alarm so that a surprise attack did not seem credible. If any of these false alarms had occurred during a period of

high tension, such as the Cuban Missile Crisis, we might have wrongly believed that a disarming nuclear attack was underway and responded to the false alarm by launching our Intercontinental Ballistic Missiles (ICBMs), thus starting a nuclear war by *accident*. During the Cuban Missile Crisis, a *miscalculation* by either Kennedy or Khrushchev could have precipitated a nuclear war, but we were spared that catastrophe by exceptionally capable diplomacy (and a lot of luck).

Our present nuclear arsenal was conceived and built during the Cold War, but we should not assume that it is the right arsenal for today's needs. There have been fundamental changes in technology and in geopolitics these past four decades. One fundamental change is the strength of NATO conventional forces: during the Cold War our conventional forces were only a third the size of Warsaw Pact forces, and, in the early years, not qualitatively better. Today NATO has significantly stronger conventional forces than Russia, both quantitatively and qualitatively.

Another fundamental change is that during the Cold War, we were faced with Warsaw Pact forces as well as those of the Soviet Union. Today most of the Warsaw Pact nations and many of the former Soviet Republics are not allied with Russia. And certainly the West today has a commanding lead over Russia in economic strength and technological innovation. What remains the same is that Russia has a strategic nuclear arsenal essentially equal to that of the United States, and a tactical nuclear force significantly larger.

The United States does not need to rebuild its nuclear forces to match those it had during the Cold War. And yet Washington must do what is necessary to maintain a robust deterrent. The question is where to draw the line.

Sea

First, the U.S. arsenal plan calls for new nuclear-armed submarines, which I support, assuming a critical analysis of the number of subs needed. I believe that the submarine force alone is sufficient for assured deterrence, and will be so for the foreseeable future. But as technology advances, we have to recognize the possibility of new threats to submarines, especially cyber attack and detection by swarms of drones. Our new submarine program should put a special emphasis on improvements to deal with these potential threats, assuring the survivability of the force for decades to come.

Air

Second, U.S. plans call for the development of a new bomber, the B-21, with improved stealth capability. I support that program (again, assuming a critical analysis of the numbers) because it provides backup should the submarines ever suffer a temporary problem that raises a question about their capability. This is not likely, but the bomber force is an insurance policy for that contingency. The new bomber would be dual capable, usable for conventional or nuclear missions, and would give us a critical new capability for our conventional forces, even if it were not necessary for deterrence.

That said, I do not support the development of new air-launched nuclear cruise missiles, which are unneeded and destabilizing. With the refurbished B61 bomb, we can maintain an effective nuclear-armed bomber force without a nuclear cruise missile.

There is still an open question as to whether the new bomber should be manned or unmanned. I believe that technically either is viable, providing that unmanned means *remotely*

controlled. It is vital that any bomber with a nuclear mission have continuous human control, including a recall capability. That could be achieved with a remotely controlled system but not with a fully automatic system.

Land

The third part of the U.S. nuclear arsenal is the land-based ICBM force. During the Cold War, we leaned heavily on ICBMs because they provided accuracy not then achievable by submarine launched missiles and bombers, and they provided another insurance policy in case the sub force somehow became disabled. Today, we have quite high accuracy in both our submarine and bomber force, and we have enough confidence in them that we do not need an additional insurance policy. We do not need a "belt and suspenders" for our "belt and suspenders."

We can safely let the ICBM force phase out when it reaches the end of its useful life, and not build a replacement missile. This would allow us to invest instead in improving our capability in irregular forces and cyber warfare, which are pressing problems for our military.

As we learned the hard way, there is only one way to win an arms race. Refuse to run.

Not rebuilding the ICBM force would be a considerable cost savings (reportedly \$238 billion over its



lifetime),⁴ but my primary concern with ICBMs is that they could trigger an accidental nuclear war. If our sensors indicate that enemy missiles are en route to the United States, the president would have to consider launching our ICBMs before the enemy missiles could destroy them in their silos; and once they are launched, they cannot be recalled. The president would have about 10 minutes to make that terrible decision.

This is not an academic concern. As I experienced firsthand forty years ago, human errors *do occur*, as do machine errors. And while the probability of an accidental launch is low, we do not have to take that terrible risk anymore. We should not rebuild our ICBM arsenal.

In 2006, I joined my colleagues George Shultz, Henry Kissinger and Sam Nunn in an op-ed alerting the world to the present dangers of nuclear weapons, and calling for actions to decrease those dangers and ultimately eliminate them. For several years, the world took timely and important actions in that direction, most importantly, the Nuclear Security Summit meetings. But the sharp downturn in relations with Russia and the aggressive rebuilding of the Russian nuclear arsenal

has stopped that progress. I believe that we should give high priority to diplomatic initiatives that can regain earlier momentum, but in the meantime we must prepare for our security.

I believe, sadly, that this entails rebuilding part of our nuclear arsenal, but we should do it in a way that does not aggravate the present dangers, nor burden us with unnecessary costs, and that keeps the door open to a return to reductions in nuclear arms and in nuclear dangers. Indeed, a significant success in diplomacy could allow both the United States and Russia to reconsider the kind of nuclear arsenals needed for security, and jointly scale back the new programs while they were still in their early stages.

Russia and the United States have already been through a nuclear arms race. I had a front row seat, and once was enough. We spent trillions of dollars and took incredible risks in a misguided quest for security. This time, we must show wisdom and restraint. Indeed, Washington and Moscow both stand to benefit by scaling back new programs before it is too late. As we learned the hard way, there is only one way to win an arms race. Refuse to run.

William J. Perry was the 19th U.S. Secretary of Defense.

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Senator Dianne Feinstein and Representative Adam Smith

Cancel the New Nuclear Cruise Missile

The Defense Department has proposed to build a new, powerful nuclear cruise missile called the Long-Range Standoff weapon (LRSO). In our opinion, this weapon is unnecessary, incredibly expensive and would move the United States closer to actually using a nuclear weapon — an unthinkable action.

The LRSO would be a new nuclear weapon. It would have a significantly upgraded nuclear warhead capable of immense destruction and the missile itself will possess added military capability, for example the capacity to evade the world's most advanced air defense systems. Its early development has already been funded, even though it has received very little debate in the administration and in Congress and is largely unknown to the general public. This is unfortunate — and in our opinion very dangerous — and we believe the LRSO must receive additional scrutiny and public debate.

The LRSO would be part of a proposed 30-year, \$1 trillion plan to overhaul the entire nuclear weapons enterprise. However, this proposal is neither affordable, executable nor advisable in order to maintain an effective and reliable nuclear deterrent.

We are convinced that the LRSO creates unnecessary risks of miscalculation in a conflict, lowers the threshold for nuclear use, is not necessary to preserve nuclear deterrence and will draw scarce resources away from other nuclear assets and advanced conventional capabilities. We are calling on the next administration and our colleagues in Congress to carefully reexamine the need for the LRSO and weigh any potential value against the risks this new weapon would create.

During the Cold War, the United States built air-launched nuclear cruise missiles to defeat advancing air-defense systems. Rather than sending large, lumbering aircraft like the B-52 into harm's way, bombers could launch nuclear cruise missiles from hundreds of miles away. These nuclear cruise missiles also had the added advantage of forcing the Soviet Union to build expensive air defenses along its borders, siphoning money from other military capabilities.

Today, the United States has multiple penetrating bombers and fighters capable of avoiding enemy air defenses, including the B-2, the new F-35 and eventually the B-21. All three platforms will be capable of dropping nuclear gravity bombs such as the B61, which itself is now being modernized by the Energy Department.

Because the United States will have multiple ways of employing nuclear weapons from the air, including from a stealthy new bomber, another expensive standoff weapon capable of being launched at an enemy from tremendous distance is not needed. Even if future enemy air defenses were able to hold our stealth fighters and bombers at bay, the United States could still reliably respond to nuclear aggression with hundreds of ballistic missiles, for which there is no defense.

However, maintaining nuclear deterrence may not be the primary

motivation for developing the LRSO. In a letter sent two years ago, Under Secretary of Defense Frank Kendall wrote the following ominous sentence: "Beyond deterrence, an LRSO-armed bomber force provides the president with uniquely flexible options in an extreme crisis." Such an approach is risky and not advisable.

We firmly believe that the only legitimate reason to maintain nuclear weapons is deterrence. Nuclear weapons are not and must not become "flexible options" for use in nuclear warfighting as an alternative to the use of conventional weapons.

Building a new nuclear weapon that provides such flexibility risks undermining deterrence by introducing uncertainty into an adversary's decision-making. For example, Congress has mandated that the LRSO be both conventionally and nuclear-armed. In the event of a conflict, an adversary could plausibly mistake the launch of a conventional cruise missile at a great distance for a nuclear weapon, sparking an accidental nuclear exchange.

