Multilateral cooperation and the prevention of nuclear terrorism: pragmatism over idealism

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International concern over nuclear terrorism has increased steadily since 11 September 2001 (9/11), prompting a series of formal and informal policy initiatives designed, either specifically or partially, to enhance multilateral cooperation to prevent it. Key examples include the Global Initiative to Combat Nuclear Terrorism (GICNT), the G8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction (GP), United Nations Security Council Resolutions (UNSCR) 1373 and 1540, and the establishment of an Office of Nuclear Security at the International Atomic Energy Agency (IAEA). The politically most notable initiative so far has been President Barack Obama's Nuclear Security Summit (NSS) of April 2010, which raised international awareness of the nuclear terror threat and sought to strengthen preventive efforts in this area.

With a second NSS taking place in late March 2012 it is timely to examine the concept of 'nuclear security' as it relates to nuclear terrorism and the challenges associated with strengthening international cooperative efforts designed to combat it. It has been argued by some that 'the imperative of keeping nuclear weapons out of the hands of terrorists' should be 'the basis for a vigorous diplomatic effort to rally the entire world behind both the vision and the logic of [global nuclear] zero'.[1] Arguments have also been made for a new 'comprehensive, universal and enforceable' Nuclear Control Regime encompassing the nuclear threats posed by both state and non-state actors.[2] However, achieving progress in this area is going to require a much more pragmatic approach to international cooperation and not the pursuit of grandiose visions. Effective multilateral action will depend first and foremost on pushing forward existing areas of cooperation, both formal and informal, and potentially developing new, albeit modest, initiatives to fill policy gaps as these are identified. An incremental approach is the only realistic way to move the agenda forward, given the complexity of the nuclear terrorism issue itself, diverging perceptions of the threat, the politics that have come to define

[1] Ivo Daalder and Jan Lodal, 'The logic of zero: toward a world without nuclear weapons', *Foreign Affairs* 87: 6, Nov.–Dec. 2008), pp. 80–95. Similarly, *The Economist* argued in 2011 that the only way to counter 'the declared ambition of terrorists to steal, buy or build a nuclear device' was 'a concerted effort to free the world of nuclear weapons': 'The growing appeal of zero: banning the bomb will be hard, but not impossible', *The Economist*, 16 June 2011.

[2] Richard Burt and Jan Lodal, 'The next step for arms control: a Nuclear Control Regime', *Survival* 53: 6, 2011, p. 54.

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debates related to the international governance of nuclear materials and related technologies, and the resulting messiness of the existing policy landscape.[3]

Nuclear terrorism and its complexities

The IAEA defines 'nuclear security' as 'the prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities'.[4] The concept is distinct from that of 'nuclear safeguards', which are defined as 'an extensive set of technical measures by which the IAEA Secretariat independently verifies the correctness and the completeness of the declarations made by States about their nuclear material and activities'.[5] The agency negotiates safeguards agreements with state parties to the Nuclear Non-Proliferation Treaty (NPT) to verify that fissile material is not diverted to military use. The key point of departure from safeguards, then, is the focus of nuclear security on non-state actors and nuclear terrorism.

The growth in anxiety about nuclear terrorism can be attributed to concerns about groups affiliated to Al-Qaeda which, over the past decade and a half, have demonstrated a capability to perpetrate mass casualty atrocities in North America, Europe, the Middle East, Africa and Asia. Justifications for acquiring and using unconventional weapons by leading figures in Al-Qaeda have deepened this anxiety. In December 1998, Osama bin Laden stated that 'acquiring [weapons of mass destruction] for the defense of Muslims is a religious duty', and in 2002 he supported an Al-Qaeda fatwa justifying the use of such weapons. International concern has been raised by, among other things, reports of basic training camps being run by Al-Qaeda in Afghanistan on radiological, chemical and biological weapons in 1999–2001; nuclear scientists from Pakistan also visited Al-Qaeda prior to 9/11 and discussed making a nuclear device.[6] Anxiety over the technical wherewithal of Al-Qaeda has been further driven by concerns over the potential opportunities presented by lax security in respect of legacy nuclear and radiological materials in former Soviet republics, and the role of the A. Q. Khan proliferation network in assisting the Libyan, Iranian and North Korean nuclear programmes, including the supply of weapon designs to Libya and Iran.

Projections and estimates related to nuclear terrorism can only be considered approximations because of the limited open historical record upon which to base observations.[7] Nevertheless, as Ferguson and Potter highlight, the concept

[3] See e.g. William Walker, 'Nuclear enlightenment and counter-enlightenment', *International Affairs* 83: 3, May 2007, pp. 431–53; Tanya Ogilvie-White and David Santoro, 'Disarmament and nonproliferation: towards more realistic bargains', *Survival* 53: 3, 2011, pp. 101–18.

[4] IAEA, 'Concepts and terms', http://www-ns.iaea.org/standards/concepts-terms.asp?s=11&l=90, accessed 17 Feb. 2012.

[5] IAEA, 'What we do', http://www.iaea.org/OurWork/SV/Safeguards/what.html, accessed 17 Feb. 2012.

[6] Rolf Mowatt-Larssen, 'Al Qaeda's pursuit of weapons of mass destruction: the authoritative timeline', *Foreign Policy*, 25 Jan. 2010, http://www.foreignpolicy.com/articles/2010/01/25/al_qaedas_pursuit_of_weapons_of_mass_destruction?page=0,0, accessed 17 Feb. 2012.

[7] Micah Zenko, 'Intelligence estimates of nuclear terrorism', *Annals of the American Academy of Political and Social Science* 607, Sept. 2006, pp. 87–102; Matthew Bunn and Susan B. Martin, 'Is nuclear terrorism a real threat?',

encompasses four scenarios:[8]

- the theft, or illicit purchase, of an intact nuclear weapon from a national arsenal and its detonation;
- the theft or illicit purchase of fissile material to make and detonate an improvised nuclear device (IND);
- attacks on, or the sabotage of, either civil or military nuclear facilities such as power reactors or spent fuel ponds to release radioactivity; and
- the theft, or illicit purchase, of non-nuclear radioactive materials to make and detonate a radiological dispersion device (RDD) or to make and deploy a radiation emission device (RED).

A brief examination of these scenarios will illustrate the diverse and complex set of issues covered by the concept of nuclear terrorism, and begin to explain why multilateral policy responses have developed in an incremental fashion to date.

Intact weapons and INDs

If detonated in a major city, and depending on the yield, an intact weapon would probably cause tens if not hundreds of thousands of deaths and other casualties, widespread property damage and long-term radioactive contamination.[9] However, the likelihood of terrorists acquiring and detonating such a weapon is extremely low, because it would necessitate defeating a state's command and control system and, even if this were achieved, most weapons incorporate intrinsic surety features such as Permissive Action Links (PAL) to prevent unauthorized use.[10] Nevertheless, recent reports of Pakistani nuclear weapons being moved around in non-military vehicles to avoid being tracked by the United States have exacerbated concerns over the potential seizure of such strategic assets by extremists.[11] Ironically, American efforts to track these weapons are driven by the exact same concerns because of Pakistan's continuing political instability.

