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THE FUTURE OF WEAPONS OF MASS DESTRUCTION: NON-STATE ACTORS AND TERRORISTS

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Exercise Solo Flight

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THE FUTURE OF WEAPONS OF MASS DESTRUCTION: NON-STATE ACTORS AND TERRORISTS¹

Science and technology have made enormous progress, but human nature, alas, has not changed. There is as much fanaticism and madness as there ever was, and there are now very powerful weapons of mass destruction available to the terrorist.

- Walter Laqueur, *The New Terrorism: Fanaticism and the Arms of Mass Destruction*

At the end of the Cold War, the concept of two major superpowers holding a tenuous peace over all of the countries of the world ceased. The bipolar superpower regime was replaced by an uncertain world in which many small conflicts, uprisings and insurgencies peppered the continents.

With the last decade, defined largely by the global war on terror, globalization, the growth of new military powers, and daunting riddles of asymmetry arising in every region of the world, the clarity and symmetry of the earlier bipolar era can seem preferable to the complexity we now face.²

This new reality gave rise to the creation of a number of rogue, militarized non-state organizations such as Al-Qaida, the Taliban, and most recently the Islamic State (or Daesh, as it is labelled in the Middle East and referred to in many European countries)³ employing asymmetric and guerrilla warfare tactics with aims to disrupt populations and create fear.⁴ As these organizations grow in power and capability, they continue to diversify the weapons at their disposal and may now be capable of employing weapons of mass destruction (WMDs).

¹ Throughout this paper, the terms terrorist, non-state actor, non-state organization, transnational organization and fundamentalist will be used interchangeably.

² Barry Scott Zellen, *State of Doom: Bernard Brodie, the Bomb and the Birth of the Bipolar World* (New York: Continuum International Publishing Group, 2012), vii.

³ International Business Times, "Why ISIS hates being called Daesh: What's the correct name for the world's most dangerous terrorists?" last accessed 14 April 2016, <http://www.ibtimes.co.uk/why-isis-hate-being-called-daesh-whats-correct-name-worlds-most-dangerous-terrorists-1531506>.

⁴ The Atlantic, "What ISIS Really Wants," last accessed 19 February 2016, <http://www.theatlantic.com/magazine/archive/2015/03/what-isis-really-wants/384980/>.

This paper will explore the idea that non-state actors are not only capable of managing an inventory of WMDs, both conventional and improvised, but that they are poised to use of them in the conflicts to support their path to victory.

The first part of this paper will examine the current perceived and actual level of threat these weapons pose in the hands of non-state actors. Then, drawing on the ideas of Lawrence Freedman, a professor of War Studies at King's College London, who posited that there is a “nuclear threshold – the point at which restraints on nuclear employment are abandoned,”⁵ this paper will explore if, when and how the world could expect to see these organizations employ such weapons based on the assumption that the threshold remains valid beyond state boundaries. The third, and final, section of this paper will investigate the sources of support that non-state actors receive in their quest to have and deploy WMDs.

CURRENT THREAT

This section has three themes: defining weapons of mass destruction, identifying what the actual level of threat is at present, and what people are saying about the credibility and assessed intent of the threat. It will set the tone and framework for the remaining discussions within the paper.

Definitions

In the book, *Terrorism in the Twenty-First Century*, Cynthia Combs, a professor in the Department of Political Science at the University of North Carolina, provides a number of definitions for the various weapons of mass destruction. She identifies that biological and

⁵ Lawrence Freedman, “The First Two Generations of Nuclear Strategists,” *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, Princeton University Press, 1986, 761.

chemical WMDs have been “part of the arsenal of warriors”⁶ for a long time with the more recent addition of nuclear weapons to this category. She defines biological weapons as “warfare agents that include living microorganisms and toxins produced by microorganisms, plants or animals.”⁷ She goes on to state that biological microorganisms are generally in four categories: bacteria, viruses, rickettsia or fungus and that chemical weapons can be divided into many categories such as nerve agents, blood agents, blister agents and biotoxins.⁸ Chemical weapons, as defined by Combs, are “often composed of binary compounds of chemicals that separately would not be lethal...and may contain biotoxins.”⁹ It should be noted that chemical weapons are the easiest of the WMDs to improvise as chemicals used regularly for nonlethal purposes can be easily obtained and manipulated for weapons use.¹⁰ Since she did not define nuclear weapons, the dictionary provides one where conventional nuclear weapons are those that use nuclear energy as the source of their explosive power and are often termed thermonuclear weapons.¹¹ “In nuclear weapons, fission and fusion of certain slightly radioactive materials release energy in a huge explosion.”¹² This is in contrast to dirty bombs which simply scatter radioactive material vice having a thermonuclear explosion; their main physical effect is contaminating an area. A terrorist group could create dirty bomb much more easily than a nuclear weapon, and could add

⁶ Cynthia C. Combs, “The New Terrorist Threat: Weapons of Mass Destruction,” in *Terrorism in the Twenty-first Century* (New York: Routledge, 2015), 328.

⁷ *Ibid.*, 328-329.

⁸ *Ibid.*, 330, 332.

⁹ *Ibid.*, 329.

¹⁰ *Ibid.*, 330.

¹¹ Dictionary.com, “Nuclear Weapon,” last accessed 4 May 2016, <http://www.dictionary.com/browse/nuclear-weapon>

¹² Jonathan Medalia, “Terrorist “Dirty Bombs”: A Brief Primer,” *Congressional Report*, Washington DC, Library of Congress, 29 Oct 2003, 1.

in chemical or biological material to further the effects.¹³ Thus, improvised WMDs, or dirty bombs, are the form of weapons that these organizations are likely to possess, and thus use.

