Policy Watch

Peering down from the Summit: The Path to Nuclear Security 2010–2016 and beyond[1]

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This article reviews the motivations, strengths, and weaknesses of the Nuclear Security Summits (NSS), both procedurally and substantively. Nearly fifty world leaders met at the various NSS—2010, 2012, 2014, and 2016. The circumstances that provoked these meetings were unusual, if not unique, but innovations undertaken at the meetings in global summitry and global governance will likely endure. The meetings advanced nuclear security in important ways, but the nuclear security problem cannot be resolved. It will require ultimately a commitment by states, international organizations, and nonstate actors to continuous improvement. It may ultimately require leaders to return to the summit.

Why Nuclear Terrorism Is a Threat and Nuclear Security Matters

Near the peak of his popularity, President Barack Obama addressed a large enthusiastic throng overflowing Prague's Hradcany Square in April 2009. In a speech that helped him to win Nobel laurels, he explained why the nuclear terrorism threat is important and urgent, and summoned world leaders to defeat it:

> Today, the Cold War has disappeared but thousands of those weapons have not. In a strange turn of history, the threat of global nuclear war has gone down, but the risk of a nuclear attack has gone up. More nations have acquired these weapons. Testing has continued. Black market trade in nuclear secrets and nuclear materials abound. The technology to build a bomb has spread. Terrorists are determined to buy, build or steal one.
>
> [W]e must ensure that terrorists never acquire a nuclear weapon. This is the most immediate and extreme threat to global security. One terrorist with one nuclear weapon could unleash massive destruction. Al Qaeda has said it seeks a bomb and that it would have no problem with using it. And we know that there is unsecured nuclear material across the globe. To protect our people, we must act with a sense of purpose without delay. So today I am announcing a new international effort to secure all vulnerable nuclear material around the world within four years. We will set new standards, expand our cooperation with Russia, pursue new partnerships to lock down these sensitive materials.
>
> And we should start by having a Global Summit on Nuclear Security that the United States will host within the next year. (Obama 2009)
>
> Nuclear Insecurity in Historical Perspective.[2]

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[2]*This section on the history of nuclear terrorism concerns and counteractions draws on work done by the author and his co-authors (Bunn, Malin, and Roth 2016).*

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Fear of nuclear terrorism has existed since the dawn of the atomic day, as have the efforts to prevent it. A year after the so-called Trinity Test (July 16, 1945), physicists Robert Oppenheimer and Edward U. Condon each warned that terrorists might command the power of the atom (Bunn, Malin, and Roth 2016, 133–43). In the 1940s and 1950s, however, nuclear weapons technology lay beyond the reach of private citizens or groups, in the province of governments. Consequently, the terrorist threat in the USA was determined to be a risk that a state (i.e., the Soviet Union) might abet or even plot (National Intelligence Estimate 1951).

It was not until the 1960s that the U.S. government evinced concern that terrorists, unsupported by a state, might be able to detonate a nuclear weapon (Lumb et al. 1967). Following the disappearance of a large quantity of highly enriched uranium (HEU) recognized in 1965, the U.S. Atomic Energy Commission for the first time required private holders of fissile material to secure it (Bunn, Malin, and Roth 2016).

In the 1970s and 1980s, a limited spate of vicious terrorist attacks rocked Europe and North America. Real or threatened kidnappings, bombings, assassinations, and hijackings drew Cabinet-level attention in the Nixon Administration (Richelson 2009). These concerns prompted new U.S. rules governing physical protection of and accounting for nuclear materials (Bunn, Malin, and Roth 2016). Moreover, not only Americans dreaded the possibility of nuclear terrorism. In a 1972 debate at the United Nations, Soviet diplomat Dmitri N. Kolesnik foresaw terrorist theft of atomic bombs and the use of them to blackmail governments (Lapp 1973).

Yet, even Kolesnik's alarm envisioned blackmail, not detonation, as the ends of nuclear terrorism. A later RAND study by terrorism expert Brian Jenkins was even more explicit in this assertion that, "While we cannot rule out the possibility of a 'large-scale Lod, [Airport terrorist attack]' or holding a city for ransom with a nuclear weapon, the detonation of a nuclear bomb appears to be the least likely terrorist threat" (Jenkin 1975). The U.S. Office of Technology Assessment echoed Jenkins' conclusions, but warned that, "Nihilist groups may emerge" (U.S. Congress 1977, 27). Importantly, it also concluded that a small group of people without knowledge of classified information and with only modest equipment "could possibly design and build a crude nuclear explosive device" (U.S. Congress 1977, 140).

These analyses were reflected in the first publicly available National Intelligence Estimate on nuclear terrorism, dating from 1986. The mostly declassified estimate concluded that sophisticated terrorists could probably detonate a nuclear device, if they had access to a stolen weapon or sufficient fissile material, but that they were unlikely to do so, because it would defeat the political objectives of then-known terrorist groups. Key findings of the Estimate included that:

- High-level terrorism (e.g., detonation of a nuclear device) may be within the capabilities of a few terrorist groups. The constraints that exist against it, therefore, probably are behavioral.
- Most important, the fact that most terrorists place a high premium on the political consequences of their actions probably helps dissuade them from threatening terrorist acts that could lead to mass, indiscriminate casualties, because such a threat would alienate even those that they consider sympathizers among the affected public (National Intelligence Estimate 1986).

In the late 1990s, actions and statements by Aum Shinrikyo and al Qaeda raised the prospect of weapons *use* and the Central Intelligence Agency

alerted policy makers to that possibility (Counterterrorism Center Commentary 1997). Catastrophic terrorist acts occurred after the turn of the millennium, including the September 11th attacks and the horrific slaughter of school children and their parents in the Russian town of Beslan. These events removed any doubt that some terrorist groups sought to inflict as much carnage as possible, and therefore were not bound by the political constraints that apparently bridled terrorists in the 1970s and 1980s.

