

Shipping Container Security

Overcoming Obstacles in the 21st Century

Kevin Lalama and Katharyn Nicolle

May 2013

Key Points:

- U.S. maritime ports are vulnerable to nuclear and radiological terrorist devices hidden within shipping containers.
- Due to unforeseeable costs and international disputes, the U.S. Department of Homeland Security (DHS) failed to meet the July 2012 deadline for 100 percent radiation scanning of all U.S. bound shipping containers.¹
- The International Atomic Energy Agency's Illicit Trafficking Database has documented 615 incidents of loss or theft of nuclear or other radiological materials since 1993, including sixteen cases involving highly enriched uranium. Terrorist organizations such as Al-Qaeda are known to be interested in acquiring a nuclear device.²
- There are many areas of shipping container security that can and should be strengthened.
- New technology, adequate funding, and policy changes are areas for strengthening shipping container security.

Background: A Nuclear Security History

Nuclear challenges have changed over the past twenty years, but they have not disappeared. Although the Cold War nuclear conflict no longer exists, the threat of nuclear terrorism remains very real. The U.S. started the Nunn-Lugar Cooperative Threat Reduction program in 1991 to prevent the misuse of the unsecured nuclear materials from last century. Since then, the program has deactivated over 7,600 warheads, destroyed more than 2,300 missiles, and secured twenty-four nuclear weapons storage sites worldwide.³



However, since 1993, the International Atomic Energy Agency's Illicit Trafficking Database has documented 615 incidents of theft or loss of nuclear or other radiological materials, sixteen of which involved highly enriched uranium.⁴

The terrorist group Al-Qaeda has been pursuing a nuclear weapon for over fifteen years. Similarly, terrorist organizations such as Aum Shinrikyo and Lashkar-e-Taiba have also expressed interest in acquiring a nuclear device.⁵

Shortly after 9/11, Customs and Border Protection (CBP) implemented the Container Security Initiative (CSI) to identify potential foreign threats before they arrive in U.S. ports.⁶

The U.S. National Targeting Center prioritizes high risk containers through an intelligence and analysis-based system. The system relies on information such as the identity of the sender and receiver, as well as the supposed contents of the shipment. These shipments are then pre-screened with detection technology in foreign ports.⁷

Congress re-introduced the idea for 100 percent container scanning via the "Implementing Recommendations of the 9/11 Commission Act of 2007."⁸ However, unforeseeable costs and international disputes forced DHS to miss the 2012 deadline for 100 percent radiation scanning.⁹

Due to logistical, cost, and jurisdiction issues, only 4.1% of inbound containers were scanned with x-ray and radiation detection technology in 2012.¹⁰

Secretary Napolitano announced in 2011 that the "100 percent [scanning] requirement is probably not the best way to go," and the U.S. is no longer mandating 100 percent screening of cargo containers.¹¹

Key Statistics:

- 15 years Al-Qaeda has been pursuing a nuclear weapon.¹²
- 615 incidents of loss or theft of nuclear or other radiological materials reported by the IAEA ITDB since 1993.¹³
 - Sixteen of these incidents involved highly enriched uranium.
- Over 10.1 million shipments were reviewed in CSI ports around the world (2011).¹⁴
 - Average of over 27,000 each day.
- 9.8 million cargo containers were shipped to the U.S. from 611 ports in 2008.¹⁵
- 4.1% of U.S. bound maritime cargo scanned for nuclear devices (2012).¹⁶
- \$16 billion to implement security measures at nearly 700 ports worldwide.¹⁷



Why Prevention is Important

A 2006 RAND Corporation Study projected the results of a single 10-kiloton nuclear device detonated from within a shipping container at the Port of Long Beach, California.¹⁸

These projections include:

- 600,000 homes lost (estimated \$300 billion)
- 60,000 lives lost (estimated \$20 billion)
- 200,000 workers' compensation claims (estimated \$80 billion)
- \$100 billion in port and surrounding infrastructure damage
- 3 million people evacuated for three years (estimated \$300 billion)
- 1 billion commercial sq. ft. lost (estimated \$200 billion)
- Estimated \$1 trillion initial economic loss



On average, thirteen percent of the U.S. diet is comprised of imported food.

A disruption of trade due to a closed maritime port would force Americans to do without a percentage of the foods they consume.¹⁹ A lower supply of food often causes prices to rise and economic loss to increase.²⁰



Shipping Container Security in the 21st Century

“The current system is woefully inadequate for stopping any determined adversary who wants to get a weapon of mass destruction into the United States.”

Stephen Flynn, terrorism expert at Northeastern University.²¹

Obstacles

Insufficient technology

According to Napolitano, “DHS would need significant resources for greater manpower and technology, technologies that do not currently exist.”²²

The British International Freight Association (BIFA) has noted repeatedly, the “limited ability of contemporary screening technology to penetrate dense cargo, or large quantities of cargo in shipping containers.”²³

High rate of false positives

With current technology and the sheer number of shipments, it is difficult to reliably spot nuclear materials with a low false positive rate.²⁴ This rate reflects the percentage of shipments assessed as high risk but CBP did not identify a threat upon further examination.²⁵

Port logistics

Some foreign ports do not have “the physical characteristics” needed to install scanning technology.²⁶ To achieve 100 percent scanning, many ports would need to be redesigned.²⁷

Negative effects on the flow of shipments

Stephen Flynn’s research shows that with current technologies it is challenging to scan containers without missing delivery schedules and delaying virtually all of a port’s containers. A small disruption in the global supply chain can have major consequences felt quickly on Wall Street.²⁸

