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Disarmament and International Security (DISEC)

Research Report

Topic 2: The future development and use of radiological dispersal devices



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Introduction

Radiological dispersal devices (RDD or dirty bombs) use conventional explosives to scatter dangerous and sub-lethal radioactive material over a general area. Damage by detonation can range from relatively minor to catastrophic, depending on materials used and the explosion's size.¹ Consequences of explosions are psychological, political, and economic harm and disruption, and extensive measures needed to vacate and decontaminate affected areas. Terrorists commonly use RDDs due to their requirement of limited technical knowledge to build and deploy the weapon. The necessary materials are easily acquired and the technology involved is simple. Over the past 50 years, millions of radioactive sources have been distributed worldwide, according to the International Atomic Energy Agency (IAEA).² Dispersed across thousands of commercial, industrial, agricultural and medical research sites in over 100 countries, and a lack of regulatory controls makes these sources vulnerable to theft and has resulted in thousands of missing or stolen radiological sources.³ Consequently, even states with strong security measures in place are faced with significant challenges.⁴ With the increase of terrorist activities in Europe, discussion over the level of threat from nuclear and radiological terrorism has found traction in Western countries. Action is therefore being taken to address the critical issues of protective actions to ensure human health and to mitigate the effects caused by terrorists' use of RDDs.

Key Terms

Radiological Dispersal Devices (RDDs and also known as Dirty Bombs) - Any device that causes the purposeful dissemination of radioactive material without a nuclear detonation.⁵ Intended to disperse powdered high-risk radioactive material through detonation using varying quantities of conventional explosives.

Radiological terrorism - "The intentional and malicious use of radiation from decay of radioactive materials to cause injury (fatal or otherwise) to person or property by unlicensed exposure through a particular device or method." Considered a subcategory of CBRN (Chemical, Biological, Radiological and Nuclear) terrorism and WMD (weapon of mass destruction) terrorism.⁶

Non-state actor - An individual or organization that has significant political influence but is not allied to any particular country or state.⁷

¹ Stimson (31/05/2007). Visited on 11/01/18. Available at: <https://www.stimson.org/radiological-dispersal-devices-rdds>

² NTI (30/12/2015). Visited on 11/01/18. Available at: <http://www.nti.org/learn/radiological/>

³ Stimson (31/05/2007). Visited on 11/01/18. Available at: <https://www.stimson.org/radiological-dispersal-devices-rdds>

⁴ Stimson (31/05/2007). Visited on 11/01/18. Available at: <https://www.stimson.org/radiological-dispersal-devices-rdds>

⁵ REMM (25/08/2017). Visited on 03/01/18. Available at: <https://www.remm.nlm.gov/rdd.htm>

⁶ Deshwal, Udan (26/04/2016). Visited on 11/01/18. Available at: <https://thewire.in/31457/radiological-terrorism-dirty-bombs-and-beyond/>

⁷ Oxford Dictionaries. Visited on 11/01/18. Available at: <https://en.oxforddictionaries.com/definition/non-state-actor>

High-risk and non-cooperative jurisdictions - jurisdictions with weak measures to combat money laundering and terrorist financing⁸. Defined by FATF (Financial Action Task Force) - an intergovernmental with the goal of establishing and promoting legal, regulatory and operational standards to combat corruption and terrorist financing.

Half-life (of a radioactive isotope) - The time it takes for a radioactive isotope to 'lose' half its atoms. This 'loss' of atoms is in the form of radiation.

Radioisotopes - atoms in an element with nuclei emitting energy in the form of ionizing radiation while searching for a more stable configuration.⁹

Theft of radioactive material and limiting accessibility:

The proliferation of easily accessible radioactive material has led to a much more tangible risk of insurgent non-state actors getting access to potentially life-threatening material for use in dirty bombs. It is therefore important to make sure that 'high-risk and non-cooperative jurisdictions' are active in the fight to secure high-risk radioactive material. Countries categorized as high-risk and non-cooperative jurisdictions include: Syria, Iraq, Iraq, Yemen, Bosnia & Herzegovina, Tunisia and Ethiopia. These countries, being more likely to experience sustained terrorist attacks and that lack the measures to fight well-organized insurgent organization, are particularly important in the discussion of securing radioactive material. As important are developed countries that have experienced terrorist attacks in the past and store significant amounts of radioactive material. Since the methods of constructing dirty bombs does not require any specialist knowledge, one of the biggest challenges for insurgent organizations is getting access to said material. Most radioactive material is not suitable for use in Dirty bombs due to a variety of factors, including: Difficulty of safely transporting said material, the half-life of the element and the extent to which the material can be used to harm people. Therefore, resources can be allocated towards very specific parts of shipments to decrease the cost of transportation. Over twice as many thefts of radioactive material occur during transit than at storage locations.¹⁰