If terrorists were helped by existing or retired personnel from a nuclear weapons facility—and again there is much discussion of 'insider threats' in the context of Pakistan—then some hurdles might be lowered.[12] A related scenario would involve a state willingly transferring a weapon to a terrorist group. In this respect

in Stuart Gottlieb, ed., *Debating terrorism and counterterrorism: conflicting perspectives on causes, contexts, and responses* (Washington DC: CQ Press, 2009), pp. 166–200; Christoph Wirz and Emmanuel Egger, 'Use of nuclear and radiological weapons by terrorists', *International Review of the Red Cross* 87: 859, Sept. 2005, http://www.laborspiez.ch/fr/the/as/pdf/irrc_859_Egger_Wirz.pdf, accessed 17 Feb. 2012.

[8] Charles D. Ferguson and William C. Potter, *The four faces of nuclear terrorism* (Monterey, CA: Center for Nonproliferation Studies, Monterey Institute of International Studies, 2004), p. 3, http://www.nti.org/c_press/analysis_4faces.pdf, accessed 17 Feb. 2012.

[9] Richard L. Garwin, 'A nuclear explosion in a city or an attack on a nuclear reactor', *The Bridge* 40: 2, Summer 2010, p. 26.

[10] US Department of Defense, 'Chapter 5: nuclear weapons surety', in *Nuclear matters: a practical guide* (Washington DC, 2008), p. 78, http://www.lasg.org/Nuclear_Matters_A_Practical_Guide_DoD.pdf, accessed 17 Feb. 2012.

[11] Jeffrey Goldberg and Marc Ambinder, 'The ally from hell', *The Atlantic*, Dec. 2011, http://www.theatlantic.com/magazine/archive/2011/12/the-ally-from-hell/8730/, accessed∑ 17 Feb. 2012.

[12] Paul K. Kerr, *Pakistan's nuclear weapons: proliferation and security issues*, CRS Report for Congress, May 2009, http://www.fas.org/sgp/crs/nuke/RL34248.pdf, accessed 17 Feb. 2012.

concerns have been raised in the past over the Iraqi, Pakistani and North Korean programmes.[13] However, it is difficult to conceive of a government that would knowingly contemplate such a transfer, as advances in nuclear forensics appear to have increased the likelihood that the source of a weapon could be identified, thus potentially attracting retaliation.[14]

Another scenario, again fraught with substantial technical hurdles, involves the construction of an IND. To build an IND with an explosive yield of more than 1 kiloton,[15] terrorists would first need to obtain more than 8 kilograms of plutonium or 25 kilograms of highly enriched uranium (HEU).[16] While there are thousands of tonnes of such materials stockpiled around the globe, their storage and transportation are carefully monitored—for example, through IAEA-administered safeguards in the civil sector—so terrorists would have to steal or purchase them via the black market.[17] If they succeeded in doing this, they would still need to obtain high explosives, precision machining equipment and a first-generation nuclear weapon design.[18] Additionally, a number of scientists, engineers or technicians with the necessary skills and experience of working with fissile materials would be required to manufacture and assemble the various components.[19]

Civil nuclear vulnerability

A much more likely prospect would involve terrorists attacking or sabotaging civil nuclear facilities—such as power reactors or spent fuel ponds—or transports to release radioactivity. This scenario was deemed to pose a threat as far back as the 1970s, when the commercial nuclear industry was expanding and incidents of hijacking and terrorism were on the increase. American officials reported 175 cases of violence, or threats being made, against nuclear facilities between 1969 and 1976.[20] The UK Atomic Energy Authority also became concerned about attacks on facilities holding special nuclear material for the purpose of blackmail, and attacks designed to disrupt the technical function of a nuclear plant's operation and/or to create an environmental hazard.[21] For its part, the UK Ministry of Defence

[13] Ferguson and Potter, *The four faces of nuclear terrorism*, p. 55.

[14] 'Nuclear forensics' is 'the technical means by which nuclear materials, whether intercepted intact or retrieved from post-explosion debris, are characterized (as to composition, physical condition, age, provenance, history) and interpreted (as to provenance, industrial history, and implications for nuclear device design': Joint Working Group of the American Physical Society and the American Association for the Advancement of Science, *Nuclear forensics: role, state of the art, and program needs*, Center for Science, Technology and Security Policy, American Association for the Advancement of Science, http://cstsp.aaas.org/files/Complete.pdf, accessed 17 Feb. 2012.

[15] 1 kiloton = 1,000 tonnes of TNT equivalent.

[16] IAEA safeguards glossary, 2001 edition, International Nuclear Verification Series no. 3, p. 23, http://www-pub.iaea.org/MTCD/publications/PDF/nvs-3-cd/PDF/NVS3_prn.pdf, accessed 17 Feb. 2012.

[17] International Panel on Fissile Materials, *2010 Global Fissile Material Report. Balancing the books: production and stocks*, fifth annual report, http://www.fissilematerials.org/library/gfmr10.pdf, accessed 19 Feb. 2011.

[18] Wirz and Egger, 'Use of nuclear and radiological weapons by terrorists'.

[19] Peter D. Zimmerman and Jeffrey G. Lewis, 'The bomb in the backyard', *Foreign Policy*, 10 Oct. 2006.

[20] Satish Chandra Pandey, *International terrorism and the contemporary world* (New Delhi: Sarup, 2006), p. 114.

[21] United Kingdom Atomic Energy Authority, interim report of the Discussion Group on Nuclear Industry Security Measures, AB 63/222, 1978, p. 4.

warned the Home Office in 1974 that 'it is only prudent to observe precautionary measures against the possibility of attacks on elements of the nuclear programme particularly in view of the serious consequences'.[22]

Similar anxieties exist today because of the recent experience of mass casualty terrorism, and these are further exacerbated by the expected global expansion of the civil nuclear sector, including within regions that have suffered from years of terrorist violence such as the Middle East and South-East Asia. It is also prudent to assume that the lessons of the Fukushima nuclear disaster will not have been lost on terrorists interested in 'the spectacular'. Fukushima illustrated what a highly successful attack could achieve if the general and back-up cooling systems of a nuclear facility were knocked off-line as they were by the tsunami in Japan that followed the earthquake of March 2011.

The nuclear accidents at Three Mile Island, Chernobyl and Fukushima all damaged the safety reputation of the nuclear industry and, in the case of the former two incidents at least, drove up the cost of producing nuclear power because of demands for greater regulation, and the delays and redesign requirements that followed. A terrorist event could be expected to have similar effects. Moreover, the governments of nuclear technology supplier countries could become increasingly cautious in promoting greater nuclear power use following a nuclear terror event.[23] Indeed, all the scenarios outlined so far have the potential to knock the nuclear energy renaissance off course, at the very least temporarily.

Radiological dispersal

Radioactive non-nuclear materials suitable for use in an RDD are far more widely available than fissile materials because of their use in hospitals, universities and industry.[24] Radioisotopes are not nearly as tightly controlled, as was tragically highlighted in 1987 by a radiological accident in Goiânia, Brazil, where the local population came into contact with caesium-137 from an abandoned teletherapy unit. This resulted in four deaths, 249 incidents of radiation exposure, and significant economic and social disruption.[25]

Radioactive materials can be dispersed by relatively unsophisticated means such as wrapping them in conventional explosives. While an RDD event is considered to be more probable than a nuclear attack, it would be unlikely to cause many

[22] Letter to Mr Hilary, Assistant Secretary, F4 Division of the Home Office, from Mr Denis C. Fakley of the MoD, 29 July 1974, DEFE 19/140.