In the context of this critical examination, WMDs are understood to include such munitions as chemical, biological, radiological and nuclear weapons. These weapons may be highly technological, well-researched and well-developed formal weapons systems, or they may be adhoc devices, improvised with whatever technology is available at a given time and place.

Level of threat

International conventions require signatory nation states to report weapons holdings. Veracity aside, the declared and possibly verified inventories by nation states are all that may be assessed as non-state organizations are bound by no mechanism.¹⁴ Thus, a confirmation of what terrorist or non-state actors have in their inventories at this point in time is unavailable. However, examining the global availability of WMDs could provide a hypothesis for the potential WMD holdings of non-state organizations.

Nuclear weapons holdings have been tracked since their invention. Figures 1 and 2 provide a visual depiction of the number and distribution of nuclear weapons from their initial use in 1945 through the end of the Cold War in the early 1990s, and today, more than twenty-five years later.

¹³ *Ibid.*, 2.

¹⁴ Cynthia C. Combs, "The New Terrorist Threat: ...", 332.

Nuclear weapon states*, 1945–2006						
Year	United States	SU/Russia	Britain	France	China	Total
1945	6					6
1946	11					11
1947	32					32
1948	110					110
1949	235	1				236
1950	369	5				374
1951	640	25				665
1952	1,005	50				1,055
1953	1,436	120	1			1,557
1954	2,063	153	5			2,218
1955	3,057	200	10			3,267
1956	4,618	426	15			5,059
1957	6,444	660	20			7,124
1958	9,822	869	22			10,713
1959	15,468	1,060	25			16,553
1960	20,434	1,605	30			22,069
1961	24,126	2,471	50			26,647
1962	27,387	3,322	205			30,914
1963	29,459	4,238	280			33,977
1964	31,066	5,221	310	4	1	36,582
1965	31,982	6,129	310	32	5	38,458
1966	32,040	7,089	270	36	20	39,455
1967	31,233	8,339	270	36	25	39,903
1968	29,224	9,399	280	36	35	38,974
1969	27,342	10,538	308	36	50	38,274
1970	26,662	11,643	280	36	75	38,696
1971	26,956	13,092	220	45	100	40,413
1972	27,912	14,478	220	70	130	42,810
1973	28,999	15,915	275	116	150	45,455
1974	28,965	17,385	325	148	170	46,980
1975	27,926	19,055	350	188	185	47,604
1976	26,579	21,205	350	212	190	47,536
1977	25,722	23,044	350	228	200	49,544
1978	24,826	25,393	350	235	220	51,024
1979	24,605	27,935	350	235	235	53,360
1980	24,304	30,662	350	250	280	55,246
1981	23,464	32,049	350	274	330	56,467
1982	23,708	33,952	335	274	360	58,629
1983	24,099	35,804	320	279	360	60,882
1984	24,367	37,431	270	280	415	62,753
1985	24,237	39,197	300	360	425	64,519
1986	24,401	45,000	300	355	425	70,481
1987	24,344	43,000	300	420	415	68,479
1988	23,586	41,000	300	410	430	65,726
1989	22,380	39,000	300	410	435	62,525
1990	21,004	37,000	300	505	430	59,239
1991	17,287	35,000	300	540	435	53,562
1992	14,747	33,000	300	540	435	48,022
1993	13,076	31,000	300	525	435	45,336
1994	12,555	29,000	250	510	400	42,715
1995	12,144	27,000	300	500	400	40,344
1996	11,809	25,000	300	450	400	37,159
1997	10,950	24,000	260	450	400	36,060
1998	10,871	23,000	260	450	400	34,981
1999	10,824	22,000	185	450	400	33,859
2000	10,577	21,000	185	470	400	32,632
2001	10,527	20,000	200	350	400	31,477
2002	10,475	19,000	200	350	400	30,425
2003	10,421	18,000	200	350	400	29,371
2004	10,358	18,000	200	350	400	28,308
2005	10,295	17,000	200	350	400	28,245
2006	10,104	16,000	200	350	200	26,854

Figure 1 – World Nuclear Holdings (1945-2006)¹⁵

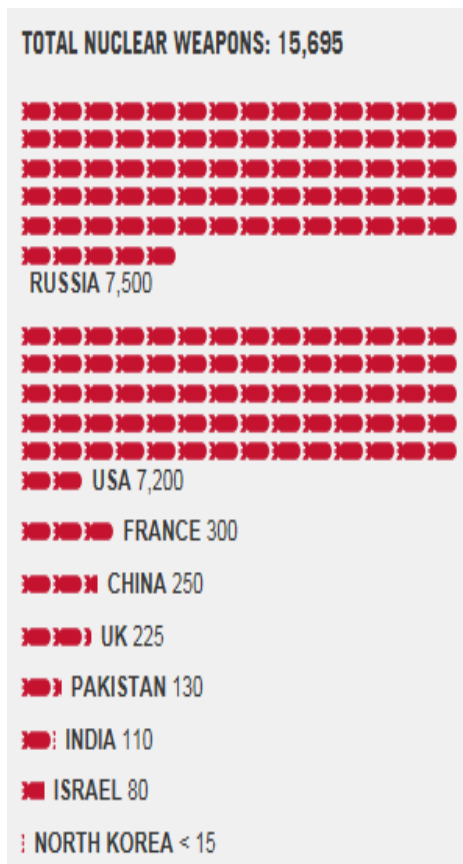


Figure 2 – World Nuclear Holdings (2016)¹⁶

It should be noted that the exact number of nuclear weapons in national arsenals is still unknown, as states protect these numbers as secret and sensitive information. The fact that there are less nuclear weapons held by countries now than at their peak does not mean that the nuclear weapon/material has been destroyed. Rather, it means that the fissile material from those weapons is in storage, and potentially available for black market sales or theft – a concept that will be explored below.

