

Nuclear Terrorism – Imminent Threat?

by Brendan G. Melley

The 2015 *National Security Strategy of the United States* stated that “No threat poses as grave a danger to our security and well-being as the potential use of nuclear weapons and materials by irresponsible states or terrorists.”¹ On March 25, 2014, in The Hague, President Obama stated, “I continue to be much more concerned when it comes to our security with the prospect of a nuclear weapon going off in Manhattan.”² This is a sentiment he repeated throughout his presidency, and it has reference, of course, to the frequently alluded-to scenario of terrorists obtaining nuclear weapons or “weapons-usable” nuclear material (i.e., fissile material that could be used in a nuclear weapon, also known as weapons-grade material). Experts and senior officials frequently state that this scenario is a matter of “when,” not “if.”³ This concern became even more urgent after it was learned that al Qaeda had sought access to nuclear material and technical knowledge associated with building a nuclear weapon, and it remains a concern with ISIS and other violent extremist organizations.

The fear of a nuclear apocalypse at the hands of terrorists has been amplified in the media, in movies and novels, and by political leaders’ statements since 9/11. In some respects, a violent extremist organization like al Qaeda already can be presumed to be a terrorist nuclear power, for they have been able to terrorize Americans about a possible nuclear attack without necessarily having to prove that they possess an actual weapon.⁴

Yet, a terrorist nuclear attack has not occurred to date. Terrorism experts and analysts have debated this for years, and no consensus exists as to why the world has not seen terrorists succeed at perpetrating a nuclear attack. Despite the seeming inevitability of a terrorist attack with a nuclear weapon, terrorists may be substantially less likely to conduct such an attack than most analysts and policymakers expect, for two overarching reasons:

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1. Nuclear terrorism is difficult to accomplish, both technically and operationally.
2. There is no basis for a *prima facie* assumption that would-be nuclear terrorists cannot be disrupted, if not deterred, from conducting a nuclear attack.

Technical and Operational Difficulties

Technical Issues

Nuclear terrorism threats could take shape in three general pathways: the deliberate transfer of nuclear material from a state to a terrorist group or non-state actor; the sale of nuclear materials to a non-state actor on the black market, which may end up in the hands of a terrorist group; and, the theft or “leakage,” or unintentional diversion of nuclear material from a state program.⁵

The question of whether terrorists would be able to steal an actual nuclear weapon from a nuclear-armed state, while conceivable, is highly problematic due to the extraordinary security afforded nuclear weapons. Attention usually is drawn to those nuclear states with perceived less-than-optimal security over their stockpiles and weapons; and many analysts point out that the spread of nuclear weapons to North Korea, and potentially Iran, increases the risk of terrorists getting access to nuclear material or weapons through collusion with regime officials, or lack of effective oversight or security. Allied to this is the fear that presently non-nuclear states will pursue a nuclear weapons program in Asia or the Middle East to counter North Korea’s and Iran’s (apparently suspended) nuclear weapons programs. This possibility would, of course, offer terrorists potentially more opportunities to acquire a weapon or the necessary material. However, the same reasons why existing nuclear states feel dis-incentivized to share nuclear weapons with terrorist would apply to these nuclear aspirants as well.

Several ongoing efforts take the form

of addressing the supply problem, i.e., the international availability of fissile and other nuclear-related material. Four Nuclear Security Summits have been held since President Obama spoke in 2009 of “a new international effort to secure all vulnerable nuclear material around the world.”⁶ The fewer sources of fissile material that exist, the easier it will be to secure the remaining locations from theft or attack. It is precisely for this reason that the United States has made the lockdown of nuclear materials a national priority. Most of the international community ostensibly shares this objective.

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The 2004 United Nations Security Council Resolution (UNSCR) 1540 directs states to refrain from “providing any form of support to non-[s]tate actors that attempt to develop, acquire, manufacture, possess, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery.” It also called for states to adopt and enforce “appropriate effective laws” and “establish domestic controls” to prevent the proliferation of WMD to non-state actors.⁷ The aims of UNSCR 1540 have been institutionalized in efforts that include the legacy Cooperative Threat Reduction programs with the states of the former Soviet Union, the Russia- and U.S.-led Global Initiative to Combat Nuclear Terrorism, and the Proliferation Security Initiative, to which over 100 states have subscribed.