[23] 'Next steps for nuclear security: key issues for the Nuclear Security Summit and beyond', Summary of the Nuclear Security Conference, 18–19 Feb. 2010, Centre for Science and Security Studies, King's College London, http://www.kcl.ac.uk/sspp/departments/warstudies/research/groups/csss/NuclearSecurityConferenceKeyIssuesandNextSteps.pdf, accessed 17 Feb. 2012.

[24] Nine radioisotopes have been identified as particularly suitable for use in an RDD because of their availability and high radioactivity: strontium-90; polonium-210; cobalt-60; caesium-137; californium-252; iridium-192; americium-241; plutonium-238; radium-226. See 'Radiological dispersal device (RDD)', Human Health Fact Sheet, Argonne National Laboratory, Aug. 2005, http://www.evs.anl.gov/pub/doc/rdd.pdf, accessed 17 Feb. 2012.

[25] IAEA, *The radiological accident in Goiâna*, 1988, http://www-pub.iaea.org/mtcd/publications/pdf/pub815_web.pdf, accessed 17 Feb. 2012.

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casualties other than those killed or injured by the explosion itself. However, the psychological and economic effects would be significant because of long-term radioactive contamination.[26] Even so, despite the seemingly higher likelihood, the fact remains that terrorists have yet to launch an attack using radioisotopes. The only historical instance in the open record occurred in 1995 when Chechen rebels buried a container of caesium-137 wrapped in conventional explosives in Izmaylovsky Park, Moscow, but without detonating it.[27]

The scenarios outlined here illustrate the breadth and complexity of the issues traditionally comprehended by the term 'nuclear terrorism'. This range of possibilities in part explains why the pursuit of unifying policy options—such as a single nuclear security instrument—makes little sense in practical terms. As will be shown below, specific nuclear security initiatives have been designed over time to counter evolving threats or strands of threats. In doing so, the policy landscape has developed a patchwork quality with an emphasis, particularly since 9/11, on plugging policy gaps in the politically most feasible ways.

Diverging threat perceptions

Just as the possible threat scenarios vary, so do threat perceptions. During the 1970s, for example, worries about sabotage by anti-nuclear groups in the UK drove improvements in security at nuclear facilities.[28] More recently, enhancing nuclear security has been an issue driven by the United States and allied governments—along with countries like India and Russia—because they perceive a significant risk that non-state actors will exploit fissile or other radioactive materials for malign purposes.

For its part, the United States has tried to influence the threat perceptions of other states by seeking to emphasize the transnational character of nuclear terrorism. In October 2009, US Secretary of State Hillary Clinton stated that 'a nuclear terrorist bomb detonated anywhere in the world would have vast economic, political, ecological and social consequences everywhere in the world'.[29] Some four years previously, UN Secretary General Kofi Annan had similarly argued that a nuclear terrorist attack 'would not only cause widespread death and destruction, but would stagger the world economy and thrust tens of millions of people into dire poverty'.[30] Indeed, even a failed detonation of an IND would have profound

[26] Dana A. Shea, *Radiological dispersal devices: select issues in consequence management*, CRS Report for Congress, 7 Dec. 2004, http://www.fas.org/spp/starwars/crs/RS21766.pdf, accessed 17 Feb. 2012.

[27] The poisoning of Alexander Litvinenko with polonium-210 in London in 2006 was not a terrorist act and is generally regarded as an assassination. Other approaches to harnessing radioisotopes for malign purposes are covered in James M. Acton, M. Brooke Rogers and Peter D. Zimmerman, 'Beyond the dirty bomb: rethinking radiological terror', *Survival* 49: 3, Autumn 2007, pp. 151–68.

[28] UKAEA, interim report of the Discussion Group on Nuclear Industry Security Measures.

[29] Remarks by Hillary Rodham Clinton, Secretary of State, Renaissance Mayflower Hotel, Washington DC, 21 Oct. 2009, US Department of State, http://www.state.gov/secretary/rm/2009a/10/130806.htm, accessed 17 Feb. 2012.

[30] Kofi Annan, 'A global strategy for fighting terrorism: keynote address to the closing plenary', International Summit on Democracy, Terrorism and Security, Madrid, 2005, http://english.safe-democracy.org/keynotes/a-global-strategy-for-fighting-terrorism.html, accessed 17 Feb. 2012.

effects, particularly if the target city was in the United States or an allied country. A global campaign to locate, capture or destroy the group responsible, similar to that which followed 9/11, could be expected. If the source of the weapon or material could be attributed, the public and political demand for retribution would likely result in punitive action against the country of origin, whether its government provided the nuclear wherewithal or was merely culpable as a result of poor security.

While Washington views 'the greatest potential danger facing the United States' as emanating 'from a terrorist group like al-Qaida obtaining a crude nuclear device',[31] this perception is far from universally shared. Governments in countries that have no direct experience of Al-Qaeda-inspired terrorism, or do not possess nuclear weapons and/or a civil nuclear energy sector—or are not located in a region where these exist—have understandably been slower in recognizing nuclear terrorism as a security problem requiring concerted and sustained international cooperation. It is unsurprising, therefore, that nuclear terrorism does not occupy the top billing for all states as the 'most immediate and extreme threat to global security',[32] as viewed by the Obama administration and the Bush administration before it.

As Tobey notes, for example, the 2010 NSS 'did not forge a genuinely common assessment' of the nuclear terror threat, and a plan to provide leaders attending the summit with a threat briefing based on intelligence-derived information 'quickly foundered on the rocks of differing national assessments and concerns'.[33] To be sure, the lack of historical precedent makes threat assessment a somewhat abstract process for some governments. The matter is further complicated by the wariness of governments that hold, and actively collect, relevant intelligence about sharing it, concerned as they are to avoid revealing sources and methods and risking operations under way to identify and extinguish relevant plots.[34]

Threat perception is also influenced by wider politics, both domestic and international. At the recent High Level Meeting on Nuclear Safety and Security organized after Fukushima, the Non-Aligned Movement (NAM) stated that measures to strengthen nuclear security 'must not be used as a pretext or leverage to violate, deny or restrict the inalienable right of developing countries to develop research, production and use of nuclear energy for peaceful purposes without discrimination'.[35] Some 35 years earlier, British Members of Parliament raised similar concerns over the negative implications for civil liberties of enhanced civil

[30] 'Statement by Secretary of State Hillary Rodham Clinton to the 2010 Review Conference of the Treaty on the Non-Proliferation of Nuclear Weapons', general debate, New York, 3 May 2010, p. 5, http://www.un.org/en/conf/npt/2010/statements/pdf/usa_en.pdf, accessed 17 Feb. 2012.

[32] 'Remarks of President Barack Obama', Prague, 5 April 2009, Embassy of the United States, http://prague.usembassy.gov/obama.html, accessed 17 Feb. 2012.

[33] William Tobey, *Planning for success at the 2012 Seoul Nuclear Security Summit*, policy analysis brief, Stanley Foundation, June 2011, pp. 2, 6, http://www.stanleyfoundation.org/resources.cfm?id=459, accessed 17 Feb. 2012.

[34] Mowatt-Larssen, 'Al Qaeda's pursuit of weapons of mass destruction'.