The fact is that employing the LRSO as a warfighting weapon in a limited nuclear exchange could cause unintended, rapid escalation toward all-out nuclear war. Referring to Russia's dangerous doctrine of "escalating to de-escalate," Deputy



Secretary of Defense Robert Work testified before the House Armed Services Committee on June 25, 2015, that, “Anyone who thinks that they can control escalation through the use of nuclear weapons is literally playing with fire. Escalation is escalation, and nuclear use would be the ultimate escalation.”

The United States must maintain a safe, secure and reliable nuclear deterrent. However, developing a new generation of nuclear cruise missiles would unnecessarily siphon limited resources from preserving nuclear deterrence without adding to our national security.

Those resources could be better used to build the Navy’s next generation of ballistic missile submarines, the most survivable leg of the nuclear triad, and to develop the Air Force’s B-21 strategic bomber, which would play a role in both conventional and nuclear missions.

To date, Congress has appropriated \$223 million for the Air Force to begin development of the LRSO and for the Energy Department’s early work on refurbishing the W80 warhead. In fiscal year 2017, the president requested an additional \$315 million, which both the Armed Services and Appropriations Committees have agreed to fully fund.

According to estimates provided by the Defense and Energy departments, the cost to complete the LRSO will be approximately \$20 billion. Congress will be asked to fully fund this new weapon during the height of an estimated \$1 trillion nuclear modernization program that includes investments in new long-range stealth bombers, ballistic missile submarines, ground-based intercontinental ballistic missiles and nuclear-capable fighters, as well as modernize the associated nuclear warheads and infrastructure, including increasing nuclear warhead production capacity across the nuclear complex.



We believe it would be far wiser to invest in our conventional standoff capabilities, such as the Air Force's Joint Air-to-Surface Standoff Missile and the Navy's Tomahawk cruise missile. Both of these weapons can precisely attack targets from hundreds of miles away and will not risk crossing the threshold to a nuclear exchange, starting an uncontrolled escalation into an all-out nuclear war, killing hundreds of thousands of civilians, or producing radioactive fallout that would irreparably damage the planet.

Congress would be wise to follow the recommendation of the last nuclear

posture review, which stated that the United States will "reduce the role of U.S. nuclear weapons in U.S. national security strategy" by strengthening our conventional military capabilities, and at a minimum conducting an analysis of alternatives for the nuclear cruise missile that includes conventional capabilities.

Reconsidering or delaying the LRSO would provide us an opportunity to realistically assess how we can best support our national security priorities. Doing so would help us strengthen our ability to deter nuclear attack by maintaining effective nuclear forces, reduce the risk of an accidental or

unintended nuclear war and freeing up vital resources to invest in the conventional capabilities that we need to protect American interests across the globe.

Senator Dianne Feinstein is the senior United States Senator from California, and the ranking member of the Senate Select Committee on Intelligence.

Representative Adam Smith is a member of the United States House of Representatives from the State of Washington, and is the ranking member of the House Armed Services Committee.



Add Democracy to Nuclear Policy

The 2016 U.S. presidential campaign has, among other things, reminded the public that the president has the sole authority to launch a nuclear attack. While public discussion focused on the temperament, judgment and character of the person occupying the office of the presidency, it has also raised the larger question about the democratic legitimacy of a single person being able to launch a nuclear war. As William Broad and David Sanger of *The New York Times* put it, “is there any check on a president’s power to launch nuclear arms that could destroy entire cities or nations?” Their answer is no, not really.¹

As President Richard Nixon observed in 1974, “I can go back into my office and pick up the telephone and in 25 minutes 70 million people will be dead.”²

As it stands today, long after the fall of the Soviet Union and the perceived need to act quickly in response to its actions, Americans have continued to cede the right to decide when the nation will launch a nuclear war to a single person. We have no voice in the most significant decision the United States government can make — whether to destroy another society with weapons of mass destruction.

To safeguard our democracy and reduce the risk of a nuclear weapons launch, the next administration should: place our nuclear weapons on a much lower level of launch readiness, release to the public more information about the nuclear weapons in our own arsenals, include legislators and outside experts in its nuclear posture review and recognize Congress’ authority to declare war as a prerequisite to any use of nuclear weapons.

Of all the powers of the U.S. president, that of Commander in Chief of nuclear military forces is the most grave, and carries with it the responsibility for the welfare of the world. The current posture and readiness of U.S. nuclear forces gives the president power

to wipe out entire nations within 30 minutes of a launch command.

Normally, under the Constitution, only Congress has the power to declare war. Yet, our nuclear doctrine of deterrence and prompt retaliation in the face of incoming missiles requires rapid reaction with no time for consultation with Congress or even with cabinet members and national security advisors. The result is that the most consequential decision a president can make, with the potential to obliterate nations and kill millions of people, is made in secret and without deliberation.

How is it that, in the longest surviving democracy, the power to wreak the most catastrophic destruction in the history of the world is held by a single person? Such power completely contradicts the constitutional checks and balances that the Founders created in 1787. It is long past time to reexamine policies that place such massively destructive power in the hands of one person.

Current nuclear doctrine is a carryover from the Cold War between the United States and the Soviet Union. The nuclear age dawned at the end of World War II, when President Harry Truman ordered the atomic bombings of Hiroshima and Nagasaki.

But that decision was made by a Commander in Chief in a time of war. Immediately following World War II, the militarization of conflict with the Soviet Union led U.S. presidents and national security policy advisors to use the new nuclear arsenal as a means of *detering* the Soviets.

In particular, two assumptions of nuclear deterrence fly in the face of democratic norms — speed and secrecy. The need for speed derives from the nuclear postures of the two superpowers. Not only did each build large arsenals of weapons to overwhelm the adversary, but they also maintained the arsenals in a high state of launch readiness. In the event of a surprise attack, each could launch missiles even before the enemy’s had exploded on their soil, using their nuclear capability rather than seeing it destroyed by enemy incoming missiles. The idea was to “use them or lose them” in the face of Soviet attack. Since it takes only 30 minutes for an intercontinental ballistic missile to reach the enemy, neither side had time for deliberation. And certainly there was no time for Congress to declare war. However, in a supreme irony of history, by placing speedy retaliation against an authoritarian regime in the hands of the president, a democratically elected president became an authoritarian leader.

Throughout the Cold War, the United States and the Soviet Union maintained secrecy about their own capabilities to keep the other side off balance and to gain technical superiority. In the 1940s, the United States sought to keep bomb designs secret with the unrealistic hope that the Soviets would never figure out how to make an atomic bomb. That hope was dashed in 1949 when the Soviets tested their first atomic bomb, and again in 1953 when they tested their first thermonuclear bomb just a few months after the United States tested theirs. Although the need for secrecy was invoked to keep information about the bomb from other countries, knowledge leaked and weapons have proliferated ever since 1945. Yet, government leaders have also invoked the need for secrecy to keep information about nuclear war fighting from their own citizens. Ironically, officials in the Soviet Union knew more about U.S. nuclear forces and capabilities than U.S. citizens did.

In the early 1990s, with the demise of the Soviet bloc and normalization of relations between Russia and the United States, it would have made sense to rethink nuclear deterrence and especially the need for quick launch and retaliation. Beginning in 1994, the superpowers were working together to dismantle their nuclear weapons through a cooperative program that provided transparency about nuclear forces and even partial sharing of war plans. Yet, neither military command revisited the fundamentals of nuclear deterrence — a doctrine devised during the most hostile days of the Cold War. Nor was there an opening up of the policymaking process to include legislative members or interested citizens in either country.

Today, continued secrecy and assumed requirements of high launch readiness prevent democratic consideration of how weapons should be deployed or even serious public discussion of how much money to spend on them. The result is a set of policies that, in effect, will perpetrate mass murder of innocent civilians in other countries without the explicit consent of the citizens in this democracy.

When it comes to nuclear weapons then, the conduct of war lies wholly outside the social contract between citizens and their government.

When it comes to nuclear weapons then, the conduct of war lies wholly outside the social contract between citizens and their government. With the capability to launch nuclear weapons without a declaration of war by Congress, the president becomes a tyrant, acting on his or her own outside the democratic institutions provided for in the Constitution.

Even though they had no way of envisioning the advent of the nuclear age, the Framers of the U.S. Constitution understood the dangers of tyranny and lodged the power to

declare war and provide resources for war-making with Congress rather than the president. They believed that ceding such power to the executive would contribute to lawlessness among nations and a state of perpetual war. The Founders viewed citizen participation in decisions about war as a necessary check on the power of the president and as a way to prevent the tyranny they had fought against as colonists under British rule.³

Some see an antidote to this nuclear tyranny in today's popular election of the president, who is said to represent us all. Yet, we are a nation of laws and institutions for a reason. Individuals can fall ill, be corrupted, or exercise poor judgment. That's why the U.S. Constitution places checks and balances on the actions of individual leaders by providing for three bodies of government — the executive, the legislature, and the judiciary. When it comes to waging war, the Constitution makes a special provision: the largest deliberative body in our government is given the responsibility to decide. Placing our own citizens in harm's way to kill and injure those in other societies is the most consequential decision a nation can make. The Founders understood that such a grave responsibility should be lodged in the institution that is the most broadly representative of the population and that affords the greatest opportunity for deliberation.