Washington was unnerved. The U.S. government's worst nightmares grew from Osama bin Laden's reported August 2001 campfire conversation with a Pakistani nuclear scientist, discussing how al Qaeda might acquire nuclear weapons (Bunn et al. 2011). For decades, U.S. agencies had known that it was technically possible to fashion an improvised nuclear device. Since the early 1990s, there had been many seizures of weapons grade fissile material outside of authorized control. Now a new and more malevolent form of terrorist seemed determined to use nuclear weapons.

Were this to occur, not only would tens or perhaps even hundreds of thousands of people perish or suffer grievous wounds, and economic damage many times the cost of the September 11th attacks be inflicted, but international commerce would be stunted to the detriment of billions of people (Annan 2005), and very likely war would ensue.

The best way to ensure that terrorists could not detonate a nuclear device is security preventing them from stealing a weapon or the fissile material needed to make it. Fortunately, programs were already in place to do just that. They originated under legislation authored by Senators Sam Nunn and Richard Lugar, and signed by President George H. W. Bush in 1991. The act authorized efforts to secure, decommission, and dispose of weapons and material related to nuclear, chemical, and biological warfare, first in former Soviet states, and eventually around the world. President Clinton gave further definition to these efforts and began all of the major programs that later Administrations would pursue—from physical security upgrades at nuclear storage sites, to HEU and plutonium disposition, to improving border controls to detect and deter illicit trafficking. After September 11, President George W. Bush doubled the budgets for nuclear security assistance. Additionally, he launched the 2005 Bratislava Initiative with Russian President Vladimir Putin, increasing the scope and pace of physical security upgrades in Russia and setting a 2008 deadline for completing the work.

By the end of 2008, U.S. programs to improve nuclear security had made enormous progress. For example, fifty-two research reactors in thirty countries were converted from high to low enriched uranium fuel, and nearly two tonnes of fissile material were removed to secure storage in the United States or Russia. Over 700 vulnerable radiological sites, containing material totaling over 9 million curies, were secured. The USA provided 160 Russian border crossings with radiation detectors to deter and detect illicit nuclear trafficking, with Russia equipping a similar number. Physical security upgrades were completed at 148 Russian nuclear weapons and material storage sites, ranging from Murmansk to Kamchatka. Nearly 400 tonnes of Russian HEU was down blended, fabricated into power reactor fuel, and purchased by the USA, accounting for about 10 percent of U.S. electricity production (National Nuclear Security Administration 2008).

There was still a lot of work remaining as President Obama assumed office. After noting the substantial progress made by three previous Administrations, Matthew Bunn (who today leads the Managing of the

Atom Project at Harvard's Belfer Center) catalogued some of the unresolved problems on the eve of the first Nuclear Security Summit in 2010:

> Terrorists are seeking nuclear weapons, and the materials needed to make them are still housed in hundreds of buildings and bunkers in dozens of countries—many in urgent need of better security. There have already been 18 documented cases of theft or loss of plutonium or highly enriched uranium, along with incidents that provide striking evidence of security weaknesses—including a 2010 break-in by unarmed peace activists at a Belgian base where U.S. nuclear weapons are reportedly stored and a 2007 armed attack on a South African site housing hundreds of kilograms of HEU (Nuclear Threat Initiative 2012).

Why Climb to the Summit?

> "[Summitry] is made possible by air travel; it is made necessary by weapons of mass destruction . . . . (Reynolds 2014)."

"It is not easy to see how matters could be worsened by a parley at the summit," said Winston Churchill (Reynolds 2014), proposing his novel metaphor in an uncharacteristically tentative argument. He spoke shortly before Edmund Hillary and Tenzing Norgay bested Everest. For his listeners, Churchill evoked lonely individuals, struggling in rarefied air, amidst a landscape devoid of flora and fauna.

Reynolds, a Cambridge University historian, pushed the metaphor farther:

> It is this epic quality that lures statesmen to the summit. Having surmounted the foothills of domestic affairs, they are drawn almost magnetically to the peaks of international politic. (Reynolds 2007)

Yet a meeting of top leaders was not always considered desirable nor necessary. Only 110 years ago, a sitting U.S. president first traveled overseas, and that was mainly to inspect the Panama Canal—at the time, a failing construction project beset by accidents and disease—rather than to meet with leaders. For America, real summitry began less than a century ago, with Woodrow Wilson at the Paris Peace Conference in 1919 (MacMillan 2003).

The Paris Conference was the September 1938 meetings between Neville Chamberlain and Adolf Hitler, which produced the disastrous Munich Agreement. This Conference, and the bitter aftertaste of the Yalta accords, likely sapped even Churchill's defense of his summit proposal. They illuminate the first systemic problem with summit meetings—that *they entail risk that things will go wrong*, and even small mistakes can prove fatal, sometimes for millions of people.

At Yalta, Churchill's permanent undersecretary for foreign affairs, Alexander Cadogan, raised a second systemic weakness of summit meetings: *heads of state are not always prepared to solve important and complicated problems*. Cadogan carped privately, "It's always the same with these Conferences: they take days to get on the rails. The Great Men don't know what they are talking about and have to be educated, and a bit more tidy in their methods" (Neilson and Otte 2009). Nuclear security is a specialized and technical topic, generally beyond the experience of the "Great Men" (and Women), and most of the decisions affecting it are made at levels far below the heads of state.