[35] Statement by HE Mr Bruno Rodriguez Parrilla, Minister of Foreign Affairs of the Republic of Cuba, on behalf of the Non-Aligned Movement before the High-level Meeting on Nuclear Safety and Security, New York, 22 Sept. 2011, http://www.reachingcriticalwill.org/political/energy/hlm/HLM-NAM.pdf, accessed 17 Feb. 2012.

nuclear security measures. In 1976, for example, Alan Beith noted in the House of Commons that 'some of the dangers can be exaggerated and can lead to unreasonable fears in the minds of those who live near or work in these undertakings'.[36]

The lack of widespread consensus on the threat further explains why multilateral cooperation has to date been an incremental affair and why the negotiation of an overarching and binding framework would meet significant political resistance. Consequently, the only effective route is to pursue a gradual process of 'socialization' with respect to international acceptance of the nuclear security norm.[37]

The politics of nuclear governance

The politics of nuclear governance presents a third complicating factor. To understand the impact of recent political debates surrounding nuclear governance, the relationship of nuclear security to non-proliferation, arms control and disarmament must be briefly explored. Non-proliferation has traditionally focused on preventing additional state actors from acquiring nuclear weapon capabilities, although all efforts to prevent the dissemination of sensitive knowledge, materials and technology at the state level will, of course, also have an indirect effect on preventing terrorist acquisition and use. However, in contrast to nuclear security, the non-proliferation regime is dominated by a single legal instrument—the NPT—backed up by a safeguards regime implemented by the IAEA with a legal mandate to verify states' obligations. With arms control, the size and shape of the Russian and US nuclear arsenals have been managed through negotiations, such as those which resulted in the new START agreement in 2011.[38] Disarmament involves the negotiated elimination of specific categories of nuclear weapons, as demonstrated by the Intermediate Range Nuclear Forces Treaty of 1987, for example, or the elimination of nuclear weapons in their entirety, as envisioned in article VI of the NPT. While it has been ambitiously argued in some quarters that pursuing the elimination of nuclear weapons possession by all states would remove the potential for nuclear terrorism, this would only be relevant to the scenario where non-state actors might seek to steal an intact weapon from an existing national arsenal,[39] although global stocks of weapons-usable fissile material would also be expected to diminish substantially at the same time, of course.

Since the late 1990s the politics surrounding NPT debates over disarmament and non-proliferation have become increasingly divisive, with the NAM blocking moves by the United States and others to strengthen non-proliferation measures in the absence of greater progress on nuclear disarmament by the five permanent

[36] Hansard (House of Commons), 26 Feb. 1976, vol. 906, cols 701–55, 'Atomic Energy Authority (Special Constables) Bill', http://hansard.millbanksystems.com/commons/1976/feb/26/atomic-energy-authority-special, accessed 17 Feb. 2012.

[37] Martha Finnemore and Kathryn Sikkink, 'International norm dynamics and political change', *International Organization* 52: 4, Autumn 1998, p. 902.

[38] Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms, US State Department, http://www.state.gov/documents/organization/140035.pdf, accessed 17 Feb. 2012.

[39] Daalder and Lodal, 'The logic of zero', pp. 80–95; 'The growing appeal of zero', *The Economist*, 16 June 2011.

members of the UN Security Council. From the NAM's perspective, the emphases placed on the three NPT 'pillars' of non-proliferation, disarmament and peaceful use have become too skewed in the direction of the first.[40] Many NAM states view the nuclear security agenda through this NPT lens, so the prospects of developing a stronger normative foundation in this realm—through a new single legal instrument, for example—are unavoidably tied, and ultimately hostage, to NPT politics. Specifically, nuclear security cooperation is complicated by the lack of appetite on the part of many developing countries for new instruments that impose additional obligations related to the use of nuclear energy.[41]

The influence of NPT politics was clearly demonstrated in 2009, following the publication by Gordon Brown's government of *The road to 2010*, which argued that 'the UK believes that greater assurance is required to secure fissile material against the risks from nuclear terrorism' and that 'more work, coordinated globally, is required to address these challenges'.[42] Most controversially, from an NAM perspective, the paper stated that 'the Government believes it is vital that nuclear security becomes an integral part of the global nuclear framework—a new, fourth "pillar" of the global agenda'.[43] This was a clear attempt by Downing Street to promote a normative sense of 'oughtness'[44] with regard to nuclear security. In October 2009, Hillary Clinton also argued that in addition to the original three pillars, 'we should add a fourth: preventing nuclear terrorism. Stopping terrorists from acquiring the ultimate weapon was not a central preoccupation when the NPT was negotiated, but today, it is, and it must remain at the top of our national security priorities.'[45]

By late 2009 the UK and US governments had ceased pushing the vision of a fourth pillar because of objections from NAM parties to the NPT, which saw it as incompatible with the existing pillars and an attempt to impose additional obligations related to the security of nuclear materials.[46] Nuclear terrorism is not seen as a top priority by many NAM countries, so efforts at 'creating equivalence' between the suggested fourth pillar and the existing three were always going to meet resistance.[47] The Obama and Brown governments were subsequently very careful about delinking the 2010 NSS from the broader nuclear and NPT agendas. In the run-up to and during the summit this manifested itself in the emphasis placed on *national responsibility* and the centrality of the IAEA in terms of providing assistance to states *when requested to do so* by governments.

[40] See e.g. statement by HE Dr R. M. Marty M. Natalegawa, Minister for Foreign Affairs of the Republic of Indonesia, on behalf of the NAM states party to the NPT before the 2010 review conference of the parties to the treaty, 3 May 2010, http://www.un.org/en/conf/npt/2010/statements/pdf/nam_en.pdf, accessed 17 Feb. 2012.

[41] Tobey, *Planning for success*, p. 2.

[42] Cabinet Office, *The road to 2010: addressing the nuclear question in the twenty-first century* (London: The Stationery Office, July 2009), Cm 7675, p. 8.

[43] Cabinet Office, *The road to 2010*, p. 12.

[44] Finnemore and Sikkink, 'International norm dynamics', p. 891.

[45] Hillary Clinton, Remarks at Renaissance Mayflower Hotel, Washington DC, 21 Oct. 2009.

[46] Kat Barton, 'Rhetoric and reality, contradictions in the midst of change: the UK government role at the 2010 NPT Review Conference', Acronym Institute for Disarmament Diplomacy, http://www.acronym.org.uk/docs/1101/UK%20gov%20role%20in%202010%20NPT%20Rev%20Con.pdf, accessed 17 Feb. 2012.

[47] Deepti Choubey, *Restoring the NPT: essential steps for 2010* (Washington DC: Carnegie Endowment for International Peace, 2009), p. 40.

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The politics associated with nuclear governance demonstrate that there is little appetite on the part of many countries to pursue grandiose visions for nuclear security. It was not surprising, then, that during the 2010 NSS Gary Samore, the Senior White House Coordinator for WMD (weapons of mass destruction) Counterterorrism and Arms Control, stated: 'Trying to construct an international regime that would require countries to take certain steps and to have an enforcement mechanism to take certain steps on nuclear security is not attainable.'[48]

A messy 'nuclear security' landscape

Given the complexity of nuclear terrorism as a security issue, diverging perceptions of the threat and NPT politics, it becomes clear why the nuclear security landscape has evolved over the years in a rather messy and complicated affair. The landscape comprises a patchwork of formal and informal instruments including non-binding codes, various groupings and legally binding conventions of limited scope. Each instrument has a different membership base; some by design are exclusive while others are more representative. A brief overview of the key components demonstrates how and why politics, and issues of practicality, have dictated their development.