What is the remedy for this nuclear tyranny? Measures should be taken immediately that would place the United States on a path to more democratic decision-making when it comes to the use of nuclear weapons. First, nuclear weapons should be placed on a much lower level of launch readiness, even to the point of

removing warheads from missiles until the time when they may be needed. The United States and Russia are the only two countries that have nuclear bombs ready to go within minutes of a command; yet, we are no longer locked in a struggle for world domination, and the risks of accidental or unauthorized launch are too great to continue this unnecessary policy. Such a reduction in launch readiness would immediately reduce the risk of launch by a president without consultation.

Second, the U.S. government can publish information about the nuclear weapons we have in our arsenals, setting an example for other countries to follow, and most importantly, provide information to its own citizens to use in their discussions about nuclear war. In fact, the Defense Department in May 2016 and the State Department in April 2015 already have begun to declare the numbers of active weapons in U.S. arsenals, as well as those awaiting dismantlement. Information about the plans for those arsenals, including potential targets and estimates of their effects would help inform voters about what is at stake when we talk about nuclear war. Ideally, the information would inspire legislators to hold public hearings about the military use of these world-altering weapons, along with the costs of their deployment and maintenance.

Third, the next U.S. nuclear posture review should include consultations with legislators and interested constituencies. As the administration prepares for nuclear war, the nation is entitled to participate in this most consequential planning. The nuclear posture review is, in effect, our rationale for when and why it is acceptable to use nuclear weapons. As such, it should be subjected to special

scrutiny, as it is being reviewed and changed in the next administration.

Fourth, Article I, section 8 of the U.S. Constitution, which gives Congress the power to declare war, should be reinstated as the law of the land. Despite near-constant U.S. military action around the world since 1945, Congress has not formally declared a war since World War II. Neither has it taken the lead in deciding when and whether to use nuclear weapons. In this context, the initiative of Sen. Edward Markey (D-MA) and Rep. Ted Lieu (D-CA) is especially welcome. Their proposed legislation, the Restricting First Use of Nuclear Weapons Act of 2016, would prohibit the president from launching nuclear weapons without a declaration of war from Congress, except in response to a nuclear attack. A president may choose to ignore such a new law, and even invoke the War Powers Act of 1973 to use nuclear weapons; but to do so would further deepen the public's alienation from their government and contribute to the decline of public trust in our democratic institutions.

Without congressional deliberation and citizen participation in the gravest decisions of life and death, our democracy is greatly diminished. Citizens are treated as children who don't deserve a voice in how our country's nuclear weapons are deployed. Experts claim they are the only ones who have sufficient training and knowledge to make policy choices about the fate of our society. That is not how a democracy should work.

It is time for citizens to exercise their democratic rights and demand a major role in nuclear weapons policymaking. The next administration should respond



with plans to reduce secrecy and increase wider participation in how our nuclear weapons are used. The likely outcome, once the public fully understands the consequences of nuclear war, is a greatly reduced role for nuclear weapons in national security policy. The certain outcome is a restoration of our democratic institutions.

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Bring Home U.S. Tactical Nuclear Weapons from Europe

In the United States, anything nuclear is inherently presidential. Any change in nuclear policy requires presidential leadership and sustained engagement. Moreover, decisions to pursue new initiatives must be made early in a new administration, and then executed over a number of years. Coming late to the nuclear policy party — or just stopping by — is usually a recipe for frustration and inaction.

The issue of whether the United States needs to continue to store tactical nuclear weapons in Europe will be no different. Changing the nuclear status quo in NATO will require the early and sustained leadership of the next U.S. president. Moreover, the clock is already ticking: with the next NATO summit looming in 2017, the next administration will need to take the initiative early in their first term, before the cement of NATO summitry and bureaucracy hardens around their legs for the next four years.

Today, there is a compelling case for NATO to move to a safer, more secure and more credible nuclear deterrent — without basing U.S. tactical nuclear weapons in Europe. That case begins with a recognition that sustaining NATO's current nuclear posture is an expense that (a) NATO members need not incur to maintain a credible nuclear deterrent; and (b) will increasingly undercut efforts to sustain credible conventional capabilities across NATO. Furthermore, the security risk of basing U.S. nuclear bombs in Europe — highlighted by the recent terrorist attacks in Belgium and political developments in Turkey — clearly demonstrate the case for consolidating U.S. nuclear weapons in the United States.

An Expensive, Out of Date and Dangerous Status Quo

The B61 life extension program (LEP) now underway in the United States is intended to replace the B61 bombs stored in Europe with a new variant, the B61-12. This program was originally justified as a cost-effective means to upgrade the safety and security of the weapons while preserving U.S. extended deterrence commitments to NATO allies. However, estimated costs have risen significantly from \$4 to \$13 billion, which for only 400-480 bombs could make this the most expensive nuclear weapon ever built.¹

The Obama administration has strongly supported the B61 LEP; nevertheless, some have questioned whether the modified B61's increased accuracy and limited earth-penetrating capability constitutes the development of a new, more usable nuclear capability.² This has raised concerns that military commanders might be more willing to recommend using the bomb based on the questionable assumption that the radioactive fallout and collateral damage would be limited.³ This could reopen uncomfortable debates over nuclear use policy in many of the host countries, à la the neutron bomb in the 1970s.

More broadly, there has been little in the way of public discussion and even less debate about what alliance missions the B61-12 has been designed to address that cannot be accomplished with other U.S. nuclear and NATO conventional capabilities.

The argument that these weapons, first deployed in Europe in the early 1950s, play a deterrent role that cannot be fulfilled today by U.S. strategic weapons or conventional weapons has been refuted by a number of military experts, including the former Vice Chairman of the Joint Chiefs of Staff under President Barack Obama.⁴ In order for any weapon to be credible as a deterrent, its use must be plausible; otherwise, it has no political utility as a deterrent. Even taking into account what some perceive to be a more “usable” weapon, it is hard to envision the circumstances under which a U.S. president would initiate nuclear use for the first time in over 70 years with a NATO dual-capable aircraft (DCA) flown by non-U.S. pilots delivering a U.S. B61 bomb. It is equally hard to envision host-country governments authorizing their aircraft to deliver the weapon. And according to at least one former NATO commander, it is hard to envision any mission succeeding even if ordered, given the political and operational constraints involved.⁵

There are also questions relating to the status and expense of maintaining and eventually upgrading DCA in NATO countries that reportedly host the B61. The nuclear sharing mission is not popular among publics or certain political parties and parliamentarians in host countries, and none of these countries has so far publicly discussed its decisions relating to enabling any DCA replacement aircraft to carry nuclear weapons. It is also not clear who will pay the extra costs to make the aircraft dual-capable. While cost figures are not publicly available, they are expected to be significant, and governments will likely face opposition in getting the consensus necessary to invest in a commitment that will sustain the nuclear mission in their countries for decades to come.

On the conventional side of the deterrence ledger, given the strong possibility that Vladimir Putin will remain president for another eight years, a long term response to Russian security policy in Europe will likely require the U.S. to commit to conventional reassurance plans beyond the \$3.4 billion tagged for 2017 (which was already four times 2016 spending). This new spending will have to be sustained against the backdrop of continuing demands for even more from certain NATO members — and continuing fiscal constraints across NATO.

Another new and increasingly alarming consideration in continuing to base U.S. nuclear weapons in Europe is the risk of a terrorist attack against a European NATO base. The U.S. Air Force cited deficiencies in the security of U.S. nuclear weapons stored in Europe in a study a few years ago, and former senior NATO officials have also raised concerns. U.S. Air Force General Robertus C.N. Remkes, who commanded the 39th Air Base Wing at Incirlik Air Base and later J5 EUCOM, wrote in 2011 of the severity of the political and security consequences of

any infiltration of a site for the alliance, whether or not the attackers gained access to the weapons themselves.¹

More recently, in March 2016, the Pentagon reportedly ordered military families out of southern Turkey, primarily from Incirlik Air Base, due to ISIS-related security concerns. This report came shortly after the Brussels terrorist attacks and what appears to have been a credible threat to Belgian nuclear power plants. In July, we saw the Turkish commanding officer at Incirlik arrested for his alleged role in the Turkish coup plot. If reports are accurate — that Incirlik is a major NATO installation hosting U.S. forces that control one of the largest stockpiles of nuclear weapons in Europe — this shows just how quickly assumptions about the safety and security of U.S. nuclear weapons stored abroad can change literally within minutes, adding another layer of security concern.