A third systemic problem with summit meetings is that *failure at the top to achieve a successful outcome can foreclose other opportunities to reach negotiated*

agreements. Therefore, diplomats and White House staff usually seek to involve heads of state either at the symbolic conclusion of a deal, or when all other efforts to break an impasse have failed. This makes summit meetings the last resort as tools for solving policy problems, not a first option. Leaders, too, usually prefer meetings where the outcome is assured and the risk of failure is not great.

The NSS also had particular disadvantages due to their organization and agenda.

First, *the NSS were very large*. The opening meeting included forty-seven nations, thirty-eight represented at the head of state or government level. Indeed, 2010 Washington Summit was then the largest gathering of leaders since the United Nations organizing meeting in 1945. Not only was this an enormous logistical undertaking, but the sheer size of the meeting limited the scope and depth of dialog. For each head of delegation to speak even for ten minutes would have taken more than eight hours, few leaders would have the time or patience for such a lengthy presentation.

Second, *the meetings were both regular and finite*, an unusual combination. The NSS met biannually from 2010 to 2016. They were not part of an ongoing series of meetings with open-ended topics, like the G7, which can create a commitment to a lasting process. It was also not a "one-off" conference, aiming to resolve a specific problem, such as President Obama organized on peacekeeping in 2015, which can promote a sense of urgency.

Third, *the NSS agenda was extremely narrow for any meeting of heads of state*, let alone for four such conferences, involving scores of leaders, over six years. Statesmen and women typically meet on a broad range of security, economic, and transnational issues (e.g., G7 or G20 meetings) or at least on the full spectrum of one of those topics (e.g., NATO summits). Failing that, these meetings may be held to conclude an important agreement (e.g., the climate change conferences). Bilateral meetings on the margins of the NSS provided some opportunities for broader agendas, but could not fundamentally alter the scope of the conferences.

The particular NSS problems compounded the inherent issues common to all top-level meetings and led to "summit fatigue." Belgium's Sherpa, Ambassador Werner Bauwens, explained this phenomenon with surprising candor:

> Lastly, there is the unavoidable summit fatigue or summit overkill. I have done four summits with four different Belgian leaders, but the atmosphere is a bit like it is in tourism: I have seen it. I have done it. The drive goes and that is normal; it is not a criticism. These things do happen, even in my marriage, where I keep the drive, fortunately, and have done for 35 years—she may disagree with me. There is summit fatigue. (Bauwens 2015)

Given the dangers and disadvantages associated with summit meetings, why did President Obama choose to summon his peers to the meet on nuclear security? He first mentioned such a gathering in a campaign appearance at Purdue University in July 2008,[3] pledging, "And I'll lead a global effort to secure all loose nuclear materials around the world during my first term as President" (Obama 2008). According to a senior U.S. official who

[3]*The text of the speech did not mention a Summit, but reporting on the event does, implying that either the idea was mentioned in the question and answer period that followed the address or in background briefings to reporters (Meyer and Nicholas 2008).*

attended all four meetings, there were multiple reasons for selecting the summit route (Senior U.S. Official 2016).[4]

First, *inviting leaders to the summit invoked President Obama's enormous personal popularity*. International confidence that the U.S. president would "do the right thing in world affairs" jumped in surveys by an "eye-popping" average of more than 38 points from 2008 to 2009 in 24 nations polled by Pew Research. In half those states, such confidence was shared by more than 70 percent of respondents (Pew Research Center 2009). Hence, foreign leaders wanted to be seen with President Obama, and if discussing nuclear security was the cover charge, they were more than happy to pay it.

Second, *summit meetings could generate quick results*. The Prague speech called on nations to "act with a sense of purpose without delay." Unlike treaty negotiations or even revision of formal international standards, summit meetings could bring tangible improvements to nuclear security within months, not years or even decades. Against the urgent problem of nuclear terrorism, the White House opted for rapid action and a schedule it could better control.

Third, *summit meetings could cut through red tape*. Especially before the first summit, there were a large number of projects—physical security improvements, conversion of reactors from HEU to low enriched uranium (LEU) fuel, fissile material removals, etc.—which were in the works, but had not received final approvals, mainly for bureaucratic reasons. The repeated deadlines established by successive summits necessarily focused energy on fulfilling these efforts.

Fourth, *the summits drew high-level attention to the problem of nuclear security*. Inevitably, the process of Sherpa meetings, preparing leaders for their roles, and the natural desire of leaders to announce accomplishments (fully encouraged by their hosts), led to internal dynamics within states to examine nuclear security issues and to make progress on them. One can imagine a leader saying to a subordinate, "I am going to Washington to meet with Obama and I don't want any incidents that might embarrass me on this matter." American policy makers were mindful that meeting at the summit also had the advantage of raising public awareness (although in many cases publics remained confused about the exact scope of the meetings).

Fifth, a meeting of leaders underscored a principle the U.S. team repeatedly tried to inculcate: that *heads of state or government bear a responsibility for the security of fissile material that cannot be delegated*.[5] This principle was borrowed from the private sector, where chief executive officers accept an analogous burden. It was tangibly demonstrated by the leaders' presence at a meeting focused exclusively on nuclear security.

Sixth, the framers of the NSS sought to use them to "*empower, elevate, energize, and enhance international organizations and instruments*," such as the International Criminal Police Organization (Interpol) and the International

[4] *A four-year effort to secure all vulnerable nuclear material was first proposed by Matthew Bunn and Anthony Wier (Bunn and Wier 2006).*

[5] *The Obama Administration sought to enunciate the principle explicitly in the Summit Communiqué. Unfortunately, the best they could negotiate was a more elliptical formulation, a clear demonstration that some leaders remained reluctant to accept responsibility for nuclear security: "Sustaining security improvements requires constant vigilance at all levels, and we pledge that our countries will continue to make nuclear security an enduring priority. We, as leaders, are conscious of our responsibility" (White House 2016b).*

Atomic Energy Agency by placing their leaders on a visible platform with heads of government and state.