Informal regulation

Several instruments, informal as well as formal, exist that seek to order and constrain behaviour related to preventing nuclear terrorism.[49] The initial framing of the nuclear security landscape can be traced to 1975, when the IAEA first published *Recommendations for the physical protection of nuclear material* (Information Circular [INFCIRC]/225).[50] The genesis of this document is linked to the convergence of an expanding nuclear industry and the growth in instances of hijacking and terrorism. With global nuclear energy production growing from less than 1GW(e) in 1960 to 100GW(e) by the late 1970s, INFCIRC/225 provided guidance for countries seeking to establish nuclear security systems.[51]

While not legally binding, or originally designed with political goals in mind, INFCIRC/225 has become widely recognized as the international standard for protecting nuclear material in the context of non-state threats,[52] and has taken on

[48] Press briefing, 13 April 2010.

[49] Finnemore and Sikkink, 'International norm dynamics', p. 891.

[50] IAEA, *Nuclear security recommendations on the physical protection and nuclear material and facilities* (INFCIRC/225/Revision 5), Jan. 2011, http://www-pub.iaea.org/MTCD/publications/PDF/Pub1481_web.pdf, accessed 17 Feb. 2012.

[51] David Biello, 'Safety concerns often amount to status quo at U.S. nuclear industry's aging reactors', *Scientific American*, 25 March 2011, http://www.scientificamerican.com/article.cfm?id=safety-concerns-status-quo-at-us-reactors, accessed 17 Feb. 2012; IAEA, '50 years of nuclear energy', 2004, http://www.iaea.org/About/Policy/GC/GC48/Documents/gc48inf-4_ftn3.pdf, accessed 17 Feb. 2012.

[52] Craig Everton, Stephan Bayer and John Carlson, 'Developments in the IAEA's nuclear security series and physical protection guidance document INFCIRC/225', paper presented at Annual Meeting of the Institute of Nuclear Materials Management, 11–15 July 2010, http://203.6.168.65/asno/publications/developments-in-the-iaea-INFCIRC225.pdf, accessed 17 Feb. 2012. INFCIRC/225 has a legally binding effect in certain bilateral safeguards agreements which cite it as the security standard to be applied to nuclear materials and facilities under these agreements.

growing political significance as a result. While INFCIRC/225 has been criticized for setting low standards for physical protection in the context of determined and well-resourced adversaries,[53] stronger provisions were watered down during the formulation process to gain the required consensus on content among IAEA member states—a characteristic shared by the 2001 *Code of Conduct on the Safety and Security of Radioactive Sources* (CCSSRS), which provides guidelines for controlling certain radioactive sources used in the civil sector.[54] The CCSSRS originated in response to concern over the widespread civil and military use of such sources.[55]

Since their formulation, both documents have evolved significantly in response to strategic changes, with a major revision to the CCSSRS in 2003 following 9/11, and INFCIRC/225 now in its fifth edition. Although regularly updated, they remain non-binding, so although many states have pledged to uphold them, in practice they may not be widely or effectively implemented. For example, as of September 2011 just 55 of the 105 parties to the CCSSRS had provided the IAEA with a self-assessment questionnaire related to its Supplementary Guidance on the Import and Export of Radioactive Sources.[56]

Formal regulation

Increased trade in nuclear materials during the 1970s brought with it a move to place physical protection on a more formal footing, and to facilitate information sharing and best practice among states. The key outcome was the Convention on the Physical Protection of Nuclear Material (CPPNM), opened for signature in 1980. The CPPNM took force in 1987, obligating state parties to apply physical protection measures to nuclear material during international transport.[57] The convention has been ratified by 144 states and is the only legally binding instrument with specific provisions for physical protection of nuclear material. However, the focus on international transport limits its scope and, after 9/11, this weakness resulted in the negotiation of an amendment in 2005 to broaden coverage to include the domestic use, storage and transport of such materials.[58] The amendment is not in force since it requires two-thirds of the state parties to ratify it and little more than half of this number had done so by June 2011. Furthermore, the convention's

[51] Jack Boureston and Tanya Ogilvie-White, 'Seeking nuclear security through greater international coordination', Council on Foreign Relations working paper, March 2010, p. 5, http://www.cfr.org/international-law/seeking-nuclear-security-through-greater-international-coordination/p21709, accessed 17 Feb. 2012.

[54] IAEA, Code of Conduct on the Safety and Security of Radioactive Sources, 2003, http://www-ns.iaea.org/tech-areas/radiation-safety/code-of-conduct.htm, accessed 17 Feb. 2012.

[55] IAEA, 'International summary of round table discussions', International Conference on the Safety and Security of Radioactive Material, 14–18 Sept. 1998, pp. 369–70, http://www-pub.iaea.org/MTCD/publications/PDF/Pub1042_web.pdf, accessed 17 Feb. 2012.

[56] IAEA, 'List of states that have a made a political commitment with regard to the Code of Conduct on the Safety and Security of Radioactive Sources and the Supplementary Guidance on the Import and Export of Radioactive Sources', http://www.iaea.org/Publications/Documents/Treaties/codeconduct_status.pdf, accessed 17 Feb. 2012.

[57] IAEA, Convention on the Physical Protection of Nuclear Material (CPPNM), 1987, http://www.iaea.org/Publications/Documents/Conventions/cppnm.html, accessed 17 Feb. 2012.

[58] IAEA, Amendment to the Convention on the Physical Protection of Nuclear Material, http://www.iaea.org/Publications/Documents/Conventions/cppnm_amend_status.pdf, accessed 17 Feb. 2012.

provisions for physical protection lack the specificity of INFCIRC/225, and there is no oversight body or verification mechanism to assess whether state parties are meeting their obligations. In this respect compliance would appear to be quite low; in 2008 under half of the signatories had reported establishing national legal frameworks with regulations for the physical protection of nuclear materials, facilities and transport.[59]

Created with the aim of addressing gaps in the CPPNM, the International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT) came into force in July 2007. It was opened for signature in 2005, some seven years after initial drafting by Russia.[60] ICSANT requires state parties to enact legislation to make unauthorized possession of nuclear materials, and attacks on nuclear facilities, offences under national law and punishable by appropriate penalties. Parties must also implement practical measures, as outlined by the IAEA in documents such as INFCIRC/225, to protect nuclear and radioactive materials and to cooperate with one another in preventing, detecting and responding to nuclear and radiological terrorism. It also goes beyond other instruments by covering both military and civil activities and requiring states to criminalize the planning of nuclear terrorist events. ICSANT represented significant progress in formalizing key aspects of the nuclear security landscape, although it suffers from limited membership with only 77 state parties, and 115 signatories, as of October 2011.[61]

The role of the IAEA

Although the IAEA developed INFCIRC/225 and the CCSSRS, serves as the depository organization for the CPPNM and assists in coordinating ICSANT activities, it does not have the legal authority to ensure that states comply with the standards of behaviour set out in these instruments, nor does it have an oversight or verification role for CPPNM and ICSANT. States themselves are responsible for ensuring nuclear security measures are in place, and this means disparities exist between different states' provisions in this area.[62] Moreover, safeguards inspectors are not allowed to report back formally to the IAEA on security-related issues uncovered during inspections.[63]

After 9/11 the role of the IAEA was strengthened, with the establishment in 2002 of an Office of Nuclear Security along with a rolling Nuclear Security

[59] Julia C. Morse, 'Fulfilling the Prague promise: a framework for nuclear security', *Journal of Public and International Affairs* 21, Spring 2010, p. 146, http://www.princeton.edu/jpia/past-issues-1/2010/Fullfilling-the-Prague-Promise.pdf, accessed 17 Feb. 2012.