Changing the Status Quo

One thing is certain: any change in NATO's nuclear status quo will begin in the White House, and not at NATO headquarters in Brussels. The next president of the United States will need to take charge of this issue if he or she wants to move NATO towards a safer, more secure and more credible nuclear posture — without the expense, opportunity cost and risk of basing U.S. nuclear weapons in Europe.

Easier said than done? Of course. But it is also true that the next president can, and should, get this done by carefully leading — and working with — NATO. The trick is knowing when and how to lead — and when and who to work with.

First, it will be important for the next president to take the first step with allies months before the next NATO summit in 2017. Springing a new

initiative on NATO days before, or even at, the summit is counter to how NATO works, and counterproductive to getting change done.

Second, the first step taken by the administration should be comprehensive, and not incremental. The president needs to lay out a vision and rationale for moving towards a safer, more secure, and more credible nuclear deterrent — and explain in broad terms why and how this can be done to improve the security of all NATO members. In brief, the president would say something along these lines:

- I am committed to maintaining a safe, secure and credible NATO nuclear deterrent for as long as one is needed; and I am committed to sustaining conventional reassurance initiatives to meet any challenge to NATO's security.
- Both of these crucial objectives can be better achieved without the expense, opportunity cost and risk of basing U.S. tactical nuclear weapons in Europe. I will therefore consolidate all U.S. tactical nuclear weapons now stored in Europe in the United States.
- At the same time, the United States will work closely with NATO allies to strengthen NATO's overall deterrent and defense capabilities, both nuclear and conventional.
- With respect to nuclear deterrence, the United States will work closely with NATO to restructure NATO's nuclear deterrent so that it is safer, more secure, more credible and more affordable. This will include: maintaining the strategic nuclear forces of the alliance, along with a more visible demonstration of the security guarantee provided by these forces to European allies;

and enhancing information sharing, consultations and planning.

- With respect to conventional deterrence, the United States will devote a portion of the savings associated with consolidating U.S. tactical nuclear weapons back to the United States, and scale back the U.S. B61 modernization program to conventional reassurance over the next five years.

Third, the “NATO process” should then be used not to “review,” but rather to “implement” the president’s vision. No new NATO strategic concept or deterrence and defense posture review is needed. Indeed, these NATO-led reviews are often the graveyard for initiatives, large and small.

This is not to say that NATO does not, or will not, have an important role to play. NATO’s Nuclear Planning Group should be given a clear mandate in 2017 to develop and recommend to ministers and leaders how existing nuclear sharing, consultations and planning can be enhanced across NATO, and how NATO can visibly and more credibly demonstrate that it remains a nuclear alliance.

Fourth, it will be important for the president to work with Congress to ensure the smooth implementation of this initiative, including continued funding of conventional reassurance initiatives. Up until now, the Obama administration’s conventional force enhancements for Europe are being funded from an off-budget, war-fighting account meant for Iraq, Syria and Afghanistan. This avoids having to make difficult trade-offs in the Pentagon budget, and may prove unsustainable beyond 2017. The next president and Congress can and should seek to provide greater predictability and permanence regarding our commitment to bolster NATO defenses.

Finally, the next president will need to confidently make the case that it is important for NATO leaders to stop acting on the dangerous idea that mirror imaging Russian actions, in particular in the case of nuclear weapons, equates to sound security policy. Yes, Russia has retained and is now modernizing its inventory of tactical nuclear weapons in Europe. But with the United States, Britain and France, it is also true that NATO has a robust nuclear deterrent and does not need to invest in tactical nuclear weapons. In fact, NATO has a range of other defense priorities, including terrorism, migration and cybersecurity, that will demand greater attention and effort in the years ahead.

That’s a message that NATO countries need to hear from our next president — and, for their own security, the sooner the better.

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Notes

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Press Pause on Missile Defense in Europe

The Iran nuclear accord, concluded in July 2015, has fundamentally improved the outlook for European security. Iran is now much less likely to obtain nuclear warheads, and its missile programs are proceeding more slowly than expected. As a result, current U.S. plans to build additional interceptor missiles in Poland should be placed on hold.

The plan for missile defense in Europe was announced by the Obama administration in September 2009 to defend primarily against the developing nuclear and missile threat from Iran. Called the European Phased Adaptive Approach (EPAA), the word “adaptive” was used for a reason — the system would be deployed in phases, which could be adjusted to the threat as it developed. As President Barack Obama said in 2009, “if the threat from Iran’s nuclear and ballistic missile program is eliminated, the driving force for missile defense in Europe will be eliminated.”¹

EPAA’s first two phases are already in place to address Iran’s conventionally armed, medium-range missiles, but there is no need to extend that capability to target long-range missiles that Tehran does not possess. As the French ambassador to the United States, Gerard Araud, stated in May, “what we have done [on European missile defense] is enough... missile defense is not something we should do... just for itself... and it’s just common sense to link it to the re-evaluation of the threat.”²

The next president should put deployment of EPAA’s third phase on hold while reassessing the plan. This pause would potentially save hundreds of millions of dollars and provide additional time to develop more capable interceptors, if needed. This pause would not preclude the

possibility of deploying Phase III later. If Iran began developing longer-range missiles and resumed proliferation-sensitive nuclear activities, there would be ample time to respond.

European Phased Adaptive Approach

The Obama administration came into office seeking a new relationship with Russia and a new approach to U.S. plans to place anti-missile weapons in Europe. The Bush administration had called for large, land-based interceptors (similar to those in Alaska and California) to be stationed in Poland with radar in the Czech Republic. Their purpose was to defend U.S. territory against intercontinental ballistic missiles (ICBMs) that Iran was believed to be developing.

In contrast to the Bush plan, President Obama’s EPAA is proceeding in phases with smaller sea- and land-based SM-3 interceptors developed for Aegis-equipped ships. The first two phases cover Southern Europe against missiles of short and medium-range. However, later plans would come closer to those of the Bush administration. Phase III would deploy more capable interceptors in Poland to protect the rest of Europe from intermediate range missiles (IRBMs), and Phase IV would have targeted ICBMs aimed at the United States.

In line with EPAA’s purpose to avoid a capacity-driven approach disconnected from facts on the ground, in March 2013 the Obama administration cancelled Phase IV. As Deputy Assistant Secretary of State

EPAA’s phases

Phase I Complete.

X-band radar placed in Kürecik, Turkey; Aegis-equipped ship with SM-3 Block IA interceptors deployed in the Mediterranean Sea in 2011; four U.S. Aegis ships home-ported in Rota, Spain, in 2014-2015.

Phase II Complete.

Aegis Ashore site, with Block IB interceptors and radar, built in Deveselu, Romania in 2013-2016; upgraded interceptors also deployed in ships.

Phase III Underway.

Aegis Ashore site to be built in Redzikowo, Poland, with Block IIA interceptors in 2016-2018; upgraded interceptors also deployed in ships and in Romania.

Phase IV Cancelled.

Would have deployed Block IIB interceptors in Poland by 2022.

Frank A. Rose explained at the time, the interceptor planned for Phase IV had experienced “significant delays” due in part to insufficient congressional funding. A 2012 report by the Congressional Research Service noted that, “Iran has not demonstrated the kind of flight test program many view as necessary to produce an ICBM.”³

With Phase I and II already in place, Phase III commenced on May 13, 2016, with groundbreaking on a land-based Aegis Ashore site in Poland, set to be completed in 2018.⁴

The Faulty Security Rationale for Phase III

Since 2013, when Phase IV was cancelled, the threat environment has undergone profound changes. In July 2015 Iran and world powers reached a historic nuclear accord, the Joint Comprehensive Plan of Action (JCPOA). By bringing about an intrusive inspections regime, as well as significantly reducing Iran’s stockpile of enriched uranium and operating centrifuges, the JCPOA, if fully implemented, ensures that the country will not produce fissile material for a nuclear warhead for the next 15 years. If Iran were to withdraw from the accord and embark on a crash nuclear weapons program, there would be at least two years for the international community to respond.⁵ The accord is also leading to a normalization of relations between Iran and European countries.

At the same time, Iran’s missile development has fallen short of previous predictions. Iran’s arsenal is still limited to short and medium-range missiles, and Tehran does not seem to be interested in extending their reach. As Michael Elleman at the International Institute for Strategic Studies points

out, “during the past decade, Iran has focused on improving the accuracy and reliability of its missiles, with little attention to increasing range.”⁶ However, if Iran decided to develop an operational IRBM, this would require at least 3-5 years of testing.⁷

There is thus no need, at this time, for more advanced interceptors against non-existent Iranian IRBMs. Although Iran’s medium-range missiles could reach some NATO countries in Southern Europe, the infrastructure that was put in place during EPAA Phases I-II already covers this geographical area.