¹⁵ Natural Resources Defense Council, “Global nuclear stockpiles 1945–2006,” *Bulletin of the Atomic Scientists* 62 (2006):4, 66.

¹⁶ Ploughshares Fund, “World Nuclear Weapon Stockpile,” last accessed 3 February 2016, <http://ploughshares.org/world-nuclear-stockpile-report>.

Paul Bracken, author and professor of political science and business at Yale University, noted that in the 1990's, states that wanted nuclear materials or nuclear parts could acquire them from countries such as France or China. He pointed out that "Iraq's bomb parts were smuggled through front companies operating in Switzerland."¹⁷ Additionally, he noted that if a country needed "zirconium fuel rods for a uranium enrichment plant to make a nuclear bomb's exploding core; no problem. At least a dozen countries offer these, no questions asked."¹⁸ These stockpiles continue to be targets for resale; as recent as 29 April 2016, the *National Post* ran an article stating that five people had been arrested for attempting to sell uranium in the former Soviet state of Georgia. In the article, it highlighted that the form of uranium for sale is a potential component in nuclear weapons, and that this was the second arrest of this type within a month.¹⁹ Today, a quarter-century later, the only thing that has changed is that it is not just nation states that can purchase nuclear parts or materials, transnational terrorist organizations can as well.

Non-state actors may also seek to exploit the stockpiles of nuclear or industrial chemical materials or decommissioned nuclear weapons. The Ploughshares Fund, a public foundation that supports initiatives to prevent the spread and use of nuclear, biological and chemical weapons and other weapons of war, have classified these stockpiles as targets for terrorist organizations, particularly the nuclear fissile material.

The risk of nuclear weapons or fissile materials falling into the wrong hands has greatly increased since September 11. Stockpiles of nuclear materials are often loosely guarded abroad, and even the most secure nuclear facilities at home have proven to be vulnerable. Over the last two decades numerous attempts at nuclear theft have been documented. Some have come dangerously close to succeeding.²⁰

¹⁷ Paul Bracken, "Introduction," *Fire in the East: The Rise of Asian Military Power and the Second Nuclear Age* (New York: Harper Collins, 1999), xxvii.

¹⁸ *Ibid.*, xxviii.

¹⁹ "Five Arrested for Trying to Sell Uranium," *National Post*, 29 April 2016.

²⁰ Ploughshares Fund, "World Nuclear Weapon Stockpile,"

Naysayers have put out the argument that “most analysts of contemporary terrorism assumed, until recently, that the costs – financial and political – were too high for modern terrorists to seriously attempt the use of such weapons today.”²¹ However, as shown previously in this paper, while the cost of building a nuclear weapon remains quite high, access to nuclear, chemical and biological material and the technological skills to develop such weapons have become much less restricted. A US Congressional Report on terrorist dirty bombs states that “there is legitimate global commerce in radioactive materials of concern, but also potential for fraudulent purchases and theft during shipment or use, and problems of disposing of sources no longer wanted.”²² Thus, the possibility of a nuclear or chemical dirty bomb as a terrorist weapon is now quite feasible.²³

Credibility and Assessed Intent

Although there are international conventions and United Nations (UN) oversight commissions, particularly the UN Special Commission on Iraq, the development and production of WMDs remains possible.²⁴ This was clearly evident in the 1991 Gulf War which exposed Iraq’s WMD programme. A number of specific terrorist incidents and trends in terrorist activity during this period also “highlighted perceptions of societal vulnerability to terrorism, and NBC terrorism in particular.”²⁵ These incidents included the 1993 bombing of the World Trade Centre by Islamic Fundamentalists followed by the Oklahoma City bombing in April 1995 by American far-right extremists. Terrorists were now willing to bring the fight to the homeland of the US, and the fear was that the terrorists would escalate their actions from conventional attacks to NBC

²¹ Cynthia C. Combs, “The New Terrorist Threat: ...”, 327.

²² Jonathan Medalia, “Terrorist “Dirty Bombs”: ...”, 3.

²³ Cynthia C. Combs, “The New Terrorist Threat: ...”, 327-328.

²⁴ Nadine Gurr and Benjamin Cole, *The New Face of Terrorism: Threats from Weapons of Mass Destruction* (IB Tauris, 2002), 4.

²⁵ *Ibid.*, 5.

attacks.²⁶ These concerns were reinforced when the Japanese subway system in Tokyo was subjected to an NBC attack in March of 1995.

To determine the credibility of terrorist organizations to actually construct WMDs, this paper will now evaluate the assessment provided in a US Congressional Report on terrorists and dirty bombs. In the report, it states

Perhaps because of the term “dirty bomb,” the public and media have focused on radioactive material dispersed by an explosive device. A dirty bomb could be made by surrounding TNT, C-4, or other chemical explosive with a powdered radioisotope. Many terrorist groups would have the skill and materials needed to make the explosive part of the device; it would be somewhat harder for them to obtain the radioactive material and convert it to powdered form. Terrorists could also disperse radioactive material without an explosive by spraying, scattering, or simply dumping it.²⁷

Thus, from the analysis provided in this report by the congressional research service, non-state terrorist organizations presently possess the ability to construct WMDs.