[60] UN, International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT), http://untreaty.un.org/cod/avl/ha/icsant/icsant.html, accessed 17 Feb. 2012.

[61] UN, 'Status of the International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT)', http://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=UNTSONLINE&mtdsg_no=XVIII~15&chapter=18&Temp=mtdsg3&lang=en#Participants, accessed 17 Feb. 2012.

[62] See e.g. the Nuclear Materials Security Index recently launched by the Nuclear Threat Initiative (NTI), *NTI Nuclear Materials Security Index: building a framework for assurance, accountability, and action*, pp. 14–15, http://www.ntiindex.org/static/pdfs/nti_index_final.pdf, accessed 17 Feb. 2012.

[63] 'Next steps for nuclear security', summary of Nuclear Security Conference, 18–19 Feb. 2010, p. 4.

Plan (NSP) and a Nuclear Security Fund (NSF).[64] The office helps member states that seek assistance to bolster nuclear security procedures and practices in line with INFCIRC/225 through, for example, its International Physical Protection Advisory Service (IPPAS).[65]

Efforts made to strengthen the role of the IAEA in nuclear security reflect a consensus among its member states that the agency is the key multilateral institution in this field. However, there is no consensus on giving the agency an enforcement role in relation to nuclear security.[66] Indeed, the IAEA's nuclear security activities are largely funded through voluntary contributions from member states to the NSF; some 90 per cent of the NSP budget comes from voluntary contributions and not (as is the case with safeguards and safety) via the regular budget,[67] and amounts pledged to the Fund often differ from those actually received.[68]

It is clear, then, that the other roles and interests of the IAEA—principally related to safeguards and safety—have a direct influence on how the agency is organized to enhance nuclear security around the world. Indeed, the lack of an international body with a mandate to identify substandard behaviour—without first being requested to do so by a member state—certainly puts a brake on norm development. This lack of a robustly mandated 'organizational platform' bears witness to the technical and political constraints on enhancing multilateral cooperation.[69]

UN Security Council action

As a result of heightened concerns that terrorists might go nuclear or seek other types of WMD following the 9/11 attacks, the UN Security Council took direct action by mandating specific behaviour on the part of member states in an effort to strengthen international preventive efforts. Adopted immediately after 9/11, UNSCR 1373 requires states to adopt 'relevant international conventions and protocols to combat terrorism' and recognizes the threat posed by international terrorism and by WMD materials and their trafficking.[70] UNSCR 1540, adopted in April 2004, requires all states 'to refrain from providing any form of support to non-State actors that

[64] Anita Nilsson, 'Security of material: the changing context of the IAEA's programme', *IAEA Bulletin* 43: 4, 2001, http://www.iaea.org/Publications/Magazines/Bulletin/Bull434/article3.pdf, accessed 17 Feb. 2012; IAEA, Office of Nuclear Security, http://www-ns.iaea.org/security/, accessed 17 Feb. 2012.

[65] IAEA, 'International Physical Protection Advisory Service', http://www-ns.iaea.org/security/ippas.asp, accessed 17 Feb. 2012.

[66] Office of the Press Secretary, The White House, press briefing by Ben Rhodes, Deputy National Security Advisor for Strategic Communications; Gary Samore, Senior White House Coordinator for WMD Counterterrorism and Arms Control; and Laura Holgate, Senior Director for WMD Terrorism and Threat Reduction, 13 April 2010, Washington Convention Center, Washington DC, http://www.whitehouse.gov/the-press-office/press-briefing-ben-rhodes-deputy-national-security-advisor-strategic-communications, accessed 17 Feb. 2012.

[67] Jack Boureston and Andrew K. Semmel, *The IAEA and nuclear security: trends and prospects*, Policy Analysis Brief, The Stanley Foundation, December 2010, p.6, http://www.stanleyfoundation.org/publications/pab/Boureston_SemmelIPAB1210.pdf accessed 19 Feb. 2012.

[68] IAEA, Nuclear Security Fund, http://www-ns.iaea.org/security/nsf.asp?s=4, accessed 17 Feb. 2012.

[69] Finnemore and Sikkink, 'International norm dynamics', pp. 899–900.

[70] UNSCR 1373 (2001), http://www.un.org/News/Press/docs/2001/sc7158.doc.htm, accessed 17 Feb. 2012.

attempt to develop, acquire, manufacture, possess, transport, transfer or use nuclear, chemical or biological weapons and their means of delivery'.[71]

In a manner similar to ICSANT and other initiatives, Resolution 1540 focuses on addressing key weaknesses in the current regime, specifically the lack of effective national export controls in many countries. It was heavily influenced by the revelations that emerged from early 2004 about the transnationally organized A. Q. Khan proliferation network supplying nuclear weapons-related technology to Iran, Libya and North Korea. Technology and materials were sourced by the network from suppliers in countries such as Malaysia, Pakistan and Singapore, which are not among the select membership of the Nuclear Suppliers Group.[72]

Resolution 1540 requires all states to enhance national export controls to 'prevent the proliferation of nuclear, chemical and biological weapons, and their means of delivery'. However, like other nuclear security-related instruments, it suffers from the lack of a verification mechanism, which was omitted in order to get the resolution passed as swiftly as possible. Consequently, the 1540 Committee lacks authority: indications suggest that implementation has been slow and national reporting uneven. The effective implementation of Resolution 1540 is further complicated by the lack of buy-in from many developing states owing to its origins in a Security Council action rather than an initiative from a more representative forum such as the UN General Assembly.[73]

Informal actions since 9/11

Beyond the regulatory instruments, various new but informal processes and categories of action have been created since 9/11 to strengthen nuclear security cooperation.[74] The Bush and Obama administrations played important entrepreneurial roles in developing these initiatives as informal affairs in order to avoid drawn-out, and potentially futile, negotiations to establish new legal instruments such as ICSANT, which took nearly a decade to formalize. The initiatives have been designed to address perceived weaknesses in existing international cooperation.

The GP was launched by the G8 in June 2002 at the initiative of the Bush administration in direct response to growing concerns that terrorists would seek to acquire and use chemical, biological, radiological and nuclear (CBRN) weapons capabilities. The agreed focus was initially on addressing CBRN legacy issues in Russia, because 'it possessed what was by far the largest inventory of weapons

[71] UNSCR 1540 (2004), http://www.un.org/sc/1540/, accessed 17 Feb. 2012.

[72] Michael Laufer, *A. Q. Khan nuclear chronology*, issue brief (non-proliferation), VIII: 8 (Washington DC: Carnegie Endowment for International Peace, 7 Sept. 2005), p. 5, http://www.carnegieendowment.org/static/npp/Khan_Chronology.pdf, accessed 17 Feb. 2012.