The James Martin Center for Nonproliferation Studies produces annual reports that outline the incidents in which radioactive material has been stolen by non-state actors. (It is recommended that delegates check this report before the conference as it provides a very valuable insight into some of the statistics surrounding the issue. They also recommend new policies to combat the issue. A link to the report can be found in in the bibliography at nti.org) In their 2016 report, they outline where most radioactive material is stolen from. They report that the United States experience the most crime involving radioactive material with 64% of worldwide incidents taking place within American borders.¹¹ It is important to

⁸ FATF. Visited on 11/01/18. Available at: [http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/?hf=10&b=0&s=desc\(fatf_releasedate\)](http://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/?hf=10&b=0&s=desc(fatf_releasedate))

⁹ Foro Nuclear. Visited on 11/01/18. Available at: <http://www.foronuclear.org/en/ask-the-expert/120059-what-are-radioisotopes>

¹⁰ NTI (29/04/2015). Visited on 11/01/18. Available at: <http://www.nti.org/newsroom/news/global-nuclear-radiological-trafficking-incidents-increase-between-2013-and-2014/>

¹¹ NTI (18/08/2017). Visited on 11/01/18. Available at: <http://www.nti.org/analysis/reports/cns-global-incidents-and-trafficking-database/>

note that the United States, Canada, France, Japan, South Korea and Belgium are the only countries that systematically and publicly report incidents involving nuclear and other radioactive material. Most incidents happen as a result of human error suggesting that there is a lack of security personnel or security culture concerning the handling of radioactive material. The study concludes that there are three key aspects that should be addressed in order to significantly reduce the risk of theft of radioactive material.¹²

- 1) Lack of transparency in reporting methodology obscuring the scale of threat posed by illicit trafficking.
- 2) Lapses in physical security and human error.
- 3) Radioactive material is often used in situations where non-radioactive material can prove just as useful.

Health risks

The scope of health risks involved in the detonation of a dirty bomb is dependent on a wide array of factors such as, but not necessarily limited to: The amount and type of radioactive material used in the dirty bomb, weather conditions (particularly wind) and the kind of exposure (Ex: Direct skin contact, inhaling fumes etc.) In many cases, the effects of exposure to radioactive material materialize after a prolonged period of time. These effects can be even more psychologically (and physiologically) damaging to a victim than a shrapnel explosion since the memory of the detonation follows them in the form of the later mutations they might develop or the immediate effect on the skin and hair that many radiological dispersal devices have. It is therefore in the interest of all member countries of the UN to participate in the effort to nullify the threat of radiological dispersal devices.

Action in the field:

Many countries have individually and collectively taken measures to decrease the threat posed by radiological terrorism by securing commercial radiological sources. A well-known initiative is the U.S.-led Global Threat Reduction Initiative (GTRI)¹³, having secured more than 1700 radiological sites worldwide, containing millions of curies. Other efforts are the United Nations Security Council Resolution 1540 (see below) and the Nuclear Terrorism Convention. Furthermore, the IAEA has established a Code of Conduct of the Safety and Security of Radioactive Sources.¹⁴

In a pre-Nuclear Security Summit activity, the Nuclear Threat Initiative, a non-profit and non-partisan organisation that works to reduce the global threats from nuclear and other weapons of mass destruction, released the ‘Radiological Progress Project Report in March 2016.’¹⁵ Reviewing progress of the participating states; including Australia, Canada,

¹² NTI (29/04/2015). Visited on 11/01/18. Available at: <http://www.nti.org/newsroom/news/global-nuclear-radiological-trafficking-incidents-increase-between-2013-and-2014/>

¹³ NTI (30/12/2015). Visited on 11/01/18. Available at: <http://www.nti.org/learn/radiological/>