Andrew O’Neil, Senior Lecturer at the School of Political and International Studies in Flinders University, Australia, has conducted some threat assessments on the potential for terrorists to use WMDs. Overall, his assessment is that non-state terror organizations pose a credible threat when it comes to using WMDs; yet, the ease with which attacks can be conducted has been exaggerated.²⁸ He points out that knowledge on “how to build a bomb” is readily available on the internet and “lapses in Russia’s nuclear system during the 1990s that included a leakage of weapons-grade fissile material onto the black market”²⁹ are contributing factors to the credibility of the threat. However, he also points out that it is more difficult for non-state

²⁶ *Ibid.*

²⁷ Jonathan Medalia, “Terrorist “Dirty Bombs””: . . . , 3.

²⁸ Andrew O’Neil, “Terrorist Use of Weapons of Mass Destruction: How Serious is the Threat?,” *Australian Journal of International Affairs* 57, no. 1 (2003): 99-101.

²⁹ *Ibid.*, 101.

organizations than nation-states to acquire WMD materials. As expected, nuclear materials are the most difficult to obtain, and chemical materials the most readily available.³⁰ His final assessment is that terrorist groups subscribing to fundamentalist religious ideologies are “much more likely to be attracted to the mass destructive properties of WMD[s] than terrorist organizations have been in the past.”³¹

Not all researchers believe that terrorist will use WMDs weapons, however. In the 1970s, analyst Brian Jenkins questioned “terrorists’ ability and motivations to procure NBC weapons: ‘Nuclear terrorism is neither imminent nor inevitable.’”³² However, since the 1970s, while terror organizations have not yet used nuclear weapons, they have used both chemical and biological ones. Other analysts believe that “WMD terrorism is far beyond the capability, and even the intent of terrorist groups such as al-Qaeda. Some claim that the likelihood of a non-state actor acquiring such weapons is virtually zero.”³³ These skeptics, however, are not supported by the overwhelming evidence. Terror organizations have already used WMDs to further their goals of instilling fear into the population of the world. When the general, conventional weapon terror attacks of non-state actors are combined with terrorists’ trends to escalate violence, the credibility of non-state actor WMD use is present and real.

Furthermore, doubters of terrorist WMD use, particularly nuclear weapon use, have articulated that obtaining a nuclear weapon would be very difficult for terrorist groups. They state that there is a very real obstacle in building such a weapon, particularly having an appropriate quantity of weapons’ grade fissile material, and the engineering technical know-how.

³⁰ *Ibid.*, 101-104.

³¹ *Ibid.*, 107.

³² Nadine Gurr and Benjamin Cole, *The New Face of Terrorism: ...*, 7.

³³ Rolf Mowatt-Larssen and Graham T. Allison, *Al Qaeda Weapons of Mass Destruction Threat: Hype or Reality?* Belfer Center for Science and International Affairs, 2010, 2.

Yet, other experts believe that if the materials and the scientists/engineers were accessible, extraordinarily capable groups could build a crude nuclear weapon from scratch.³⁴ On the other hand, both sides support the potential of the average group's ability to build dirty bombs, as these are significantly less complex weapons systems. Thus, while dirty bombs appear the more likely WMD weapon of choice for non-state organizations, conventional WMDs cannot be ruled out.

EMPLOYMENT OF WEAPONS OF MASS DESTRUCTION

This section will first look at the historical strategies used for missiles and other WMDs. The second part of this section will look at some historical cases where WMDs have been used by non-state actors, and this will lead to the final part of this section which will look at the timeline for future use of these weapons by non-state actors and how we can expect them to be deployed.

Strategies

Many of the strategies to use, or counter the use of, WMDs have their basis in the nuclear strategies developed in the mid 20th century, thus a review of the strategies developed and postulated for nuclear weapons is useful in this paper. Nuclear strategy theories began even before the detonation of the first nuclear bomb. The key strategy employed during the Cold War was that of deterrence through mutually assured destruction (MAD).³⁵ MAD consisted of the concept that if one side launched a single weapon against their enemy, or any of the states aligned with the enemy, a retaliatory response deploying the full range of nuclear assets with multiple weapons delivered to many key strategic locations within the enemy's country would

³⁴ Steve Bowman, "Weapons of Mass Destruction: The Terrorist Threat," Library of Congress Washington DC Congressional Research Service, 2002, 4.

³⁵ The Columbia Electronic Encyclopedia®. S.v., "Mutually Assured Destruction," last accessed 20 April 2016, <http://encyclopedia2.thefreedictionary.com/Mutually+assured+destruction>.

occur. The initiating country would then “attempt to expend their whole nuclear stockpile as rapidly as possible,”³⁶ thus bringing about in the total destruction of both sides and, the resulting nuclear winter would assure the destruction of the remainder of the rest of the world.³⁷ With the end of the Cold War, and the emergence of a single hegemon (US), MAD, as a strategy faded. However, the more generic strategy of deterrence continues to be discussed, including within the context of deterring rogues, terrorists and non-state actors as a valid option.

A principle architect of the Cold War strategy of deterrence and “one of the era’s greatest thinkers”³⁸ was Bernard Brodie. Knowing of the extreme lethality of these weapons, he strongly believed “that general war between the nuclear powers must never be fought”³⁹ and was credited as saying, “Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them.”⁴⁰ If this reasoning is brought forward to the contemporary environment, it is conceivable that he might support the corollary that the aim of today’s militaries’ actions could be to avert war and the use of WMDs by those who presently possess them.