[73] Brian Finlay, Johan Bergenas and Veronica Tessler, 'Beyond boundaries in the Middle East: leveraging nonproliferation assistance to address security/development needs with Resolution 1540' (Muscatine, IA: Stanley Foundation, Sept. 2010), p. 23, http://ww€w.stimson.org/images/uploads/research-pdfs/MErpt910.pdf, accessed 17 Feb. 2012; Johan Bergenäs, 'The slippery slope of rational inaction: Resolution 1540 and the tragedy of the commons', *Nonproliferation Review* 15: 2, July 2008, pp. 373–80.

[74] Finnemore and Sikkink, 'International norm dynamics', p. 891.

and materials'. The G8 committed an unprecedented budget for this work: US$20 billion over ten years, around half of which was to be provided by the United States under existing 'cooperative threat reduction' programmes in the former Soviet Union which had been running since the early 1990s.[75] The GP has undoubtedly realized some success in dismantling nuclear submarines and destroying tens of thousands of chemical weapons in Russia. However, by focusing on Russian priorities the initiative has neglected challenges more directly associated with the terrorist agenda, including securing nuclear and radiological materials in Russia and elsewhere. While the GP was extended beyond its original ten-year mandate at the G8 summit in France in June 2011, disappointingly no new budget pledges were made, although this is perhaps understandable given that some GP states have yet to live up to their original funding pledges.[76]

Four years later, in 2006, the Russian and US governments launched GICNT, another voluntary instrument. This was designed to facilitate collaboration between states at an operational level through forming partnerships and sharing best practice in line with a set of principles related to the prevention and detection of, and response to, nuclear terrorism. Again, the initiative was designed to plug gaps in the existing nuclear security regime. GICNT appears to have been successful in capacity-building, with nearly 50 multilateral events conducted in 19 countries on topics as diverse as border monitoring, mitigation of the effects of terrorist incidents, and forensics.[77] Moreover, membership rapidly expanded to 82 countries by October 2011. While this demonstrates growing international buy-in, it has complicated the coordination of activities in areas where national interests diverge, such as information-sharing, particularly in relation to nuclear forensics, which remains a sensitive issue for many states, especially those with nuclear weapons.[78]

The above summary demonstrates that the existing nuclear security landscape comprises a complex network of new and older instruments both binding and voluntary in nature, with widely varying memberships and addressing different aspects of the threat. This situation complicates the introduction of a unifying instrument, and so recent efforts have focused on galvanizing existing approaches by encouraging higher-level political buy-in. This has been clearly illustrated by the NSS process, which constitutes the most recent addition to the policy landscape.

[75] Alan Heyes, Wyn Q. Bowen and Hugh Chalmers, *The global partnership against WMD: success and shortcomings of G8 threat reduction since 9/11*, RUSI Whitehall Paper 76 (Abingdon: Taylor & Francis, 2011), pp. 73–4, 81.

[76] Heyes et al., *The global partnership against WMD*, pp. 2, 5, 91–7.

[77] GICNT, US State Department, 'Global Initiative to Combat Nuclear Terrorism: key multilateral workshops and exercises', http://www.state.gov/documents/organization/172982.pdf, accessed 17 Feb. 2012.

[78] Daniel H. Chivers, Bethany F. Lyles Goldblum, Brett H. Isselhardt and Jonathan S. Snider, 'Before the day after: using pre-detonation nuclear forensics to improve fissile material security', *Arms Control Today*, July–Aug. 2008, http://www.armscontrol.org/act/2008_07-08/NuclearForensics, accessed 23 Oct. 2011.

Nuclear summitry

Established by the Obama administration in 2010, the first NSS brought together 47 national governments,[79] the European Union, the IAEA and the United Nations: the largest gathering of world leaders in the American capital since the UN Conference on International Organization in 1945. Eight months earlier, Obama had announced he would organize the event to 'discuss steps we can take to secure loose nuclear materials; combat smuggling; and deter, detect, and disrupt attempts at nuclear terrorism'.[80] The summit was designed by the administration to raise international awareness of nuclear terrorism, to develop a consensus on the threat and to secure a set of specific commitments from the participants. It also represented a clear recognition on the part of the Obama team that strengthening nuclear security cooperation required high-level political endorsement to provide momentum.

The main achievement was getting the 47 governments, mostly represented by heads of state from across the globe, to accord a high priority to the nuclear security agenda. Indeed, the summit included delegations from both NPT and non-NPT states, as well as eight of the nine states that possess nuclear weapons—including Israel, which attended alongside several Arab governments. Despite the relevance of North Korea, Iran and Syria to discussions of nuclear security, these governments were not invited, given outstanding questions over their compliance with the NPT and/or UNSCRs; including them would arguably have damaged the process and undermined the goal of securing consensus.

The final communiqué noted that 'nuclear terrorism is one of the most challenging threats to international security' and that 'success will require responsible national actions and sustained and effective international cooperation'.[81] In an echo of the 2002 G8 summit which launched the GP, the White House emphasized that the participants came together 'to advance a common approach and commitment to nuclear security at the highest levels'. This involved endorsement of Obama's objective of locking down 'all vulnerable nuclear material in four years' and working jointly towards this goal. Among other things, the NSS communiqué called for:

- improving security and accounting of plutonium and HEU;
- reducing the use of HEU;
- universalizing key treaties;
- providing the IAEA with the resources to develop nuclear security guidelines

[79] Algeria, Argentina, Armenia, Australia, Belgium, Brazil, Canada, Chile, China, Czech Republic, Egypt, Finland, France, Georgia, Germany, India, Indonesia, Israel, Italy, Japan, Jordan, Kazakhstan, Malaysia, Mexico, Morocco, The Netherlands, New Zealand, Nigeria, Norway, Pakistan, Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Vietnam.

[80] Office of the Press Secretary, The White House, 'Press conference by the President', 10 July 2009, http://www.whitehouse.gov/the-press-office/Press-Conference-President-LAquila-Italy-7-10-09, accessed 15 Nov. 2011.

[81] Office of the Press Secretary, The White House, 'Communiqué of the Washington Nuclear Security Summit', 13 April 2010, http://www.whitehouse.gov/the-press-office/communiqu-washington-nuclear-security-summit, accessed 19 Feb. 2012.

and provide advice to member states on implementing them;
- sharing best practices for nuclear security within industry, while ensuring security measures do not prevent countries enjoying the benefits of peaceful nuclear energy;
- encouraging efforts to secure radioactive substances.[82]

A work plan with specific actions was agreed, and some 30 states made national commitments to enhance domestic security provisions or to work bilaterally or multilaterally to improve global provisions.[83] Gary Samore noted that the administration 'used the summit shamelessly as a forcing event to ask countries to bring house gifts'.[84] While there was insufficient support among the participants to establish a formal mechanism for evaluating implementation of commitments because these were offered voluntarily, the NSS did inject impetus into eliminating the production of and improving the security around vulnerable fissile material. For example, while Kazakhstan did not attend the summit, it did, with assistance from the US National Nuclear Security Administration, secure enough HEU to make 775 nuclear bombs in November 2010.[85]

Ultimately, however, it did not prove possible at the summit to develop a clear consensus on the threat. The insertion in the communiqué of a reference to securing radiological materials clearly demonstrates that many of the participating governments see this issue as a greater priority than securing vulnerable fissile materials; the German government has since led a work strand on protecting radioactive sources ahead of the next NSS in Seoul.