¹⁴ NTI (30/12/2015). Visited on 11/01/18. Available at: <http://www.nti.org/learn/radiological/>

¹⁵ Deshwal, Udan (26/04/2016). Visited on 11/01/18. Available at: <https://thewire.in/31457/radiological-terrorism-dirty-bombs-and-beyond/>

Denmark, Germany, Italy, Japan, Kazakhstan, Republic of Korea, Turkey, United Arab Emirates, United Kingdom, and the United States, the report aimed to raise awareness on the urgency in reducing the threat of, and replacing the use of dangerous isotopes, and to develop more effective systems for securing radioactive sources. At the 2016 Nuclear Security Summit, Indian Prime Minister Narendra Modi, announced multiple key initiatives taken by the government in the area of nuclear security and nonproliferation, showing interest in the summit's priority areas of countering nuclear smuggling, nuclear security, and sharing best practices through Centres of Excellence.¹⁶ Action has been taken to strengthen the national detection architecture for nuclear and radioactive material, and a plan to use vitrified forms of vulnerable radioisotopes such as cesium-137.¹⁷

Relevant Countries

United States - The United States of America are crucial to the process of streamlining reporting methodology for particularly vulnerable countries. Having the most experience with theft of valuable radioactive material, the potential advice they can share is priceless. Furthermore, United States will also need to engage in the discussion of preventing theft since they experience a lot of illicit trafficking of radioactive material.

Canada - Much like the US, Canada experiences some of the highest numbers of theft of radioactive material, so they will need to come to the table ready with suggestions and ideas of possible solutions.

Iran - With the development of the Iranian nuclear programme, there are bound to be some risks involved in the transportation of radioactive material.

Turkey - Being the host of nuclear warheads and the bridge between Europe and the Middle-East it is important that Turkey acts as a safeguard for illicit trafficking into Europe and vice versa.

France - France experiences the third most cases in which radioactive material is stolen. France has also been the victim of multiple terrorist attacks in the recent years, so it is more important than ever to ensure the safety of the radioactive material suited for use in dirty bombs.

Relevant Organizations

North Atlantic Treaty Organization (NATO) - have released books concerning defence against terrorism such as WMDs and RDDs.

¹⁶ Deshwal, Udan (26/04/2016). Visited on 11/01/18. Available at: <https://thewire.in/31457/radiological-terrorism-dirty-bombs-and-beyond/>

¹⁷ Deshwal, Udan (26/04/2016). Visited on 11/01/18. Available at: <https://thewire.in/31457/radiological-terrorism-dirty-bombs-and-beyond/>

Nuclear Threat Initiative (NTI) - a non-partisan, nonprofit organization working to prevent catastrophic attacks and accidents with WMDs. NTI works with countries and industry on strategies to secure radiological materials. The organization has launched an initiative to eliminate one of the most lethal types of radioactive sources; cesium 137 blood irradiators, by replacing the source with alternative technologies to achieve permanent threat reduction.

Nuclear Regulatory Commission (NRC) - issued regulations to secure radioactive sources.

Department of Homeland Security - develops and operates equipment to detect radioactive material.

The National Nuclear Security Administration (NNSA) - has recovered thousands of disused or abandoned radioactive sources.

Relevant UN Resolutions

S/RES/1540

Resolution adopted by the United Nations Security Council on 28 April 2004 during the 4956th meeting, on *non-proliferation of weapons of mass destruction*

Addressing the threat of nuclear, chemical and biological weapons, UN affirms the need to take appropriate and effective actions against the threat to international peace and security caused by the proliferation of nuclear, chemical and biological weapons and their means of delivery.

Available at: [https://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/1540\(2004\)](https://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/1540(2004))

S/RES/2325

Resolution adopted by the United Nations Security Council on 15 December 2016 during the 7837th meeting, on *non-proliferation of weapons of mass destruction*

Recognizing the efforts needed on a national and international level, to strengthen global response to the challenges and threats to international peace and security posed by WMDs. Expressing the importance of communication between states and the requirement for some states of assistance.

Available at: [https://www.un.org/ga/search/view_doc.asp?symbol=S/RES/2325\(2016\)](https://www.un.org/ga/search/view_doc.asp?symbol=S/RES/2325(2016))

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