Brodie’s belief in deterrence is shared by the modern theorist James Blackwell, professor and Special Advisor to the Assistant Chief of Staff Strategic Deterrence and Nuclear Integration of the US Air Force, who discussed deterrence in a contemporary environment in his article,

³⁶ Bernard Brodie, *The Development of Nuclear Strategy, ACIS Working Paper No. 11* (Los Angeles: Center for Arms Control and International Security, University of California, 1978), 20.

³⁷ Aland Robock, Luke Oman, and Georgiy L. Stenchikov, "Nuclear winter revisited with a modern climate model and current nuclear arsenals: Still catastrophic consequences." *Journal of Geophysical Research: Atmospheres* 112, no. D13 (2007): 1, <http://onlinelibrary.wiley.com/doi/10.1029/2006JD008235/full>.

³⁸ Barry Scott Zellen, *State of Doom: ...*, vii.

³⁹ Bernard Brodie, *The Absolute Weapon* (New York: Harcourt, Brace, 1946).

⁴⁰ *Ibid.*

“Deterrence at the Operational Level of War.”⁴¹ In this article, he postulates that we should not assume that opponents without fear (referring to terrorists) cannot be deterred. In fact, he states that “there is indeed evidence that rogues and non-state actors who possess weapons of mass destruction and their means of delivery can be deterred,”⁴² thus implying that Brodie’s mid-century strategy of deterrence could be revived for the new millennium. Blackwell went on to cite the 1991 Gulf War as proof that deterrence did work in the modern battlespace when the US “conveyed the not-so-veiled threat that if the Iraqis [or any of their “allies”] used chemical or biological weapons on US troops, then [the US] would respond with nuclear weapons.”⁴³ No chemical or biological weapons were used, ergo deterrence worked in that case. He proposes that with further behavioural research to determine where terrorist fears lie, then by applying military or political force to those fears, deterrence of terrorist or non-state actor groups could be achieved. So, in the same vein that the US adopted deterrence with the Soviets for the Cold War and against the Iraqis in the 1991 Gulf War, so too, must we prepare a strategy to deal with terrorists and their use of WMDs.

There are additional concepts which Brodie postulated that remain relevant to today’s strategic problems and puzzles.⁴⁴ First, during the Cold War, Brodie noted that the Soviets not only showed a high degree of historical persistence, but that in the past they had demonstrated their resolve to see things through to the end. This made them a serious and credible threat as an adversary. He also noted that western strategists tended to presume that when threatened, the Soviets would respond in a western way to these threats, but this assumption was not based in

⁴¹ James Blackwell, “Deterrence at the Operational Level of War,” *Strategic Studies Quarterly* (Summer 2011): 30-51.

⁴² *Ibid.*, 48.

⁴³ *Ibid.*

⁴⁴ Barry Scott Zellen, *State of Doom: ...*, xi.

fact.⁴⁵ The promise not to use a type of weapon does not correlate to the opposition agreeing to the same dictate, or feeling that they must abide by the same limitation. Brodie also suggested that the main goal in a nuclear exchange, and thus we can postulate for WMD use as well, is to “terminate it as quickly as possible and with the least amount of damage possible.”⁴⁶ As will be explored in the final paragraphs of this section, today’s non-state actors have repeatedly demonstrated their own levels of persistence and resolve to use extreme measures, many beyond the conventions proscribed under international humanitarian law. Given this understanding, Brodie’s observances from the Cold War bear reviewing in the context of modern considerations for WMD use.

The theory of escalation is a key point in nuclear strategy that is relevant in the modern context of WMD use. Brodie proposed that every time a certain level of violence is introduced by one side, it is highly likely that the other side would respond with a commensurate, or higher, level of violence, with the assumption they had the capability to do so. He also observed that the trend in warfare is to increase levels of violence, not decrease them, as a conflict progresses until the end, whether that be in capitulation or a cease-fire.⁴⁷ Blackwell built upon Brodie’s concept of escalation. He stated:

if escalation is more like a vortex than a ladder, then chances are a crisis in the multipolar, proliferated nuclear world will be more like 1914 than 1939 in terms of its potential for spiraling out of control. The twenty-first century is fraught with risks of misperceptions among crisis participants from divergent cultural perspectives and with clashing strategic interests.⁴⁸

⁴⁵ *Ibid.*, 163.

⁴⁶ Bernard Brodie, *The Development of Nuclear Strategy*, ..., 21.

⁴⁷ Barry Scott Zellen, *State of Doom*: ..., 163.

⁴⁸ James Blackwell, “Deterrence at the Operational Level of War,” ..., 45.

Given that “terrorism's ultimate psychological objective is its main currency - specifically, to instill widespread fear with the goal of coercing political change,”⁴⁹ it would be reasonable to expect an increased level of violence from non-state actors, and the use of WMDs would be one means of putting escalation into action.

Historical Cases of WMD Use

Improvised chemical and biological attacks provide the best source of historical examples where terrorist or non-state actors have used WMDs. The following paragraphs will describe two events – one chemical and one biological – to demonstrate how non-state actors have used these weapons in recent history. This will provide a hypothesis for how we could possibly expect non-state actors to employ WMDs in the future and the basis for this investigation.