Looking forward

The organization and outcome of the 2010 NSS provide further evidence that an incremental approach is the only practical way to move the nuclear security agenda forward. It demonstrated that there is little appetite at the international level, particularly within the developing world, for ambitious schemes that seek to move beyond the patchwork of nuclear security instruments that already exist in response to a threat many do not fear. Indeed, in the absence of a major forcing event—such as a terrorist attack against a nuclear facility—the prospects for enhancing the nuclear security norm will continue to be complicated by the complexity of the subject matter, diverging threat perceptions and the politics of nuclear governance. An emphasis should be placed, therefore, on a pragmatic approach which builds on existing initiatives and gives consideration to areas in which the agenda could be supplemented in a functional sense. In these respects several things stand out.

[82] The White House, 'Key facts about the Nuclear Security Summit', 13 April 2010, http://www.whitehouse.gov/the-press-office/key-facts-about-nuclear-security-summit, accessed 17 Feb. 2012.
[83] The White House, 'Key facts about the Nuclear Security Summit'.
[84] Office of the Press Secretary, The White House, press briefing by Rhodes et al., 13 April 2010.
[85] Robert Golan-Vilella, Michelle Marchesano and Sarah Williams, *The 2010 Nuclear Security Summit: a status update*, Arms Control Association and Partnership for Global Security Report, April 2010, http://www.armscontrol.org/system/files/Status_Report_April_11_2011_WEB.pdf, accessed 17 Feb. 2012.

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Solidification

The growing numbers of states signing and ratifying the two legally binding conventions—CPPNM and ICSANT—suggest that international buy-in to the nuclear security agenda is slowly growing. However, the limited membership of ICSANT (just 77 states) demonstrates that this is a slow process and there is a long way to go to broaden support. Similarly, while 144 states have ratified the CPPNM, its expanded mandate still depends on the amendment being ratified. Once the amendment is adopted attention could be shifted to how CPPNM implementation is monitored in the absence of a review conference provision. Progress in these areas would start to solidify a nuclear security norm by increasing pressure on non-signatory or non-compliant states to conform, either through the embarrassment of non-participation or failing to meet obligations, or by demonstrating the benefits of international legitimation and political esteem associated with full participation.[86]

Reassurance

Tied to solidification is the issue of reassurance. Those governments pushing for stronger global nuclear security provisions should continue to reassure developing countries that the aim is not to undermine their rights as enshrined in the NPT. There appear to be parallels here with the recent evolution of multilateral nuclear approaches such as the IAEA Fuel Bank and the UK Fuel Assurance initiatives, which are designed to persuade countries to voluntarily forgo the development or procurement of proliferation-sensitive nuclear fuel cycle capabilities—notably those associated with uranium enrichment—by offering assurances related to the supply of nuclear fuel. In a similar fashion, successfully reassuring those states worried about the demands for strengthened nuclear security arrangements should help to develop a wider consensus on the need to strengthen international cooperation.

Momentum

While the 2010 NSS was originally conceived as a one-off event, the value of organizing further summits was quickly identified as a means of maintaining political momentum for the nuclear security agenda. In preparation for the Seoul NSS in March 2012 the focus has been on nine priority areas.[87] The 2010 participants will also provide progress reports on their original commitments and are likely to make additional commitments to future work. Given Seoul's proximity to Japan, the South Koreans have, understandably, stated that the meeting 'will serve as a forum for discussion not only of the issue of nuclear security, but also

[86] Finnemore and Sikkink, 'International norm dynamics', p. 895.

[87] Management and minimization of HEU use in civil applications; transport security; preventing nuclear trafficking; international nuclear forensics cooperation; nuclear security culture; ratification and adherence to treaties/conventions; coordination between existing initiatives; protecting sensitive information; protecting radioactive sources. See 'Nuclear security after Fukushima', *IISS Strategic Comments*, 17: 26, Aug. 2011, pp. 1–3.

of its interface with nuclear safety which became the focus of renewed attention following the Fukushima nuclear accident'.[88] However, it is important for security to remain the major focus of the 2012 NSS because there are other well-established forums for discussing nuclear safety issues.

Maintaining international momentum to address security challenges such as nuclear terrorism always requires periodic high-level political endorsement. This imperative was reflected in the recent announcement by the Dutch government that it will host an NSS in 2014.[89] A third summit certainly makes sense in terms of measuring progress on locking down all vulnerable materials in four years. But if Obama does not win a second term in November 2012 the future efficacy of the process could be called into question. While a new Republican US president could be expected to give strong support to international efforts to combat nuclear terrorism, it is unclear whether this would extend to a process so closely tied to a preceding Democrat administration. Even if Obama is re-elected, there is still no clarity on how periodic high-level engagement will be ensured after 2014. One idea could be to hold summits at longer time intervals along the lines of the NPT review conference, which occurs every five years, with supporting 'sherpa' activity across the intervening periods similar to the NPT preparatory committee process.

Governance

As the consequences of a nuclear security event would be similar to, if not more devastating than, a safety event, the two scenarios should be treated in a more balanced fashion by the IAEA. While the development of a global nuclear security inspection system run by the IAEA is off the table for political and practical reasons, nuclear security could nevertheless be mainstreamed by funding it through the regular IAEA budget, as safeguards and safety are, rather than through voluntary contributions. Addressing the disparity in resources and priority accorded respectively to safeguards, safety and security will, of course, require a larger general budget, and that brings with it further challenges in terms of persuading member states to support such a move at a time when most government coffers are under severe strain.

There is a related case for better integrating the agency's work on safety, safeguards and security. The IAEA Board of Governors could decide to build on the overlap between the three work-streams to establish a more formalized set of reporting relationships and requirements. A more coherent and less compartmentalized approach to nuclear governance by the agency makes sense, given that nuclear power looks set to enjoy a renaissance. A long-term goal could be to elevate the Office of Nuclear Security to departmental status within the IAEA.

[88] '2012 Nuclear Security Summit: beyond security towards peace', http://www.thenuclearsecuritysummit.org/eng_info/overview.jsp, accessed 17 Feb. 2012.

[89] Government of the Netherlands, 'Netherlands asked to host Nuclear Security Summit 2014', http://www.government.nl/news/2012/01/31/netherlands-asked-to-host-nuclear-security-summit-2014.html, accessed 17 Feb. 2012.

New initiatives

Finally, there always remains scope for developing new, narrowly targeted and voluntary initiatives to fill policy gaps. For example, while the first NSS focused on materials, the second will also address intangible elements of the agenda, including the protection of sensitive nuclear information and security culture. Various approaches could be pursued to enhance the protection of sensitive information. Enhancing professional awareness and responsibility, and developing robust security cultures across the civil nuclear sector, would appear to be an achievable goal in this respect. While the construction of a crude IND may not require the highly specialized knowledge of a nuclear scientist, the potential pool of expertise from which a terrorist group may seek to draw includes scientists and engineers working in dual-use areas such as metallurgy, physics and high explosives. Consideration could therefore be given to promoting awareness of this possibility among individuals who may come into contact with potentially sensitive information, and alerting them to the possible security implications of wider dissemination. There is a clear role here for education and training programmes aimed at the scientific sector, academia and industry. Engaging with the various constituencies to develop ethical codes of conduct based on self-governance would complement this approach.