The “supply” side of nuclear weapons production likewise poses significant technical and operational challenges for terrorists pursuing a nuclear weapon from raw fissile materials. The simplest nuclear device to assemble would be a crude “gun-type” weapon with a quantity of

highly enriched uranium (HEU).⁸ The concept is simple enough: by means of high explosives, drive one mass of HEU into another one, causing the now super-critical mass of HEU to release its energy in a nuclear explosion.⁹ Even so, substantial technical hurdles exist to getting the HEU into the right physical state, size, shape, and with the necessary chemical properties to be useful in a gun-type device.¹⁰ A possessor of uranium would have to refine the ore to metallic form, understand any impurities within its composition, cast it, and then machine it to precise specifications of size and shape.¹¹

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Terrorists would need access to highly specialized machinery and equipment in order to manufacture the necessary HEU for a nuclear device. Much of the equipment necessary is specifically designed for the particular purpose of nuclear weapons production (such as numerous sensitive high-speed gas centrifuges configurable into cascades) and not generally available on the open market. Indeed, the infamous nuclear program supplier Abdul Qadeer Khan needed years to assemble the equipment necessary to manufacture centrifuge parts for the state nuclear programs to which he sold. A terrorist group that chooses to pursue a large centrifuge plant for enriching uranium as its path to acquire fissile material for a nuclear weapon would be taking on a very long timetable to achieve its aims. Even committed states spend years acquiring, manufacturing and testing centrifuge cascades. “The equipment is so specialized, and the suppliers so few, that a forest of red flags would go up.”¹² Customs and export licensing officials in most countries would take notice of

the equipment and materials being transferred, ask questions, and possibly prevent the shipment from being sent or received.

Plutonium, a by-product of uranium in nuclear power plant operations, is available in hundreds of reactors around the world.¹³ Here again, however, the weaponization process is not a simple one. Weapons-ready plutonium must be chemically reprocessed in order to be suitable for an implosion-type device, in which exactly shaped high explosives rapidly compress a mass of plutonium into itself and create a nuclear explosion.¹⁴ To accomplish this, terrorists would need “precision machine tools to build the parts, special furnaces to melt and cast the plutonium in a vacuum ... and high-precision switches and capacitors for the firing circuit.”¹⁵ Plutonium is harder to handle than HEU due to its high heat and radioactivity and requires more restrictive physical protective measures to prevent radioactive sickness or death. Terrorists would have to observe the “absolute need of foreseeing, preparing for, and observing all the necessary precautions” of working with plutonium.¹⁶ If terrorists had access to a nuclear reactor that produced plutonium, they would need a “special, shielded chemical plant to chop up its radioactive fuel, dissolve it in acid, and then extract the plutonium from the acid.”¹⁷

Whether terrorist use HEU or plutonium, they still likely would also require “non-nuclear explosive testing” to develop a weapon with confidence that it would work.¹⁸ This may involve very specialized testing devices of the implosion system, and the high-explosive “lenses” that would be triggered, to see if the plutonium would be compressed symmetrically and result in a suitable yield.¹⁹ Without access to appropriate – and sensitive – diagnostic equipment, terrorists would have to resort to theoretical calculations, which would place a high premium on the caliber of the involved engineers for the operation.²⁰

Operational Issues

Unless a state that was a nuclear power provided terrorists with an already manufactured warhead, terrorists would need time, a secure space, and a talented team of engineers, chemists, metallurgists, and physicists. Highly trained personnel such as these, ideally with experience in a state’s nuclear weapons program, might be able to be identified as potential recruits to the terrorist organization, either for money or ideology. It is even quite possible that a few former weapons designers and engineers would be susceptible to being recruited by a terrorist group. However, it is far from certain that an entire weapons design and manufacturing team could be assembled securely by a terrorist group at one time.

In addition to the actual manufacturing of a device, operational security would be one of the terrorist groups’ major challenges. The more people involved in what most likely would be a terrorist organization’s most sensitive operation, the more the risk of detection and disruption by law enforcement or intelligence personnel. If the group is not adequately walled off or quarantined (for what likely would be an extended period of time), some might brag or even just hint at the importance of the project, and this might be detected.