The first event was the Tokyo subway sarin gas attack in 1994 by the Aum Shinrikyo cult.⁵⁰ This was the first time a chemical warfare agent had been used to attack the civilian population by terrorists in Japan. Prior to this sarin gas attack, which caused 500 casualties including eight deaths, there had never been such a large-scale disaster caused by nerve agent in peacetime and, until this event had taken place, a terrorist attack with chemical warfare agents in a public setting was incomprehensible.⁵¹ The second event took place in late September through early October 2001 and was comprised of a series of bio-terror attacks by terrorists using anthrax via the US Postal Service. Up to eight anthrax-laden letters were sent in the mail to locations in

⁴⁹ Jonathan M. McComb, "Closing Pandora's Box: The Threat of Terrorist Use of Weapons of Mass Destruction." *Global Security Studies* 4, no. 1 (2013): 02, 80.

⁵⁰ Okumura, Tetsu, Kouichiro Suzuki, Atsuhiko Fukuda, Akitsugu Kohama, Nobukatsu Takasu, Shinichi Ishimatsu, and Shigeaki Hinohara, "The Tokyo Subway Sarin Attack: Disaster Management, Part 1: Community Emergency Response," *Academic Emergency Medicine* 5, no. 6 (1998): 613.

⁵¹ *Ibid.*

Florida, New York and Washington, DC, and there were suspicions linking these attacks with those of 9/11.⁵²

These are but two examples in recent history documenting that terrorist organizations are both willing, and able, to use WMDs. When the US investigated al-Qaeda camps in Afghanistan, they found evidence that the group had downloaded information on nuclear weapons, including some crude bomb designs, and that they had attempted to recruit nuclear weapons scientists to work with them.⁵³ While this is not definitive proof that these terrorists have a nuclear capability, it does demonstrate that modern terrorist organizations are, at a minimum, looking at the full spectrum of WMD use.

Future Use of WMDs

From the early 1990s to present day, there have been three trends in terrorist activity: an increase in the lethality of their attacks, the rapid growth of religious-inspired attacks, and the increasing numbers of indiscriminate attacks on population targets.⁵⁴ These three trends illuminate cycle of activities which may lead to the employment of WMDs in the future by non-state actors. When assessing if, or how, non-state actors intend to use WMDs, it must be realized that “al-Qaeda’s top leadership has demonstrated a sustained commitment to buy, steal or construct WMD”⁵⁵ and that they see that “acquiring WMD for the defence of Muslims is a

⁵² Thomas G. Day, "The autumn 2001 anthrax attack on the United States Postal Service: The consequences and response," *Journal of contingencies and crisis management* 11, no. 3 (2003): 110.

⁵³ Cynthia C. Combs, "The New Terrorist Threat: ...", 327-328.

⁵⁴ Nadine Gurr and Benjamin Cole, *The New Face of Terrorism: ...*, 6.

⁵⁵ Rolf Mowatt-Larssen and Graham T. Allison, *Al Qaeda Weapons of Mass Destruction...*, 2.

religious duty.”⁵⁶ Therefore, assuming that non-state terror organizations will use WMDs at some point, this section of the paper will look at how they would go about doing this.

In 1998, Osama bin Laden asserted that “it was his Islamic duty to acquire weapons of mass destruction”⁵⁷ and he directed his lieutenants to have this as a priority in the future. The fact that al-Qaeda has not used WMDs from 1998 to present indicates to some that terrorist organizations will not use them at all. However, as discussed previously, this is a false assumption given the nature of escalation. How, then, do we expect to see non-state actors deploy WMDs? The next few paragraphs will explore this question.

WMD component acquisition has been a priority for many non-state terror organizations, particularly those based out of the Middle East.⁵⁸ Whether these component acquisitions are nuclear, radiological, chemical or biological, they can all be added to conventional or improvised munitions to make dirty bombs. Rolf Mowat-Larssen, the Director of Intelligence and Counterintelligence at the US Department of Energy, has confirmed a number of incidents where terrorist organizations, particularly al-Qaeda, have managed to acquire chemical, biological and radiological components for almost two decades, from 1988 to 2003,⁵⁹ thus providing known data that terror organizations do, in fact, have WMD materials in their possession. Through raids and intelligence gathering, it was identified that the most common targets were civilian population centres, primarily located in North America’s largest cities.⁶⁰

Walter Laqueur, respected historian, terrorologist and political commentator, supports many of the views articulated above on how non-state actors would deploy WMDs. He states

⁵⁶ *Ibid.*

⁵⁷ *Ibid.*, 5.

⁵⁸ *Ibid.*

⁵⁹ *Ibid.*, 11-28.

⁶⁰ *Ibid.*

that although many terrorist incidents of the past only affected a relatively small number of people, the terrorists of present day, and those of the future, are looking to inflict mass destruction. “For the first time in history, weapons of enormous destructive power are both readily acquired and harder to track. In this new age, even the cost of hundreds of lives may appear small in retrospect.”⁶¹ He believes that there has been a “radical transformation, if not a revolution, in the character of terrorism.”⁶² In the book *The New Terrorism: Fanaticism and the Arms of Mass Destruction*, he states that he believes that the “traditional, ‘nuisance’ terrorism will continue”⁶³ and yet we must also accept that “fanaticism inspired by all kinds of religious-sectarian-nationalist convictions is now taking on a millenarian and apocalyptic tone.”⁶⁴ He also counters the sceptics who tout the difficulty of fanatics to possess the technical know-how and the resources to make use of WMDs saying that “the technological skill...is not that complex, and the resources needed, not that rare or expensive.”⁶⁵ Given that he reinforces that fanatics are now ever more revolutionist and “apocalyptic,” we could possibly expect terrorists to use WMDs in both small-scale and widespread ways.