Regarding Phase III, former State Department intelligence analyst Greg Thielmann has noted that “the higher speed Aegis missiles to be deployed in Poland are designed to intercept longer-range missiles than Iran has developed,” and that, “it is high time for another course adjustment in EPAA implementation.”⁸

Despite the reduced threat from Iran, some seek to justify Phase III by pointing to missile threats from other countries. However, this is not necessary. The only Middle Eastern country possessing IRBMs is Israel, a U.S. ally that hardly threatens Europe, and the rest do not have advanced missile programs. Finally, missile interceptor technology is under constant development and, if deployed prematurely, will likely be obsolete by the time it might be needed.

Implications for Arms Control

Given its theoretical potential to neutralize an adversary’s nuclear second-strike capability, missile defense technology has given rise to strategic concerns since the Cold War. After those concerns were eased by the 1972 Anti-Ballistic Missile Treaty,

the issue re-emerged with the U.S. withdrawal from the treaty in 2002, triggering suspicions in Russia and China.

Russia has been particularly concerned with U.S. missile interceptors in Europe. EPAA temporarily alleviated but never completely removed that problem due to the U.S. refusal to give binding guarantees that the system is not targeted against Russia. Pointing to the potential of missile defenses to undermine its nuclear deterrent, Russia claims to have developed a new class of strategic nuclear weapons to bypass interceptors. It has also threatened to refrain from any future arms control agreements, to target countries hosting missile defense components, and to place Iskander nuclear-capable missiles in Kaliningrad for that purpose — an action that was reportedly carried out in October 2016.

Such reactions seem exaggerated, as the planned system is clearly no match for Russia’s current nuclear arsenal. As critics point out, any midcourse missile defense system is also easily rendered ineffective by countermeasures, such as decoys, and the test record for intercepting ICBMs is poor.⁹ However, Russian concerns are not completely unfounded. The key factor here is uncertainty created by future technological progress and political decisions. As Glenn Diesen and Conor Keane point out, “NATO has not ruled out the reintroduction of Phase IV nor has the possibility of a Phase V, Phase VI or Phase VII been excluded.”¹⁰ A 2011 report by the Federation of American Scientists also suggests that the interceptors deployed in Phase III could in principle “be used to create an integrated continental U.S. missile defense system that could engage Russian ICBM warheads” if moved to the north-western Atlantic. As the report notes, “even the most cursory

Russian... assessment... would consider the potential geographical reconfiguration of a mobile ship-based system.”¹¹

This situation has implications for any future arms control efforts: from the Russian perspective, the more efficient and integrated Western missile defenses become, the more likely they could threaten its deterrent — particularly if the number of nuclear weapons were significantly reduced.

Implications for Regional Security

After failed efforts to find common ground, NATO-Russia consultations on missile defense waned after 2010 and ended with the annexation of Crimea.¹² Since then, it has become commonplace to dismiss Russian anti-missile defense rhetoric as part of its general intransigence. At the same time, Russian provocations have strengthened the Alliance’s resolve to stick to their previous missile defense plans.

Missile defense has thus become tied to the conflict with Russia, which partly explains its disconnect with the developments in Iran. On the other hand, European support for missile defense has never been driven solely by the Iranian threat. Certainly the Eastern European countries hosting interceptors and radars value the system mainly because of the American military presence that it brings on their soil. As Liviu Horowitz of ETH Zurich writes, “missile defense deployments... represent an American trip wire, one that reassures elites in many countries that Washington is guarding their security.”¹³ Against this background, and given the lack of clarity about the system’s purpose, recent calls within the alliance to turn missile defense against Russia are not surprising, even though this is surely not what President Obama meant when he made EPAA

“adaptable” seven years ago.¹⁴

Missile defense is currently giving Europeans a false sense of security. The interceptors in Southern Europe provide protection against potential missile threats from the Middle East, but the deployment of Block IIA interceptors in Poland is unnecessary and counterproductive.

The next administration should press the pause button before proceeding with Phase III. At the same time, it should come up with a more sustainable way to address Poland’s anxiety about Russia.

While adding nothing by way of protecting Europe either from Iranian or Russian missiles, Phase III is increasing regional tensions. It is also undermining long-term prospects for arms control, which — however unlikely they may now seem — still remains the only realistic safeguard against the threat of nuclear weapons.

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Learn from Iran, Engage North Korea

Since official relations between Washington and Tehran were severed in 1980, five American presidents spanning a period of three decades — from Jimmy Carter to George W. Bush — have struggled to figure out how to deal with Iran. As a candidate for the presidency in 2007, then-Senator Barack Obama indicated that if elected he would take a different approach from his predecessors and “engage in aggressive personal diplomacy” with Iran. “For us not to be in a conversation with them doesn’t make sense,” he said.

Once in office, President Barack Obama pursued a dual track policy toward Iran. He began by putting in motion a “pressure track” aimed at weakening and isolating Iran’s economy through international sanctions that were harsher than those of the previous administration. In 2012, he initiated an “engagement track” and authorized U.S. officials to participate in secret diplomatic exchanges with their Iranian counterparts. This under-the-radar dialogue paved the way to formal negotiations within the context of the “P5+1” group of major powers that included the five permanent members of the United Nations Security Council — China, France, Russia, the United Kingdom and the United States, plus Germany.

The result of this three-year process of diplomacy is the landmark nuclear accord known as the Joint Comprehensive Plan of Action (JCPOA) reached in July 2015. The JCPOA places strict limits on Iran’s nuclear program — including a sharp reduction in Iran’s uranium enrichment capacity that increases breakout time from around 90 days to a year, the full elimination of the plutonium path to a nuclear weapon, and the establishment of a rigorous monitoring and inspections system — in exchange for sanctions relief.

The administration’s limited outreach to North Korea stands in sharp contrast.

As part of the February 2012 Leap Day deal, the U.S. negotiated a moratorium on the DPRK’s nuclear and missile testing in exchange for targeted food assistance. But a satellite launch by Pyongyang led to the agreement’s collapse in April 2012 and diplomacy fizzled. Some thought the visit of U.S. Director of National Intelligence James Clapper to Pyongyang to secure the release of two Americans in November 2014 would lead to diplomatic traction. Although Director Clapper returned home with the U.S. citizens in his custody, the diplomatic overture went nowhere. In fact, there has been no meaningful official dialogue between Washington and Pyongyang since Kim Jong-un assumed power following the death of his father Kim Jong-il in 2011.

Under the younger Kim’s leadership, Pyongyang has sharply accelerated efforts to advance its nuclear and ballistic missiles program. North Korea carried out its fifth nuclear weapons test in September 2016 and has launched an ongoing series of missile, rocket and other weapon tests throughout the year in violation of UN Security Council resolutions. Although some of these missile tests have been deemed “failures” by experts, it would be a mistake to discount them as the North Koreans have demonstrated learning along the way. In June, Pyongyang successfully test-launched a ballistic missile that put U.S. military bases in South Korea, Japan and Guam

within reach. A submarine-launched missile in August is estimated to have reached its longest distance to date (about 310 miles).

Some project that North Korea’s nuclear arsenal could increase from an estimated one to two dozen weapons today to as many as 100 weapons by 2020. Experts see the North Korean leadership’s twin end goals to be the ability to successfully mount nuclear warheads on ballistic missiles and to develop nuclear weapon delivery systems capable of striking the continental United States. In response to these provocations as well as ongoing human rights abuses, the Obama administration has steadily increased sanctions on Pyongyang, including tougher UN sanctions in March and unprecedented unilateral sanctions specifically targeting Kim Jong-un and senior officials in his government in July.

As the Obama presidency draws to a close, the intensifying stalemate over Pyongyang’s advancing nuclear and missile programs will be passed along to the next president to deal with. Whether a new U.S. administration would be willing to expend the political capital needed to begin diplomatic engagement with North Korea early on is a big question. But given North Korea’s expanding nuclear activities — both in terms of intentions and actual progress — along with its growing

ability to work around sanctions, the next administration would be well-advised to take a page from President Obama's playbook with Tehran and explore "aggressive diplomacy" with Pyongyang as a priority.

It is tempting to want to think that the Iran deal could be a blueprint for North Korea. But the two cases are so different that it's difficult to compare them. North Korea has crossed the nuclear weapons threshold, while Iran has never possessed a nuclear weapon. Iran is a party to the Nuclear Nonproliferation Treaty (NPT) and North Korea isn't. Beyond this, differences abound in the two countries' systems of government, economies, demographics, and so forth. As an American who has had the rare opportunity to travel to both countries over the years, I have experienced these differences firsthand.

It is clear that the applicability of the JCPOA as a model is limited at best. Nonetheless, the process of diplomacy that the U.S. pursued with Iran could offer some insights on how to begin engagement with an adversary whose leadership is extremely distrustful of the United States, and vice versa.

The following draws on the experience with Iran and identifies some key takeaways for beginning engagement with North Korea.