Another operational consideration that terrorists would have to contend with is the physical movement of the device to its intended target, from the safe haven in which it was manufactured. Dozens of national and international programs have been created after the attacks on September 11, 2001, to monitor the trade routes that supply goods to markets around the world. Terrorists would have to conduct “complex international operations involving training, travel, visas, finances and secure communications” to be able to accomplish such an operation.²¹ Even if mechanisms can be thwarted or bypassed, the mere perception of a concerted international effort to find nuclear

weapons in the global commons might be expected give a terrorist group pause as they consider how best to move their weapon.

Finding a pathway to move a nuclear device potentially around the world is not without significant risk of losing physical control of the cargo, or having it detected and stopped. Using black market smuggling routes and facilitators could be one possible option, but terrorists would face the attendant risks of losing the shipment to criminal interlopers who might not know anything about the cargo other than it had high value to the shipper, and thus could be stolen from the terrorists.

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A related logistics question is whether the terrorist group would choose to accompany their cargo throughout the path to its destination. This would inevitably raise the profile of the shipment for the necessity of it being monitored. Accompanying the shipment will create risks for the terrorists themselves, as they could be identified in transit by law enforcement or intelligence agencies. Throughout the journey, anyone whom the terrorists might consider as “trusted” accomplices would create more vulnerabilities, as more people become aware of the importance of the cargo. Knowing these risks, if the terrorists decided to send the cargo without physical accompaniment, they would thus be putting their most valuable cargo into the international shipping system and hope that the system delivers the weapon to their designated far-end, witting, recipient for final preparations and movement to the intended target.

Assuming the worst case—that a terrorist group had the ability to acquire an adequate

supply of appropriate fissile material, and had the time, space, and talent to manufacture a nuclear device—two key questions emerge: would it work, and how many would the terrorists want to produce?

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For the first question, without a testing program, the production of even a crude gun-type device may not produce a functioning device.²² Terrorists want to be seen by their audience as being successful in executing a nuclear attack. Their sponsors' confidence would be eroded, and the confidence of the intended audience could be enhanced, by the production of a device that did not work. Without the involvement of skilled engineers and scientists throughout the process, a terrorist group could not be sure that whatever instructions they received were accurate, or even adequate to create a working nuclear device.

Regarding the second question, it is useful to consider that if terrorists only acquired the material for one bomb, "they would still lack an arsenal—and a single mistake in design could wreck the whole project."²³ Moreover, a terrorist group should certainly recognize that after exploding a nuclear weapon, the combined efforts of the world's law enforcement, intelligence, diplomatic and military resources would be deployed to find them and bring them to justice. If the terrorists claimed to have additional nuclear weapons, the hunt would be even more urgent and unrelenting until the terrorists and their weapons were found. While terrorists may employ suicide bombers, the terrorist leadership itself surely would want to live to guide the organization and likely would

see the need to develop a good plan for staying hidden and alive for a lengthy period of time.

The security of terrorists' operations from leaks or the disruptive effect of counterterrorism missions, combined with the challenges of coordinating and executing secure shipment, add extra elements of risk and uncertainty to the major challenges terrorists face in trying to acquire the nuclear material itself.

The Commission on the Prevention of WMD Proliferation and Terrorism noted that as proliferation of WMD programs continues, the risk grows that some state, friendly to terrorist groups, will permit or enable the transfer of WMD material to terrorists.²⁴ On the other hand, states that possess nuclear material are not likely to transfer a weapon or weapons-usable material to a terrorist or non-state actor without a great deal of confidence that the transfer would go undetected, and attribution would remain undetermined. This would mean that "a state seeking to orchestrate a nuclear attack by proxy would be limited to collaboration with well-established terrorist organizations with which it had existing relationships, simplifying the task of connecting terrorist perpetrators to their state sponsors."²⁵ Moreover, "no state would be likely to give its nuclear weapons or materials to a terrorist organization with which it did not have a long record of cooperation and trust."²⁶

"Few states trust their proxies," commented one analyst, "and indeed they often gravely weaken movements they support in order to control them."²⁷ A terrorist group "might use the weapons or materials in ways the state never intended, provoking retaliation that would destroy the regime."²⁸ For example, "Iran lacks deniability for the groups to which it might transfer more-advanced systems, but lacks the trust that would make it more likely to transfer advanced systems."²⁹

Terrorists should expect intense retribution, whether they had a "return address" or not. A nuclear terrorist attack would prompt an

immense, “unprecedented,”³⁰ international effort to determine the source of the material, and attribution efforts likely would continue for as long as it took for responsibility for the attack to be judged.