In a US Congressional Report on the terrorist threat regarding WMDs, analysis supported the concept that “‘terrorists want a lot of people watching, not lots of people dead.’ Yet, for some groups, this is demonstrably no longer the case.”⁶⁶ The report went on to state that WMD use is risky for the terrorists themselves and has uncertain effects, as well as having an inherent possibility of severe retaliation, so even though terrorist interest in WMDs is growing, widespread use by these organizations is not yet expected. However, the interest and willingness

⁶¹ Walter Laqueur, *The New Terrorism: Fanaticism and the Arms of Mass Destruction* (Oxford University Press on Demand, 2000), 4.

⁶² *Ibid.*

⁶³ *Ibid.*

⁶⁴ *Ibid.*

⁶⁵ *Ibid.*, 5

⁶⁶ Steve Bowman, “Weapons of Mass Destruction: ...”, 2.

by groups such as the Taliban, al-Qaeda and others are increasing with every conventional attack in their hopes to increase their effect.⁶⁷

When it comes to nuclear weapons, or more likely to radioactive dirty bombs, terrorists would find isotopes with very short half-lives (hours or less) of little use because the radiation could decay to low levels before the material could be used, while those with long half-lives (millions of years) emit radiation very slowly and would do little damage unless inhaled.⁶⁸

The availability of stable long half-life isotopes is quite large given that they are used in industrial radiography and cancer therapy and they often have little security because they are small, with modest amounts of shielding.⁶⁹ When this availability is combined with terrorist organizations' propensity to wish to inflict fear (terror), the possibility of a nuclear, radiological or even nuclear/chemical dirty bomb being used in the near future becomes tenable. "There is growing concern in the analytic community about the prospects for limited nuclear war in the future."⁷⁰ "Though unlikely to cause mass casualties, radiological weapons could still have very significant radiation contamination effects if well-targeted."⁷¹ When availability and terrorist propensity are further combined with Brodie's concept of escalation, the likelihood of non-state actors employing WMDs in the future is high.

SOURCES OF SUPPORT

This final section will explore the idea that some non-state organizations may have state sponsorship, and what effect this has on the non-state organization's credibility and strength to acquire, and thus use, WMDs. It will also probe the kind of support non-state organizations can access from within a target country and the effects this support could offer.

⁶⁷ *Ibid.*

⁶⁸ Jonathan Medalia, "Terrorist "Dirty Bombs": ... , 3.

⁶⁹ *Ibid.*

⁷⁰ James Blackwell, "Deterrence at the Operational Level of War," ... , 43.

⁷¹ Steve Bowman, "Weapons of Mass Destruction: ... , 4.

State Support

There are some countries in the world that are known to have supported terrorists and non-state organizations in the past, and some continue to do so today. “Iran, Iraq, Libya, North Korea, and Syria – all listed by the [US] State Department as supporters of terrorism – are believed to possess chemical weapons and at least some biological weapons.”⁷² Al-Qaeda received religious sanction in 2003 for the use of WMD against the enemies of Islam by Saudi cleric Nassir bin Hamad al-Fahd, who issued a detailed fatwa stating that since America had destroyed countless lands and killed millions of Muslims, it would be permitted to respond in kind.⁷³

Since the Islamic Revolution in 1979, Iran has been one of the world’s most active sponsors of terrorism....Iran has backed not only groups in its Persian Gulf neighbourhood, but also terrorists and radicals in Lebanon, the Palestinian territories, Bosnia, the Philippines and elsewhere. This support remains strong even today....Yet despite Iran’s very real support of terrorism for more than the last 25 years, and its possession of chemical weapons for over 15 years, Tehran has not transferred unconventional systems to terrorists.⁷⁴

It should be clearly understood that state-sponsored terrorism is not new, that some states continue this practice today, and why they do this varies. For Iran, “supporting Islam meant supporting revolution”⁷⁵ which translated into supporting terrorism. For years, Iran followed a policy of fostering a strategic rivalry between itself and many of its neighbours in which “terrorism and support for subversion were the major Iranian weapons in its toolbox....Terrorism allowed Iran to influence events well beyond its borders and ...terrorism also offered Iran some

⁷² Jonathan M. McComb, "Closing Pandora's Box: ...", 81.

⁷³ *Ibid.*, 79.

⁷⁴ Daniel Byman, "Iran, terrorism, and weapons of mass destruction," *Studies in Conflict & Terrorism* 31, no. 3 (2008): 169.

⁷⁵ *Ibid.*, 170.

degree of deniability”⁷⁶ by working through proxies. While the motivations of individual states vary, the motivations of Iran in supporting terrorist activities ring true for a number of other states as well.

State-sponsored terrorists have the benefit of being able to tie in to the full resources of a state. While non-state actors can have independent financing and resourcing means, adding those of a nation state adds the possibility of significant assets. Additionally, Jonathan McComb, from the School of Graduate and Continuing Studies in Diplomacy at Norwich University, has argued that since terrorist groups are not likely to possess the required mix of technical, scientific, and military skills to carry out an effective attack using biological weapons, the group most likely to do so is one that has state sponsorship and access to that state’s biological warfare efforts.⁷⁷ This is a key reason why non-state actors seek out state support or sponsorship.

Others in the debate over the global terrorist WMD threat have cautioned us not to assume that state involvement is a necessary element of a terrorist’s attack plan. Although terrorists sponsored by a state are the most likely to be able to overcome technical obstacles to the use of WMD, the threat of retaliation against the sponsoring state may provide a deterrent.⁷⁸ However, this has not deterred states such as Iran, Iraq, Libya, North Korea, and Syria from sponsoring terrorist organizations.