Initiate a Low-Key Diplomatic Channel, Authorized at the Highest Level

The Obama administration's outreach to Iran's leadership represented a bold stroke of diplomacy. It was a decision made by the president to establish a backchannel to resolve the long-running standoff over Iran's nuclear program. Following several years spent on the methodical build-up of an international sanctions coalition

against Iran, American officials began discreet discussions with their Iranian counterparts in July 2012 in Muscat, with the Omanis serving as a third-party facilitator. The change in players on the Iranian side from the Mahmoud Ahmadinejad administration to the Hassan Rouhani administration in June 2013 helped to move the process forward.

Through these discussions, the Americans conveyed a turn away from "regime change" in Iran as a strategic objective. While making clear that the U.S. was not prepared to accept a nuclear weapons capable Iran under any circumstances, they communicated they were prepared to accept Iran having a peaceful, heavily monitored nuclear capability, signaling some enrichment activities could be continued. They also dropped the precondition of requiring Iran to suspend enrichment in order to begin direct talks on the nuclear issue. These assurances and clarifications made it possible for the Iranians to move forward. As a result of the dialogue and an exchange of letters between Presidents Rouhani and Obama, U.S. officials came away with the belief that Iran was ready to begin negotiations that could lead to limiting their nuclear activities to peaceful purposes.

There reportedly were a total of 12 such secret meetings convened in Muscat, Geneva and New York over a period of about 16 months, leading to an interim agreement called the Joint Plan of Action (JPOA) in November 2013.

Key takeaways for North Korea:

The Iranian leadership took the outreach seriously because they knew the decision to engage was made at the highest level in Washington. The Iranian negotiators, in turn, were authorized to take part in the discussions by Iran's Supreme Leader

Ali Khamenei. The direct bilateral channel made it possible for the sensitive talks to be conducted away from the limelight and over a period of time that allowed the negotiators to have substantive, detailed discussions. (The breakthrough in U.S.-Cuban relations began in a similar way when President Obama authorized secret talks in spring 2013 with Cuba.) The dialogue provided opportunities for American and Iranian officials to convey authoritative messages and reassurances, opening the way for an interim deal.

The centrality of the role of U.S. diplomacy made the agreement possible. Although the interim agreement was nominally a deal between Iran and the P5+1 states, it was in fact the direct talks between Iran and the United States that led to the final agreement. Similar dynamics appear to be at work in Northeast Asia, where all of the regional powers acknowledge that there must be direct discussions and an agreement between the DPRK and the U.S. for any progress to be made.

Focus on a Limited Set of Realistic Objectives, Not a "Grand Bargain"

The history of U.S.-Iran relations since 1979 is strewn with failed attempts at engagement. While keeping in mind these failures — along with the considerable domestic political constraints they were sure to face — American and Iranian officials concluded they would have a greater chance of success by limiting the focus of their discussions to Iran's nuclear program and sanctions relief. They adopted a "win-win" narrative early on as a way of acknowledging that concessions by both sides would have to be made in order to get to a successful outcome.

The many profound differences that exist between the two governments were not part of the dialogue — nor were the objectives of a broader rapprochement and diplomatic normalization. They set an initial goal of hammering out an interim agreement, which froze key elements of Iran's nuclear program in exchange for limited sanctions relief and provided the time and political space for the P5+1 to pursue a more comprehensive final accord. As part of this incremental process, consensus on a framework was reached in April 2015, providing a path to a final agreement in July 2015.

Key takeaways for North Korea:

The interim agreement was already in place for a two-year period by the time implementation of the JCPOA began in January 2016. Iran's full compliance with the interim agreement — which was verified consistently by the International Atomic Energy Agency (IAEA) during this period — provided a way to test Iran and served as a much-needed trust-building function for both sides. This was important because Iran, like North Korea, had violated international nonproliferation norms in the past.

The discussions were limited to what both sides deemed to be a very specific and manageable set of agenda items in the nuclear field (this focus enabled the U.S. to maintain its full set of sanctions related to terrorism and human rights against Iran). Unlike the 1994 Agreed Framework that sought to end North Korea's nuclear weapons program and ultimately failed, the negotiations and the resulting agreement with Iran did not call for a normalization of relations. In the end, both sides' commitment to a "win-win" outcome enabled them each to say they succeeded in fulfilling their objectives. The multilateral context of the P5+1 provided the framework that made a final agreement possible.

A Priority for the Next Administration

When a new administration takes office in January 2017, a review of U.S. policy toward North Korea should be placed high on its to-do list. Such a review should yield a definitive conclusion that the current policy of "strategic patience" — continuing to apply pressure through sanctions and waiting to see if North Korea will change its current course and denuclearize or collapse — is not working. The right next step would be to try another approach with the aim of bringing North Korea back to the negotiating table and reviving the Six-Party talks or a new set of regional security talks. Key elements of this approach must include pressing Beijing to play a more constructive role, while strengthening policy coordination with Seoul, Tokyo and other partners.

Principled and pragmatic diplomacy in the absence of trust is hard, but it's not impossible.

Perhaps the most obvious and biggest lesson to be gleaned from the Iran nuclear deal for North Korea is that principled and pragmatic diplomacy in the absence of trust is hard, but it's not impossible. The four-year plus period that began with the backchannel negotiations in July 2012 to today represents the most intensive run of continuous, official dialogue between Tehran and Washington since relations were cut in 1980. U.S. Secretary of State John Kerry is on track to end his tenure as having had more face-to-face meetings with Iran's Foreign Minister Javad Zarif than with any other foreign minister. Such interactions, which were once unthinkable, have now become normal.

Of course, the case of North Korea presents a unique set of circumstances and challenges. But, as I have outlined above, there are some guiding principles that could be extracted from the experience with Iran. Without full buy-in at the highest level of leadership, any effort to engage is likely to lead to a dead-end. Given the outsized sensitivities and deep mistrust in these cases, a low-key and steady channel for dialogue would provide the best way forward. Sticking to a very specific set of mutually-agreed upon agenda items and manageable objectives and working within a broader multilateral framework would increase the chance of reaching acceptable and sustainable outcomes.

Pyongyang's track record of deception, provocation and violation of past agreements and UN resolutions is not reassuring. But the absence of dialogue

puts us in a real disadvantage as we have very little direct knowledge about North Korea. Even if dialogue doesn't lead to a breakthrough as it did with Tehran, engagement could provide opportunities to assess the North Korean leadership's strategic priorities, capabilities, intentions and threat perceptions — and lead to more informed judgments and better options for U.S. policy beyond waiting and seeing.

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Ban Production of Highly Enriched Uranium

The continued production of highly enriched uranium (HEU) for any purpose poses a significant threat to international security. Nations that want to acquire nuclear weapons could seek to do so under the cover of HEU production for civilian research or naval propulsion. While it is essential to strengthen ongoing efforts to secure existing stocks, the next U.S. administration also should make it a priority to ban the production of HEU worldwide. Such a ban would greatly reduce the risks of nuclear terrorism and the proliferation of nuclear weapons to new states.

To support a global ban, the United States would need to take some steps on its own. Although Washington long ago halted HEU production for nuclear weapons and is on a path to phase out HEU use in research reactors, the next administration will need to tackle the challenge of converting U.S. naval propulsion reactors. This is essential to the success of banning all HEU production worldwide.

Highly enriched uranium — typically containing more than 90% of the chain-reacting isotope U-235 — and plutonium are the two “fissile” materials used to make nuclear weapons. But unlike plutonium, HEU is used as a research reactor fuel around the world, and is stockpiled for use in naval reactors in four nuclear weapons nations, including the United States. This is of particular concern to nuclear security and nonproliferation experts because, compared to plutonium, the HEU path is by far the easier to follow for a state seeking a weapon or for a terrorist seeking an improvised nuclear device.

As Luis Alvarez, a senior participant in the Manhattan project, explained:

Most people seem unaware that if separated U-235 is at hand it's a trivial job to set off a nuclear explosion, whereas if only plutonium is available,

*making it explode is the most difficult technical job I know.*¹

The United States ended all production of HEU in 1992 after downsizing its nuclear arsenal at the end of the Cold War. Its remaining stocks of surplus HEU are sufficient to supply the U.S. Navy and other needs for another 50 years. Russia and China also ended their production of HEU with the end of the Cold War but Russia, which has the world's largest stockpile of HEU, recently resumed production for civilian purposes — perhaps because it had unused uranium enrichment capacity.

Military HEU: U.S. Production Halted, No Need to Resume

Unless states are conducting nuclear tests or increasing nuclear-weapon stockpiles, nuclear weapons can be remade using HEU from retired weapons.

Since the end of the Cold War, the global stock of operational nuclear warheads has declined from about 65,000 to about 10,000, with all but about 1,000 warheads located in Russia or the United States. This has freed a huge amount of Russian and U.S. HEU for other uses. Much of this excess HEU was blended down to low enriched uranium LEU for use in power-reactor fuel. The United States has reserved material to fuel its naval

reactors until 2060 however, and more excess HEU is available from the weapons stocks if needed.² Neither the United States nor Russia has any need to resume HEU production for 50 years.