Gary Samore, who managed the Summits during the first Obama term, argues, "The main value [of the meetings] was to create an action forcing event—because leaders wanted to come to summit with some tangible achievements to display. Hence, the idea of 'house gifts' and eventually 'gift baskets'" (Samore 2016).

Thus, the NSS bore both important similarities and differences with previous summits. The similarities included all the effects inherent with a meeting at the top—focused government attention, media and public awareness, and the creation of a web of connections between governments at lower levels, and industry and civil society groups.

Procedurally, the differences were the size of the meeting (very large), scope of the agenda (relatively narrow), and that the meetings would neither be ongoing indefinitely, nor a single event.

House Gifts and Gift Baskets

The NSS also involved an important substantive difference from other high level meetings. More than in most realms of international relations, participating nations' interests were coincident, not competitive, and unilateral efforts to improve nuclear security would not put those states undertaking them at a disadvantage relative to their peers. This is a different dynamic than obtains in the areas of arms control, trade, or carbon emissions reduction. In those fields, acting alone can impose costs reckoned in weakened national security or diminished commercial competitiveness.

Such is not the case with nuclear security. While a state taking unilateral action to improve controls over its nuclear weapons and materials will not be as secure as it would be if there were universal action, it would nonetheless be somewhat safer, and would not suffer great disadvantages for having acted first or alone. Security costs, while not trivial, are tiny compared to the potential consequences of nuclear terrorism, and small even compared to most overall nuclear operations budgets.

This dynamic led to the most important innovation of the Summits—national and group commitments to specific actions to improve nuclear security (see Appendices I and II). The former were termed house gifts, and the latter gift baskets. At the first NSS, Washington actively encouraged other governments to bring announcements of nuclear security actions to the meeting; at subsequent meetings, leaders built on this idea with collective commitments. According to Michelle Cann et al.,

> Gift basket diplomacy has been one of the most important and unique innovations of the summit process. These multilateral political commitments cover a wide range of technical, educational, and legislative issues that are necessary for improving global nuclear security. They emphasize the importance of regional and international cooperation and allow states to effectively cooperate on issues of mutual concern. (Cann, Davenport, and Parker 2015b)

Moreover, the approach yields relatively rapid results, without the pitfalls of the least-common-denominator diplomacy that too often besets large group of countries attempting to negotiate treaties or international standards. Cann et al. elaborated:

> This approach focuses less on members' ideals and overarching aims than on how states can work together on issues of mutual concern. It is a form of multilateral, voluntary commitment-making that supplements broad statements with practical, near-term objectives. (Cann, Davenport, and Parker 2015a)

Even more could have been made of this dynamic at the Summits, for example, by committing states to implement the pending amendment to the Convention on Physical Protection of Nuclear Material even before it entered into force. The paradox of the commons is absent from the realm of nuclear security.

Everest or Mauna Kea?

Churchill's summit image evoked Everest and lonely trekkers amid desolate conditions. The world's tallest mountain measured from base to peak is not Everest but in fact Hawaii's Mauna Kea. Mauna Kea might be a more apt visualization of the NSS. Nearly two thirds of Mauna Kea lies largely invisible beneath the Pacific Ocean. The mountain, however, is far from barren; rather it is a complex ecosystem, teeming with marine life.

Such interactions are commonplace at modern summit meetings. Using a different maritime metaphor, Alan Alexandroff and Donald Brean described the "iceberg theory" of summits by noting that "Many relevant institutions and transgovernmental networks are tasked by leaders and their ministers and working groups to prepare the agendas, action plans, and reports that are in part the outputs of global summitry" (Alexandroff and Brean 2015).

At the NSS, Sherpas who created reefs of interaction among governments both preceded and joined the leaders in meetings. These connections proved so valuable that, although NSS have ceased, the Sherpas will continue to meet. According to the White House,

> These Sherpas cut across multiple agencies to form a tight-knit community of action. This community will be carried forward after the 2016 Summit as a "Nuclear Security Contact Group" that will meet regularly to synchronize efforts to implement commitments made in the four Summit Communiqués, national statements, gift baskets, and Action Plans. Recognizing the interest from those who have not been part of the Summit process, this Contact Group will be open to countries that wish to promote the Summit agenda. (White House 2016a)

Moreover, industry summits and nongovernmental organization or "knowledge" summits supplemented the heads of state and government meeting. These supplemental meetings brought considerable intellectual, experiential, and financial resources to the process. They both helped to define the governmental agenda and added to it. Indeed, the idea of a four-year effort to secure all vulnerable nuclear material originated with Matthew Bunn.[6]

Another, though less successful example of attempted influence by nongovernmental organizations over the outcome of the leaders' Summit concerned the concept that heads of state and government hold a responsibility for nuclear security that they cannot delegate. Sherpas and academic experts discussed the "undelegatable responsibility" at several Global

[6] *The Belfer Center also employs the author.*

Dialogue meetings hosted by the Nuclear Threat Initiative. U.S. government officials agreed ultimately to the principle, and attempted to insert it into the 2016 Communiqué. After negotiations with other governments, however, the result was a faint echo of the initial idea. The final Communiqué noted blandly that, "We, as leaders, are conscious of our responsibility."

The Carnegie Corporation and the MacArthur Foundations added to the tangible results of the Summit by pledging to grant up to $25 million for "work to secure nuclear materials and reduce the threat they pose" (MacArthur Foundation 2016).