Simply, the risk of being held responsible would seem very high for a state that provides nuclear material to a terrorist group. Brian Jenkins notes, “It would require a government to take enormous risks. ... [E]ven state sponsors of terrorism have become more cautious when engaging in larger-scale, higher-risk operations.”³¹

Deterring Attacks

While there have been very few nuclear terrorist attacks from which conclusions can be drawn, it also is not possible to rule out the extent to which terrorists are being deterred or disrupted from conducting a nuclear attack. Although deterrence has historically been associated with nation states, the organizations and aims that present themselves as factors in a comprehensive deterrence calculus are fundamentally the same for states and non-state actors.³² Indeed, despite the popular belief (although not one held by many terrorism analysts³³) that terrorist organizations and leaders are irrational and even suicidal, it may be that the United States and partner nations fighting terrorism are successfully deterring nuclear terrorism even now.

Key to this proposition is the decision-making framework, i.e., what influences them to make the decisions they take, within which terrorist organizations tend to operate. For example, the leadership itself, or the support structure components, might be capable of being influenced, while the operatives themselves may not be dissuaded from attacking a target. It is generally agreed by analysts that suicidal terrorists are difficult to deter, based on their beliefs in the rewards they will attain upon being “martyred.” Yet Jenkins notes that “[n]

ot all terrorists welcome death,”³⁴ and even the most committed might be dissuaded by the idea of their “reward” being long-term confinement in a prison cell.³⁵ Similarly, it may be possible to influence a terrorist leader’s ability, or his perception of his ability, to achieve his political goals.

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In addition to the active international cooperative efforts to prevent access to nuclear materials, noted above, the disruptive effects of steady counterterrorist attacks on known terrorist bases and safe havens serve to highlight the risk of operational failure for terrorists. A failure to accomplish its mission of a devastating nuclear attack, either because of technical difficulties or the active measures to disrupt terrorist operations, would in turn undercut the stature or prestige of the group.³⁶ This need to successfully accomplish what would be the ultimate terrorist mission could drive terrorist leaders to not take some of the risks that may be acceptable at lower levels of violence.

The anticipated overwhelming retaliation for conducting an attack—a prime example of deterrence by punishment—could give some terrorists pause. As Jenkins notes, “An effective deterrent can reinforce existing self-imposed constraints by suggesting that any terrorist attack involving nuclear weapons will not only provoke retaliation but will leave the terrorist group isolated from its constituents, its hosts—those upon whom it depends for sanctuary and support.”³⁷

Conclusion

The most simple, and resonant, counterargument to the present thesis is the claim that given the time, space, and necessary materials, terrorists will be able to employ a nuclear weapon successfully. The fear of nuclear terrorism arises from “the assumption that if terrorists *can* get nuclear weapons they *will* get them,”³⁸ that the only “prudent” response is for officials to assume that “acquisition equals employment,” and that they therefore should use all necessary steps to prevent terrorist access to nuclear weapons.³⁹ Even if they were not able to make a sophisticated device, a successfully detonated nuclear device would still be destructive. “One [has] to assume at least a crude

The fear of nuclear terrorism arises from “the assumption that if terrorists *can* get nuclear weapons they *will* get them,”...

nuclear-weapons capability, and even crude weapons are weapons of mass destruction.”⁴⁰ Former Vice President Dick Cheney was cited to have said in November 2001, “if there was even a [one] percent chance of terrorists getting a weapon of mass destruction — and there has been a small probability of such an occurrence for some time — the United States must now act as if it were a certainty.”⁴¹ If an actor *possibly* can attack successfully with nuclear weapons, this has been perceived as a near-certainty that he *will*.