The surplus of HEU and plutonium created by the end of the Cold War led to a broad agreement among the states that are members of the Nuclear Nonproliferation Treaty, or NPT, (all members of the United Nations other than India, Israel, North Korea and Pakistan) to support a Fissile Material Cutoff Treaty (FMCT) that bans the production of HEU and plutonium for nuclear weapons. If and when the surplus stocks are eliminated or placed under IAEA safeguards, this would make the Russian and U.S. warhead reductions irreversible and cap the buildups of China, India and Pakistan. Unfortunately, because of the consensus requirements of the UN's Conference on Disarmament and objections by Pakistan, negotiations have yet to begin.

If all consumptive uses of HEU were shifted to LEU, a basis would be created to broaden the FMCT to include a ban on the production of HEU for all purposes. (A strong case can also be made to extend the production ban further to include the separation of plutonium for all purposes, but that is another story.) To achieve a global HEU

ban, the United States must address civilian as well as naval uses.

Civilian HEU: Still Need to Convert Many Reactors

During the 1960s and 1970s, the U.S. and Soviet Atoms for Peace programs exported HEU to fuel research reactors in about 40 countries, including Iran (from the United States), Iraq (Russia and France), Libya (Russia) and North Korea (Russia). On the eve of the 1991 Gulf War, Saddam Hussein launched a crash program to turn his HEU fuel into a bomb. Fortunately, it was too late. After his defeat, the IAEA shipped Iraq's HEU fuel to Russia.

The solution to this proliferation hazard, recognized since 1978, is to convert research reactors from HEU to LEU fuel, enriched to less than 20%. The nuclear weapons states have advised the IAEA that it is not practical to make nuclear weapons with LEU.

After 9/11, the possibility of terrorists acquiring nuclear weapons became a special concern because HEU was still present at about 130 research reactors around the world, some of them in low-security sites such as university campuses.

With the cooperation of Russia, the U.S. Global Threat Reduction Initiative (launched by the Bush administration in 2004) cleaned HEU out of 31 countries. At home, the United States converted or decommissioned most of its own HEU-fueled research reactors. As a result of pressure from the United States, most of the global radiopharmaceutical industry is in the process of switching from HEU to LEU in research reactors that produce medical radioisotopes.

Further progress in ending the use of HEU in civilian research reactors was

made by the Obama administration's series of Nuclear Security Summits initiated in 2010. As a result of these efforts, many HEU-fueled research reactors have been converted to low-enriched uranium or have been decommissioned and cleaned out.

There are still about 100 HEU-fueled research reactors left worldwide, about half of which are in Russia, which has not made converting its reactors a priority. Outside Russia, a few research reactors are still in the conversion process; it is impractical to convert some others; and a third group requires the development of new high-uranium-density fuel to make their conversion possible. Most of the world's research reactors were built before 1980, and retirement is reducing their number faster than conversion. Retirement of additional HEU-fueled reactors that are no longer needed should be encouraged. The norm that has developed against building new HEU-fueled reactors should be protected, and the remaining high-power research reactors that cannot be converted to LEU should be converted from weapon-grade uranium to as low enrichment as possible.

Naval Nuclear Propulsion: Shifting to LEU

Today the largest global user of HEU is the United States Navy, whose propulsion reactors (used in submarines and aircraft carriers) are fueled with weapon-grade HEU. The remaining U.S. HEU stocks can supply the Navy for more than 50 years. But eventually, if the Navy continues to use HEU, it would be necessary for the United States to restart production, which would legitimize other countries doing so. As an indication of the type of mischief that could result, during the Ahmadinejad administration, Iranian officials proposed that Iran begin to produce HEU for future Iranian nuclear submarines.

Together, the United States and Russia account for more than 90% of all HEU consumed by naval reactors. The United States provides HEU to, and shares reactor technology with, the UK nuclear navy; while Russia shares design information with India. France and China, the only other countries with nuclear-powered ships and submarines, already use LEU fuel.

If it were possible to convert the U.S. Navy to LEU fuel within the next 50 years, the United States would not have to resume HEU production and could press other nations not to do so either. The United Kingdom could also switch because it has access to U.S. naval nuclear reactor technology. Russia too could switch relatively easily because it mostly uses less than fully enriched HEU in its naval reactors and, unlike the United States, refuels them every ten years or so. India depends on Russia for naval nuclear technology.

The U.S. Congress has twice — in the 1990s and again in the current decade — asked the Department of Energy's Office of Naval Reactors, which designs and troubleshoots U.S. naval reactors, about the possibility of shifting to LEU.

In 1995, the Office's response was that it was on the verge of designing lifetime cores for the next generation of U.S. submarines and shifting to LEU would require either giving up this goal or designing reactors with much larger cores to accommodate roughly the same amount of U-235 in a more dilute form. In converting research reactors, the Department of Energy had found that it was possible for most reactors to increase the density of the uranium in the fuel sufficiently to compensate for the more dilute U-235 in LEU, but the Office of Naval Reactors insisted that it had already maximized the uranium density of its fuel.³

In 2014, in response to a second congressional query, the Office of Naval Reactors was somewhat more positive:

Recent work has shown that the potential exists to develop an advanced fuel system that could increase uranium loading [density] beyond what is practical today while meeting the rigorous performance requirements for naval reactors.⁴

Congress asked for an R&D plan and the Office of Naval Reactors submitted a proposal in July. According to this plan, the effort would cost about \$1 billion and take 15 years with an additional decade required to build the production capacity required to fuel the nuclear navy.⁵ Admiral Caldwell, Director of the Office of Naval Reactors, noted that the project would make it possible for his office to keep together its reactor design team to design the next naval reactor.

Admiral Caldwell testified that, if the R&D effort were successful, the fuel could be used in the new U.S. Ford-class nuclear-powered aircraft carriers.⁶ He also indicated, however, that U.S. submarines would require larger reactor vessels to accommodate enough LEU for lifetime cores, a high priority for the U.S. Navy, although other countries have refueling hatches on their nuclear submarines.

The height of a submarine reactor core is only about 10 % of the diameter of U.S. attack submarines, which are considerably smaller than U.S. ballistic missile submarines.⁷ Doubling the volume of a reactor core to accommodate the lower density of U-235 in LEU would only require increasing its height and diameter by 26%. If the height were fixed, the volume could be doubled by increasing the core diameter by 40%. It therefore should be possible to design next-generation U.S. submarines

for LEU cores. Alternatively, the United States could design its next generation submarines with refueling hatches similar to those that France has on its submarines, which allow for refueling as well as complete inspections of the reactor and piping in one-and-a-half to two months.⁸

The Office of Naval Reactors' July 2016 report indicated that it would take 25 to 30 years to develop the new LEU fuel and the associated production capacity. Assuming that the program starts in fiscal year 2018, this would mean that the fuel could be available sometime in the period 2043-2048.

Because of budgetary concerns, the Obama administration's support for the LEU fuel development program was more passive than active. Thus far, a few Members of Congress have been driving the U.S. government's engagement with the issue of developing LEU fuel for U.S. aircraft carriers and submarines. The administration was initially conflicted because the Republican majority in Congress insisted that the funding should come from the Department of Energy's nonproliferation budget rather than its budget for naval reactor research and development. However, just before the 2016 Nuclear Security Summit, the White House issued a statement that:

Consistent with its national security requirements and in recognition of the nonproliferation benefits to minimizing the use of highly enriched uranium globally, the United States values investigations into the viability of using low-enriched uranium in its naval reactors.⁹

Development of LEU fuel for naval reactors should be a major element of the next administration's nonproliferation program. In addition, the new administration should ask the Office of Naval Reactors to explore design concepts for next-generation submarines

that would include either a large enough reactor vessel to accommodate a lifetime core or a design that would facilitate rapid mid-life refueling.

If these programs succeed, U.S. Navy requirements for fresh HEU fuel could end by around 2040 and the United States could call for a ban on the production of HEU for any purpose. This would go a long way towards eliminating non-weapons use of HEU as one of the most serious threats to the global nonproliferation regime and a potential source of a terrorist nuclear device.

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Notes

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- 7 Based on the cavity height of the M-140 naval spent fuel transport container given in US Nuclear Regulatory Commission, *Certificate of Compliance* 9793, 2012.
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Support a Global Ban on Nuclear Weapons

Nuclear weapons continue to be one of the most serious threats to international peace and security around the world. They are the most destructive, inhumane and indiscriminate weapons ever created. Both in the scale of the devastation they cause, and in their uniquely persistent and hazardous radioactive fallout, they are unlike any other weapons. A single nuclear bomb detonated over a large city could kill millions of people. The use of tens or hundreds of nuclear bombs would disrupt the Earth's climate worldwide and cause widespread famine.