Joyce Connery, who helped to manage the 2010 Summit, explained that nongovernmental organizations

> have the ability to gather people and say some things that we can't say as the government: produce scholarly materials, which we use as reference material; talk to Congress and help increase our funds; and make sure that there's a security awareness in the media, in Congress, and the public at large that the government would not have the capacity to do. (Connery 2011)

The Nuclear Industry Summit also convened corporate representatives from some thirty-five countries. Industry participation is important because much nuclear and radiological material and many large nuclear facilities reside in private hands. The Nuclear Industry Summit Joint Statement committed participants to securing effectively all nuclear and radiological materials at least to International Atomic Energy Agency (IAEA) standards, continuously improving nuclear security practices through seven separate steps, enhancing security culture, and improving cyber security. If implemented, these commitments will undoubtedly strengthen nuclear security.

Summit Achievements

The tangible achievements of the NSS are substantial. After the 2016 meeting, the Obama Administration summarized them:

> Over 40 Summit countries have engaged in capacity building, whether through training, Centers of Excellence, or exercises. Over 30 countries have updated national laws, regulations, or structures relating to nuclear security. Over 20 countries have held or invited peer review missions, either bilaterally or through the International Atomic Energy Agency's (IAEA) International Physical Protection Advisory Service. Three more countries—China, India, and Jordan—have pledged to strengthen nuclear security implementation through subscribing to the 2014 Joint Statement on Strengthening Nuclear Security Implementation (INFCIRC 869), bringing the total number to 38. Eighteen countries have taken steps to increase the security of radioactive sources. Seventeen countries have been involved in removal or disposal of nuclear materials, or minimization of highly enriched uranium (HEU). Sixteen countries have ratified nuclear security treaties or taken particular steps to implement them. Fifteen countries have carried out physical security upgrades or acquired security or detection equipment. A dozen countries have joined or launched new international or regional structures to support nuclear security cooperation. Twelve countries have indicated their financial contributions to support bilateral or international cooperation in nuclear security. And 10 countries noted steps taken to support or implement United National Security Council Resolution 1540. These represent tangible, practical steps towards locking down nuclear and other radioactive material and building up the global nuclear security architecture. (Nuclear Security Summit 2016g)

Moreover, during the span of the Summits, thirteen countries and Taiwan rid themselves of HEU, allowing more than 3 tonnes of fissile material to be consolidated to secure storage in the USA or Russia. The amended Convention on the Physical Protection of Nuclear Material gained sufficient ratifications to enter into force, in part because of the political force exerted by the Summits. Thirty-two buildings storing weapons-usable fissile material received physical security improvements. And, 328 border crossings were equipped with radiation detectors to combat illicit trafficking of nuclear or radiological material (Nuclear Security Summit 2016f).

The NSS also made an important contribution by raising awareness of the issue. Complacency is the single greatest threat to nuclear security and the Summits pierced it (Tobey 2016). The process of making nearly 300 national commitments, nearly 50 joint commitments, and dozens of national reports of progress since the last meeting, focused governments' attention and resources on the problem. Preparing and answering to national leaders on the subject of the meeting inevitably raised the profile of the issue within some 50 governments. This greater awareness also help to slice through red tape that had impeded tangible progress, for example by reaching final agreements on long-planned reactor conversions and material removals.

Remaining Gaps

While the NSS' achievements are substantial, they did not resolve the issue of nuclear security. Lacunae remain in standards for and implementation of protection of fissile material capable of being used to make nuclear weapons.

No Specific and Legally Binding Standards for Nuclear Security

More than ten years after it was agreed, and fifteen years after the catalyzing September 11th attacks, the Amended Convention on the Physical Protection of Nuclear Material entered into force. Although it is legally binding, it is not specific. According to Matthew Bunn, "While containing some useful principles, the amended convention contains no particular standards for how secure nuclear material should be. It says that countries should set national rules for nuclear security, but says nothing about what those rules should say" (Bunn 2010). Furthermore, both the Convention and its Amendment are limited to material and facilities "used for peaceful purposes," excluding the 83 percent of fissile material stocks held by military establishments.

Similarly, United Nations Security Council Resolution 1540, requires states to, among other things, implement "appropriate, effective" security measures over all nuclear material within their territory, but gives no further detail on what such security entails.

The "Strengthening Nuclear Security Implementation" gift basket, originally subscribed by thirty-five nations in 2014, but joined later by Jordan, India, and China, adds somewhat to the specificity standards, but is a political commitment, not a legal obligation.

Lest this gap be taken as an insignificant omission, consider that it was only *after* the November 2015 Paris bombing and shooting attacks that

Brussels moved to place armed guards at Belgian nuclear facilities, some of which contain highly enriched uranium (Allison and Tobey 2016), and other states with fissile material or nuclear facilities still have no such requirement.

Russia's Absence a Severe Blow

Russia boycotted the 2016 meeting. As the world's largest holder of fissile material and nuclear weapons, Moscow's absence opened an enormous gap. Moreover, Russia faces threats to nuclear security from government-wide budget cuts, endemic corruption, entrenched organized crime, and spreading Islamic extremism (Trouth Hofmann 2011; Malashenko and Starostin 2015; Memoli and Wilkinson 2016). The virtual end to U.S.–Russian nuclear security cooperation within the Russian Federation further compounded these problems (Bender 2015).

Still, the Russian Foreign Ministry objected to what it saw as a heavy hand by Summit organizers—suppressing dissenting views on how the meeting should be organized (Reuters 2014), exerting "unacceptable" interference in the work of international organizations such as the International Atomic Energy Agency (Sputnik 2016), and relentlessly pursuing a Summit agenda that had already played out. Very likely, reciprocal recrimination and sanctions between Washington and Moscow after Russian use of force in Crimea, eastern Ukraine, and Syria also left the Kremlin in no mood to trek to Washington for an American pet project. Finally, because the NSS were so closely identified with President Obama from the outset, his reportedly difficult personal relationship with Russian President Vladimir Putin (Dougherty 2013) may have cost him the presence of the Russian leader. President Obama's personal appeal, an asset at the outset, became a liability in the end.