Target Country Support

In addition to nation states sponsoring and supporting terrorist groups, non-state terror organizations can also gain support from people within their target countries. This support can

⁷⁶ *Ibid.*, 170-172.

⁷⁷ Jonathan M. McComb, "Closing Pandora’s Box: ...", 82.

⁷⁸ *Ibid.*

take the shape of scientists, radicalized personnel willing to perform terrorist acts, and others from the target country. In the book, *The Emergence of the NBC Terrorism Debate*, Nadine Gurr reinforces the concept that WMD production by non-state terror organizations is possible since there are some technical personnel who have made themselves available to these organizations. In particular she identifies “concerns about the activities of so called rogue scientists who had previously been employed in the WMD programmes of the former Soviet Union, but who might have moved on to work for proliferator states for higher pay.”⁷⁹

There is a fair amount of literature written on the generic recruits of terrorist organisations such as Daesh; however, finding relevant professional academic articles on how or why technical professionals, states officials or key economic personnel join a terrorist organization is challenging. Thus, a review of more mainstream articles was necessary to build the hypothesis. According to an article from *The Guardian*, a British national daily newspaper, “the overwhelming majority of graduates recruited into Islamist terrorism studied engineering, science and medicine.”⁸⁰ The data in this article comes from a report that “draws on a range of academic studies and a British intelligence dossier that describes the ideal recruit as intelligent and curious, but unquestioning of authority.”⁸¹ In September 2014, the Daesh leader, Abu Bakr al-Baghdadi made an appeal for judges, doctors, engineers and people with military and administrative experience to join his caliphate. This article’s author asserts that this appeal may be one of the reasons why the Islamic State was successful in recent years in recruiting technically skilled personnel, but does not identify whether the recruits were ones who stayed in their country of origin, or travelled overseas to join the caliphate.

⁷⁹ Nadine Gurr and Benjamin Cole, *The New Face of Terrorism: ...*, 4.

⁸⁰ Paul Valley, “Are Scientists Easy Prey for Jihadism?” *The Guardian*, last accessed 4 May 2016, <http://www.theguardian.com/commentisfree/2015/dec/03/scientists-easy-prey-jihadis-terrorists-engineering-mindset>.

⁸¹ *Ibid.*

Another source that may give some insight into home-grown support to terrorists is provided by a Rand Corporation report. In this document, the author states that “many of the jihadist recruits in the United States began their journey on the Internet, where they could readily find resonance and reinforcement of their own discontents and people who would legitimate and direct their anger.”⁸² The author then reveals that

between September 11, 2001, and the end of 2009, a total of 46 cases of domestic radicalization and recruitment to jihadist terrorism were reported in the United States. In some of the cases, individuals living in the United States plotted to carry out terrorist attacks at home; some were accused of “providing material support to foreign terrorist organizations”; and some left the United States to join jihadist organizations abroad.⁸³

We can surmise that the professional, educated people who are joining the ranks of terrorist organizations, whether at home or abroad, armed with their various skill sets can, and will, be used by the organization. Thus, if a nuclear scientist or chemical engineer or biologist specializing in biotoxins is recruited and decides to remain in their country of origin, the terrorist organization now has home-grown terrorist support. Having someone onsite in the target country alleviates the need for the terrorist organization to travel to that country to affect its desired outcomes as it can utilize the home-grown recruit instead, and this person, who is a citizen of the target country, would have much freer access to the target areas than a foreigner.

⁸² Brian Jenkins, “Would-Be Warriors: Incidents of Jihadist Terrorist Radicalization in the United States Since September 11, 2001,” Santa Monica, CA: RAND Corporation, 2010, viii, http://www.rand.org/content/dam/rand/pubs/occasional_papers/2010/RAND_OP292.pdf.

⁸³ *Ibid.*

Support provided by states and home-grown recruits increases a non-state terror organization's capacity and resources. While neither state sponsorship nor a system of home-grown recruits is a pre-requisite for terrorist success, it does help.

CONCLUSION

This paper first looked at the current threat of WMD use by non-state actors. This paper first provided some definitions applicable to WMDs in the hands of non-state actors. It went on to articulate that the likelihood of non-state actors to use this type of weapon was high, given the nature of opposing forces to escalate the level of destruction the longer a conflict runs and the relative availability of nuclear, biological and chemical materials. This section ended with the assessment that while dirty bombs appear the more likely WMD weapon of choice for non-state organizations, conventional WMDs cannot be ruled out.

In the second section of this paper, historical strategies governing WMD use and deterrence were discussed in the context of the modern non-state actor. Both deterrence and escalation were identified as Cold War concepts that remain relevant today. It also provided some recent examples of terrorist WMD incidents to highlight the ability and willingness of non-state actors to use these types of weapons. This section concluded that when availability and terrorist propensity are combined with the concept of escalation, the likelihood of non-state actors employing WMDs in the future is high.

In the final section, a look at sources of support for non-state organizations identified that state sponsorship is beneficial, but not essential to a terrorist organization. As well, home-grown recruits within the target country could also facilitate terrorist action within that country, although there is little literature on this topic to reinforce this hypothesis.

Today's terrorists are becoming ever more violent and are continuously escalating violence to maintain their hold of fear over the population of the world. Adding WMDs to their arsenal is a logical step in this escalation process. This paper demonstrated that they not only have the capability to produce or procure WMDs, but that they are definitely poised to use them.

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