Nuclear weapons remain a serious threat to the entire world, but in particular to people in nuclear-armed countries. Citizens of nuclear-armed states not only face this threat by being targets for nuclear attack by other nuclear-armed states, but also because of the continued risk of a nuclear detonation from within their own arsenals — either through accident, miscalculation or terrorist attack.

It is every country's responsibility to ensure that we end the threat of nuclear weapons before the world sees another nuclear detonation. Over the past six years, an increased focus on the humanitarian impact of nuclear weapons has emerged in multilateral nuclear disarmament discussions and has led to a strong push by non-nuclear armed states to jumpstart an international process to prohibit nuclear weapons.

On October 27, 2016, the United Nations took a giant step towards a legally binding prohibition on nuclear weapons by voting 123 to 38 to begin formal negotiations in March 2017.

While President Barack Obama's administration chose to oppose this process, the next administration should recognize it as a legitimate international concern and support a ban on nuclear weapons. After all, numerous U.S. presidents,

including Ronald Reagan and Barack Obama, supported the elimination of nuclear weapons. If the United States were to give its support to this new endeavor, it would go a long way towards reaffirming the United States' commitment to the Nuclear Nonproliferation Treaty (NPT) and international humanitarian law.

While concerns about the humanitarian consequences of nuclear weapons have always existed, Jakob Kellenberger, the former president of the International Committee of the Red Cross (ICRC), was instrumental in bringing this issue to the forefront of the international nuclear weapons discussion. Just a few weeks before the 2010 NPT Review Conference, Mr. Kellenberger emphasized that:

Nuclear weapons are unique in their destructive power, in the unspeakable human suffering they cause, in the impossibility of controlling their effects in space and time, in the risks of escalation they create, and in the threat they pose to the environment, to future generations, and indeed to the survival of humanity.¹

At the 2010 NPT Review Conference, all state parties (including the United States) agreed by consensus to express "deep concern at the catastrophic humanitarian consequences of any

use of nuclear weapons," and affirmed the need to make "special efforts to establish the necessary framework to achieve and maintain a world without nuclear weapons."²

With this new focus on humanitarian consequences, a new movement called the "humanitarian initiative" emerged. States organized three international conferences dedicated to examining the humanitarian impacts of nuclear weapons and the legal framework that governs these weapons.

The first conference was held in March 2013 in Oslo, Norway where 128 states participated; the second in Nayarit, Mexico, in February 2014 where 146 states participated; and the third in Vienna, Austria in December 2014 with 158 states participating. All included the voices of relevant United Nations agencies, the International Red Cross and Red Crescent Movement, academia and non-governmental organizations.

Simultaneously, an ever-increasing number of states signed up to cross-regional statements expressing concerns about the humanitarian consequences of nuclear weapons. At the 2015 NPT Review Conference, 159 states expressed concerns over the catastrophic humanitarian consequences of any nuclear weapons use and declared, "it is in the interest

of the very survival of humanity that nuclear weapons are never used again, under any circumstances.”³

The humanitarian initiative has become the most dynamic movement for engaging the public, exploring new constituencies and re-energizing civil society around the issue of nuclear weapons in the past several decades.

It has provided an outlet for the frustration that many feel regarding the very limited progress on global nuclear disarmament and the lack of political will among nuclear-armed states to make meaningful moves towards a world without nuclear weapons.

The chair of the 2014 Vienna conference best summarized the key conclusions from the three conferences on the humanitarian impacts of nuclear weapons:

- *The impact of a nuclear weapon detonation, irrespective of the cause, would not be constrained by national borders and could have regional and even global consequences, causing destruction, death and displacement as well as profound and long-term damage to the environment, climate, human health and well-being, socio-economic development, social order and could even threaten the survival of humankind.*

- *The scope, scale and interrelationship of the humanitarian consequences caused by nuclear weapon detonation are catastrophic and more complex than commonly understood. These consequences can be large scale and potentially irreversible.*

- *The use and testing of nuclear weapons have demonstrated their devastating immediate, mid- and long-term effects. Nuclear testing*

in several parts of the world has left a legacy of serious health and environmental consequences. Radioactive contamination from these tests disproportionately affects women and children. It contaminated food supplies and continues to be measurable in the atmosphere to this day.

- *As long as nuclear weapons exist, there remains the possibility of a nuclear weapon explosion. Even if the probability is considered low, given the catastrophic consequences of a nuclear weapon detonation, the risk is unacceptable. The risks of accidental, mistaken, unauthorized or intentional use of nuclear weapons are evident due to the vulnerability of nuclear command and control networks to human error and cyberattacks, the maintaining of nuclear arsenals on high levels of alert, forward deployment and their modernization. These risks increase over time. The dangers of access to nuclear weapons and related materials by non-state actors, particularly terrorist groups, persist...*

- *Looking at nuclear weapons from a number of different legal angles, it is clear that there is no comprehensive legal norm universally prohibiting possession, transfer, production and use.*⁴

The Austrian government then issued a pledge to fill the legal gap for the prohibition and elimination of nuclear weapons.⁵

While civil society organizations such as the International Campaign to Abolish Nuclear Weapons have campaigned for a new treaty banning nuclear weapons — even without the participation of the nuclear-armed states — since the Oslo conference,

the “Austrian Pledge” was a sign that government involvement in the humanitarian initiative had entered a new phase. State actors were moving from simple fact-based discussions about the humanitarian consequences, to discussions about what political steps should be taken.

While the pledge does not specifically call for a ban, a majority of the more than 120 states endorsing it see the pledge as a political commitment towards negotiating a legally binding instrument that would prohibit nuclear weapons.

The prohibition of weapons typically precedes their elimination, not the other way around. For example, prohibitions of biological and chemical weapons, landmines and cluster munitions have been essential steps in ongoing efforts toward eliminating these weapons. Considering the evolution of international humanitarian law since nuclear weapons were first developed and the fact that by almost any definition the use of nuclear weapons would be incredibly destructive, inhumane and indiscriminate, it remains unacceptable that nuclear weapons are not yet prohibited.

Through a General Assembly-established working group in Geneva, tasked with “taking forward multilateral nuclear disarmament negotiations,” support for such a treaty has grown significantly among the non-nuclear weapon states. During the discussions, elements and content of such a treaty were explored by many non-nuclear weapon states and the working group concluded in August 2016 with a recommendation to the General Assembly to commence negotiations of a treaty prohibiting nuclear weapons in 2017.

While nuclear-armed states remain opposed to a treaty banning nuclear



weapons, it can still be undertaken by non-nuclear weapon states. Of course, like the biological and chemical weapons conventions, a nuclear weapons ban would allow nations with stockpiles of these weapons to join so long as they agree to eliminate them within a specified timeframe. Once such nations have joined, agreements could be developed over time to ensure that stockpiles are destroyed in a verifiable and irreversible manner.

If nuclear-armed states won't participate, the treaty process would still allow states in any part of the world to formalize their rejection of nuclear weapons and help create a clear international legal norm against the possession of nuclear weapons.

By changing the way the world perceives nuclear weapons, a treaty prohibiting nuclear weapons would have meaningful impact beyond those states that may formally adopt such an instrument at the beginning. The ban treaty, once in force, could challenge the notion that possessing nuclear weapons is legitimate for some states. It would have both normative and practical impacts on those states that stand inside and for those states outside it.

A treaty prohibiting nuclear weapons could have significant benefits for the United States.

For example, through the devaluation of nuclear weapons and the emergence of a new international norm against their possession, a ban treaty could create better conditions for nuclear disarmament, which the United States has supported as a goal for decades. If nuclear weapons were considered less attractive, as a potential risk of humanitarian catastrophe instead of an essential security tool, incentives for states wanting to develop them or spending billions of dollars to modernize them would be reduced.

With more external pressure and expectations of progress on nuclear-armed states, a ban treaty would work to reinforce other efforts championed by the United States, such as the ratification of the Comprehensive Nuclear Test Ban Treaty and further bilateral agreements to reduce nuclear arsenals.

But a nuclear weapons ban treaty could also be an effective tool to further the U.S. nonproliferation agenda. Many non-nuclear weapon states have signed the NPT because of the "bargain" contained in the treaty. States promise to not develop nuclear weapons in exchange for the promise of nuclear-armed states to disarm their weapons. But a ban would prohibit nuclear weapons universally, and thereby strengthen the NPT and make

it a more powerful tool to prevent proliferation. A ban treaty, with or without the participation of the United States, would be an effective measure for the international community to pressure all non-nuclear armed states to fully reject nuclear weapons forever.

Banning nuclear weapons is not the same as eliminating them. But a treaty banning nuclear weapons would be the most significant change to the status quo on nuclear weapons and could become a catalyst for progress on nuclear disarmament and arms control in the coming decades. While the dismantlement of all nuclear arsenals might be a long process, a clear international rejection of these weapons would be an essential component of any future disarmament and nonproliferation efforts.

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