Conditions on the Ground: Stubborn Complacency, Slowing Momentum

Russia's final reason for its absence from the Washington Summit was that "The political agenda of these meetings has been exhausted" (Crossette 2016). The view that there is nothing more for world leaders to do on the issue of nuclear security oozes complacency. That dangerous attitude, however, is not limited to Russia.

It infected operations at the Y-12 National Security Complex, where an 82-year-old nun pierced several security barriers surrounding the main U.S. storage site for HEU (Office of the Inspector General 2012). It manifested itself with South Africa's dismissive reaction to a break-in at the Pelindaba nuclear facility, which holds hundreds of kilograms of HEU from its abandoned nuclear weapons program. Although Pretoria has since taken steps to strengthen protections, according to Department of Energy expert Roger Johnston, anyone who held the views reflected in South Africa's first response "hasn't really thought through the security issues—because if they had, they would be sweating bullets. It's just not a business where you should ever be confident" (Birch and Smith 2015). Moreover, evidence of complacency extends beyond anecdotes. Security officials in many countries still see nuclear theft or sabotage as implausible, according to a survey by Matthew Bunn and Eben Harrell (Bunn and Harrell 2014).

At the close of the 2014 NSS, President Obama urged his colleagues that, "[I]t is important for us not to relax, but rather accelerate our efforts over the next two years, sustain momentum so that we finish strong in 2016" (Obama 2014). Unfortunately, nuclear security progress is slowing, budgets are declining, and important projects remain undone. Only weeks before the last Summit, President Obama submitted a budget that again substantially cut funding for nuclear security cooperation—by 24 percent from the previous year's appropriation (Bunn, Malin, and Roth 2016, 85).[7]

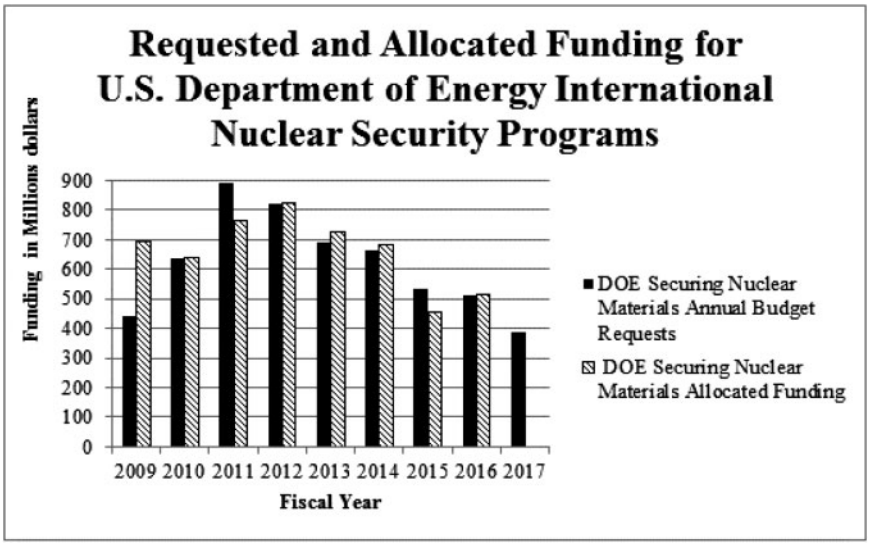

Figure 1 U.S. Funding for International Nuclear Security Assistance Programs *Source*: Bunn et al. 2016, 84.

The Obama Administration argues that the completion of many projects, and the end of work in Russia make such cuts inevitable. Yet, as late as 2013, the Administration anticipated spending almost double what it eventually requested for fiscal year 2017 (Bunn, Malin, and Roth 2016, 84). Moreover, it is undeniable that progress is being foregone. For example, despite the fact that seventy-four civil research reactors continue to use HEU fuel (Nuclear and Radiation Studies Board 2016, 31), the pace of worldwide reactor conversions from HEU to LEU slowed from 18 to 9 from 2009 to 2014 versus the previous five-year period (although closures increased, mainly in Russia, and the barriers to some conversions are technical) (Nuclear and Radiation Studies Board 2016, 110).

Military Material

Fissile material held by military programs, whether in weapons, production stocks, reactor fuel, or declared as surplus to needs, amounts to about 83 percent of the 1,366 tonnes of highly enriched uranium and 507 tonnes of

[7]*U.S. nuclear security assistance dominates total world budgets, and therefore can be taken as a measure of such work globally. For example, the 2002 Kananaskis G-8 Summit established the "10 plus 10 over 10" formula for $20 billion in total such spending over ten years. Under that commitment, the USA matched the total expenditures by all other G-8 partners combined.*

plutonium estimated to exist (Browne, Lugar, and Nunn 2015). Therefore, its security matters as much or more than protection of civil stocks.

Because of its fundamental role in national security and consequent laws and regulations imposing secrecy, many governments with military nuclear programs refuse explicitly to include those programs in international discussions and agreements on nuclear security. The International Atomic Energy Agency has no jurisdiction over military stocks, and therefore neither does its guidance on physical protection of nuclear materials and facilities (International Atomic Energy Agency 2011 & International Atomic Energy Agency 1956). The amended Convention on the Physical Protection of Nuclear Materials excludes military stocks (International Atomic Energy Agency 2005 & International Atomic Energy Agency 1980), as does the Terms of Reference for the Global Initiative to Combat Nuclear Terrorism (GICNT) (U.S. State Department 2006).