A second possible counterargument is that terrorists “bent on destruction for its own sake cannot be deterred.”⁴² Numerous statements from terrorist leaders support the view that terrorists will not stop until they are able to execute a devastating attack on a Western city. “The threat to retaliate can have little effect on those for whom mass destruction is an objective,

not a fear.”⁴³ And the situation is only getting more grim, as the “spread of nuclear weapons to new states in the Islamic world will place tools of indiscriminate destruction closer and closer to the hands of terrorists, who will use them without fear of retaliation.”⁴⁴

However, while these counterarguments are not uncommon in the popular press, they really are not arguments at all — they are counterclaims that bring to bear no substantial evidence to support the counterargument. Of course, in principle, it is always possible that a nuclear terrorist could succeed. However, one who grants a *carte blanche* to the terrorist must at the same time ignore the mountain of obstacles that stand between terrorist aspirations and the realization of a nuclear terrorist attack.

Debate will continue on the technical and operational challenges associated with terrorists’ acquiring the necessary nuclear-related components and material and employing a weapon successfully on a target. Certainly, if the fissile material were available to terrorists — despite the active programs and emphasis to secure remaining stocks of HEU and plutonium that are potentially vulnerable — *and* if enough time, space, and expertise were also available, terrorists would have a chance of making a workable nuclear device. However, the sheer number of conditions associated with this concession constitute significant obstacles to any terrorist’s plans. Preventing fissile material and related equipment and expertise from being available to terrorists remains an active effort of the international community. Active efforts by U.S. and partner intelligence and law enforcement services attempt to address whether time and space are available for a terrorist group to make their plans and develop their weapon. Failure on the part of a terrorist organization to achieve success with respect to *any* of these concessions risks the derailing of *all* of the organization’s nuclear plans. The more that terrorist leaders are convinced that the world

would be turned upside down to hunt them down for a nuclear attack, the better the possibility that they might be deterred. The more that terrorist operatives and supporters understand that their future might not be martyrdom, but spending the rest of their life in a super-maximum security isolation unit, the better the chance that they might have second thoughts about supporting a WMD attack.

The issue of state sponsorship of a nuclear terrorist attack must be acknowledged as speculation, unless and until there is clear evidence of state support to a terrorist nuclear program. Until then, one could reasonably believe that the United States and its partners in the counterterrorism fight are applying enough pressure on actual terrorist plots so that states are taking notice and avoiding being linked to such plots.

The subject of deterring terrorists from employing nuclear weapons is not well understood, and thus is a good area for more debate and research. It is worth trying to understand the role that deterrence plays, and what policies may serve to support the goal of letting terrorist leaders rethink their commitment to conducting a nuclear attack. Of course, “[t]he risk is not zero.”⁴⁵ This is undoubtedly true. The “one-percent doctrine” attributed to Dick Cheney asserts that if there is a small chance of a catastrophic event occurring to the United States, its friends or allies, including a nuclear terrorist attack, friendly governments must try to take all measures necessary to prevent that event from happening. Yet, this is unrealistic. It is, as Jenkins notes, as if al Qaeda has already become a nuclear power, as they are able to terrorize the world with the simple potential of being able to carry out an attack.⁴⁶ Indeed, the “one-percent argument” is applied by some to the nuclear terrorism problem even though it has only an extraordinarily small likelihood of ever occurring. This much, however, can be stated with confidence: Nuclear terrorism is not an existential threat to the United States.⁴⁷ An attack could certainly cause many thousands of casualties, disrupt the economy, prompt widespread panic, and spark more intensive security measures across the country. Some speculate that it could change the nature of the Constitutional protections to privacy afforded Americans. Nevertheless, such an attack would not destroy the United States as a nation-state in the way a massive nuclear exchange with the Soviet Union likely would have done. Meanwhile, the United States continues to take substantive measures to secure nuclear material around the globe, to strike terrorists when they can be identified and targeted, to infiltrate and arrest terrorists in their early stages of planning, to reinforce resiliency into the national character, and to deter terrorist leaders from conducting nuclear attacks. These efforts must, of course, be continued and enhanced.

In the end, precisely what combination and quantity of preventive measures will prevent a future nuclear terrorist attack is unknown. However, the wide range of policies against the supply and demand variables of terrorists’ acquisition of nuclear weapons are not only justified, but essential. On the supply side, national and international efforts underway must continue. On the demand side, the ability to keep terrorists on the run, literally and figuratively, could cause them to be unable to assemble the materials and team in a secure place for enough time to complete their preparations. A strong combination of focused policies and actions remains the best chance to restrict nuclear terrorism to the realm of theoretical possibility. **IAJ**

NOTES

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