It is untrue, however, that military stocks are excluded from all international deliberations on nuclear security. First, even discussions, actions, and guidance on civil stocks have an implicit application to military materials. It is hard to believe for example, that the IAEA's guidance has not informed those with responsibility over military inventories, especially because some of them participated in developing that guidance. Moreover, while the GICNT's Terms of Reference excludes military programs, officials from those programs have often attended its meetings. Second, UN Security Council Resolution 1540, which requires states to "[d]evelop and maintain appropriate effective measures to account for and secure" fissile material (United Nations 2004), covers all such inventories—civil and military. Third, the first NSS communiqué explicitly includes military programs, recognizing "the fundamental responsibility of States . . . to maintain effective security of all nuclear materials, which includes nuclear materials used in nuclear weapons, and nuclear facilities under their control . . ." (Office of the Press Secretary 2010).

Nonetheless, for some governments secrecy is security. Military stocks will therefore remain less transparent, and their security measures less subject to international scrutiny. The tension between the confidentiality of national security programs and international confidence that all weapons and materials are being protected to the highest standards will endure. The NSS, however, starting from the first communiqué, helped to reduce this tension.

Next Steps

The great advantage to the NSS was to provide "political momentum behind something that is inherently a group of technical challenges," according to National Nuclear Security Administration deputy administrator Anne Harrington (Harrington 2016). She also notes that in the process of educating leaders for the meetings, all levels of states' bureaucracies became better informed, as the briefings moved higher within governments; if the leader had to know, the minister did too, and so on. These phenomena catalyzed tangible actions to improve nuclear security.

How then should governments maintain this momentum and awareness now that the NSS have ended?

Five Action Plans and a Contact Group

At the final Summit, the leaders agreed to support efforts at five international entities to carry on their work, establishing a voluntary action plan for Member States.[8] Through a gift basket, they also created a 40-nation contact group at a senior level, and open to all states, including those that had not attended the Summits. The action plans for Member States are in support of: the United Nations; the International Atomic Energy Agency (IAEA); INTERPOL; the Global Initiative to Combat Nuclear Terrorism; and the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction.

The action plan in support of the United Nations focuses on improving implementation of UN Security Council Resolution 1540 and the International Convention on the Suppression of Acts of Nuclear Terrorism (which requires states to establish criminal statutes against such acts) through assistance, coordination, and cooperation among Member States (Nuclear Security Summit 2016a, 2016b, 2016c, 2016d, 2016e). This is an important effort because effective coordination of assistance efforts under the resolution remains elusive, and consequently many states still maintain "weak systems for controlling trafficking in nuclear commodities" (Spector and Murauskaite 2014).

The action plan in support of the IAEA supports regular ministerial meetings on nuclear security, which, with the end of the Summits, will be the highest-level regular dialog on the matter. If political momentum is to be maintained, it might come from these meetings. Such momentum may be difficult to muster given the IAEA's *modus operandi* that often devolves into sequential speeches by dozens of leaders that few of their peers have the patience to sit through. The plan also supports a broad agenda to increase and strengthen IAEA activities on such topics as security standards, nuclear forensics, security culture, and information and cyber security (Nuclear Security Summit 2016a, 2016b, 2016c, 2016d, 2016e).

The action plan in support of INTERPOL aims to increase operational information sharing and law enforcement capabilities to combat nuclear trafficking (Nuclear Security Summit 2016a, 2016b, 2016c, 2016d, 2016e). The sharing of intelligence and law enforcement information is vital to effect efforts to stop would-be nuclear criminals, the importance of which was underscored by recent terrorist interest in nuclear facilities in Belgium.

The action plan in support of the Global Initiative to Combat Nuclear Terrorism promises to expand efforts to build capacity, conduct tabletop and field exercises, and coordinate other efforts (Nuclear Security Summit 2016a, 2016b, 2016c, 2016d, 2016e). The Initiative was intended to provide the practical means to implement some of the requirements of UN Security Council Resolution 1540, especially for states with limited experience in nuclear matters.

The action plan in support of the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction seeks to coordinate and

[8]*The action plan approach was part of what Russia objected to as "interference" in the activities of international organizations, viewing it as a mandate for those organizations to act by a small group of states outside of established processes. Summit organizers responded that coordinated efforts by Member States to improve operations of international organizations was not interference and that established processes would be followed. It is notable that the action plans are titled "in support of" rather than "for" each of the international organizations.*

focus efforts to build capacity through partnership matching and centers of excellence. Importantly, it also pledges to engage G7 leaders on nuclear security (Nuclear Security Summit 2016a, 2016b, 2016c, 2016d, 2016e).

All told, the action plans contain 137 commitments to specific actions advancing nuclear security. While still not closing the gaps cited earlier, if these actions are implemented, important forward momentum toward improving nuclear security will continue.

Contact Group

Recognizing the need for "sustained action and ambition," forty countries, INTERPOL, and the United Nations formed a contact group, "with the objectives of advancing implementation of nuclear security commitments and building a strengthened, sustainable and comprehensive global nuclear security architecture." They will convene at least annually at a senior level to assess progress and identify additional steps that may be necessary (White House 2016a). They can also ensure that gaps and overlaps among the five work plans are addressed and resolved. This arrangement has the potential to sustain the important "iceberg" work of coordinated action by governments, even without the benefit of additional summits. As such, it may be one of the most important enduring accomplishments of the NSS.

Conclusions

Summitry

The NSS contained a number of innovations and several uncommon characteristics. They were large gatherings focused on a narrow topic. Initially, this energized rapid action, but later seemed to lead to summit fatigue. House gifts and gift baskets were innovations that capitalized on the nature of the nuclear security issue, which does not impose the same penalties for first or unilateral actions that might inhere in other areas of international diplomacy. The interaction among leaders also included unique elements, including scenario-based exercises at the 2014 and 2016 Summits, which despite early misgivings, proved highly successful.[9] The Nuclear Knowledge Summits and the Nuclear Industry Summits built on the "iceberg" experience from other top-level meetings, and elaborated on it with joint statements, gift baskets, and deeper interactions with leaders.

The likely unique convergence of several factors unlikely to recombine in identical circumstances suggests the possibly unique character of the NSS. These features included: an important and urgent problem affecting the security of all nations; a newly-elected American President committed to addressing the issue and enjoying unprecedented international popularity; and a ready agenda of necessary and feasible actions. Nonetheless, some of the innovations created by those Summits—gift baskets and national commitment, a contact group outliving the summit meetings, and scenario-based discussions by leaders could likely be available for other issues and possibly replicated.

[9]*Sherpas who feared that leaders would be embarrassed, even leaders, who doubted their value, initially viewed the scenario-based exercises with great skepticism, but at the Summits, they provoked animated and interesting discussions, and a determination to use more scenario-based exercises (Harrington 2016).*

Nuclear Security

The NSS undeniably advanced progress to ensuring that terrorists will be unable to obtain nuclear weapons or fissile material. Yet that progress remains incomplete: many of the easy actions have been taken; political frictions between Washington and Moscow have eroded the shared sense of commitment that once animated the two largest nuclear powers; the tension remains between natural tendencies toward complacency and a commitment to continuous improvement.

The success or failure of the Summits will be measured by the achievements of follow-on efforts. Will the gaps be closed? Will commitment to the need for continuous security improvement become universal? Will heads of state and government recognize that they cannot delegate responsibility for nuclear security any more than can chief executive officers of corporations with fissile material?

One way to ensure that the momentum continues and the sense of responsibility endures would be for leaders to return to the issue of nuclear security on a regular, but less frequent, basis—perhaps in connection with G20 meetings. In this way, nuclear security could be taken into the web of global governance established by ongoing processes.

If the leaders believe their statement that, "The threat of nuclear and radiological terrorism remains one of the greatest challenges to international security, and the threat is constantly evolving," then they will almost certainly need to address that challenge again at the summit. To paraphrase Churchill, "It is not easy to see how matters could be worsened by such a parley at the summit."

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Appendix I

Summary of Nuclear Security Summit National Commitments (Cann, Davenport and Parker, Nuclear Security Summit: Accomplishments of the Process 2016)

2010
More than 70
2012
More than100
2014
More than100
2016
About 12

Exact counts are subject to some definitional uncertainty as it is sometimes difficult to distinguish between ongoing efforts and new commitments. Every Summit participating nation made at least one national commitment.

Appendix II

Summary of Nuclear Security Summit Joint Commitments (Subscribing nations and organizations)[10]

2010
None
2012

1. Nuclear Information Security (31).
2. Global Partnership Against the Spread of Nuclear Weapons and Materials of Mass Destruction (24).
3. Nuclear Security Training and Support Centers (24).
4. Security of Radioactive Sources (24).
5. National Legislation Implementation Kit on Nuclear Security (19).
6. Activity and Cooperation in Counter Nuclear Smuggling (20).
7. Nuclear Security Summit Outreach Efforts (3).
8. Contributions of GICNT to Enhancing Nuclear Security (6).
9. Transport Security (5).
10. Minimization of HEU and Reliable Supply of Medical Radioisotopes (4).
11. Quadrilateral Cooperation on High-Density LEU Uranium Fuel Production (4).
12. Nuclear Terrorism (3).
13. Trilateral Cooperation at the Former Semipalatinsk Test Site (3).

2014

1. Transport Security (5).
2. Enhancing the Security of the Maritime Supply Chain (13).
3. Multinational Cooperation on High-Density LEU Fuel Development (5).
4. Minimization of HEU and the Reliable Supply of Medical Radioisotopes (4).
5. Enhancing Radiological Security (23).
6. Strengthening Nuclear Security Implementation (38).
7. Activity and Cooperation to Counter Nuclear Smuggling (20).
8. Countries Free of HEU (12).

[10]*Author's compilation based on Nuclear Security Summit Documents 2010–2016.*

9. Nuclear Information Security (35).
10. Nuclear Security Training and Support Centers/Centers of Excellence (31).
11. Contributions of the GICNT to Enhancing Nuclear Security (7).
12. Promoting Full and Universal Implementation of the United Nations Security Council Resolution (UNSCR) 1540 (32).
13. National Legislation Implementation Kit on Nuclear Security (29).
14. Forensics in Nuclear Security (24).
15. In Larger Security: A Comprehensive Approach to Nuclear Security (15).

2016

1. Certified Training for Nuclear Security Management (13).
2. Consolidated Reporting (1).
3. Statement of Activity and Cooperation to Counter Nuclear Smuggling (39).
4. Cyber Security of Industrial Control and Plant Systems at Nuclear Facilities (30).
5. Forensics in Nuclear Security (31).
6. Minimizing and Eliminating the Use of HEU in Civilian Applications (22).
7. Multilateral Cooperation on High-Density Low-Enriched Uranium Fuel Development for High-Performance Research Reactors (5).
8. In Larger Security: a Comprehensive Approach to Nuclear Security (16).
9. Insider Threat Mitigation (28).
10. LEU Fuel Bank (18).
11. Maritime Supply Chain Security (14).
12. National Nuclear Detection Architecture (24).
13. Nuclear Terrorism Preparedness and Response (25).
14. Nuclear Training and Support Centers (31).
15. Full and Universal Implementation of UNSCR 1540 (39).
16. Sustaining Action to Strengthen Global Nuclear Security Architecture (41).
17. Strengthening the Security of High Activity Radioactive Sealed Sources (29).
18. Transport Security (17).
19. Transport Security Good Practice Guides (7, although not all countries sponsored all guides).