High costs to deploy scanning equipment

BIFA has stated that DHS consistently underestimated the extent of the costs both to the U.S. Government and those of foreign governments.²⁹ The Government Accountability Office estimates deploying scanning programs at nearly 700 ports worldwide would cost about \$16.8 billion.³⁰



The Need for Action

“A nuclear attack on the U.S. ‘is far more likely to arrive in a cargo container than on the tip of a missile.’
Graham Allison, Harvard’s John F. Kennedy School of Government.³¹

Moving Forward

Technology

With DHS funds, the Port of Long Beach was able to combine a unique scanning vessel, a radiation-detecting helicopter, and the nation's first chemical weapons-sniffing dog.³² Long Beach has also deployed an underwater sonar system and military-grade radar system to identify vessels and detect abnormalities.³³ Further port security techniques include Intellicheck Mobilisa's Aegeus, a series of buoys with the capability to "detect incoming vessels, biological substances, and even nuclear bombs." The system is designed to detect anything in the air, and above and below the surface of the water.³⁴

DHS Science and Technology Directorate and the Transportation Security Laboratory recently developed the Container Security Test Bed (CSTB): an "outdoor laboratory" that allows researchers and developers to test new ways to detect shipping container threats.³⁵ One innovative technique pioneered by private company ConSearch is the ability to transmit information about illicit content to the receiving seaport while the container is en route using built in sensors in the container.³⁶ Additionally, MIT and Lincoln Labs are able to detect materials through samples of air inside a container from a standard air vent.³⁷



Decision Sciences' Multi-Mode Passive Detection System (MMPDS) offers a unique method capable of penetrating heavily shielded nuclear and radiological threats. MMPDS can scan and process a container in less than 30 seconds by measuring the deflection of muons in the air. Due to the absence of harmful ionizing radiation, the scan can be performed on people, animals, plants, and food. MMPDS also satisfies the 100 percent scanning policy recommended by the 9/11 Commission and later adopted by the U.S. Congress.³⁸

Funding

There is a large cost associated with shipping container security, including purchasing and operating scanner technology, modifying port infrastructure, and absorbing the cost of reduced trade flow.

Looming budget cuts make it even more important that the United States invest at the right level in the right technology. According to Secretary Napolitano, \$16 billion is necessary to implement security measures at nearly 700 ports across the globe.³⁹

The cost of a nuclear attack on American soil is undeniably high, much like the uncertain cost of precautionary measures, therefore the equitable amount of funding is tricky to determine. “The cost-benefit trade-off is the toughest issue,” Graham Allison states, “the game between hidiers and seekers is dynamic, and there is no one-hundred percent solution.”⁴⁰

Policy

Rather than screening all containers, Napolitano stated, “DHS prefers a ‘layered approach’” that includes international cooperation and better intelligence and analysis, as well as scanning some containers.⁴¹

Moving forward, Napolitano advises the U.S. Government “to undertake a pragmatic review of the whole initiative and create a revised program on a risk assessed, commercially practical and technologically feasible basis.”⁴²

Conclusions

- Nuclear and radiological devices hidden within shipping containers pose a threat to U.S. maritime ports.
- The IAEA’s Illicit Trafficking Database has documented 615 incidents of loss or theft of nuclear or other radiological materials since 1993, including sixteen cases involving highly enriched uranium.⁴³
- Obstacles to overcome in the future include: insufficient technology, high rates of false positives, port logistics, negative effects on the flow of shipments, high costs to deploy scanning equipment, and increased shipping cost.⁴⁴
- New technology, adequate funding, and policy changes are areas for strengthening shipping container security.

Kevin Lalama and Katharyn Nicolle are Adjunct Junior Fellows at the American Security Project



Endnotes

1. Bain, Ben. "DHS to Miss 2012 Deadline to Scan Containers for Radiation." FCW: The Business of Federal Technology. 1105 Media, Inc., 2 Dec. 2009. <http://fcw.com/articles/2009/12/02/dhs-cargo-radiation-scanning-extension.aspx>
2. "Incidents of nuclear and other radioactive material out of regulatory control, 2013 Fact Sheet." IAEA Incident and Trafficking Database (ITDB). International Atomic Energy Agency. 2013. <http://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf>
3. Kaszynski, Mary. "The Nunn-Lugar Cooperative Threat Reduction Program." American Security Project. American Security Project. <http://americansecurityproject.org/ASP%20Reports/Ref%2000068%20-%20The%20Nunn-Lugar%20Cooperative%20Threat%20Reduction%20Program.pdf>
4. "Incidents of nuclear and other radioactive material out of regulatory control, 2013 Fact Sheet." IAEA Incident and Trafficking Database (ITDB). International Atomic Energy Agency. 2013. <http://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf>
5. Allison, Graham. "Nuclear Terrorism Fact Sheet." Belfer Center for Science and International Affairs, Harvard Kennedy School. Belfer Center for Science and International Affairs. April 2010. http://belfer-center.ksg.harvard.edu/publication/20057/nuclear_terrorism_fact_sheet.html
6. "Container Security Initiative (CSI)." GlobalSecurity.org. GlobalSecurity.org. 13 July 2011. <http://www.globalsecurity.org/security/ops/csi.htm>
7. "Container Security Initiative In Summary." U.S. Customs and Border Protection. U.S. Department of Homeland Security. May 2011. http://www.cbp.gov/linkhandler/cgov/trade/cargo_security/csi/csi_brochure_2011.ctt/csi_brochure_2011.pdf
8. United States Congress. "Pub. L. 110-53: Implementing Recommendations of the 9/11 Commission Act of 2007." Washington, DC. 3 August 2007. <http://www.uscis.gov/ilink/docView/PUBLAW/HTML/PUBLAW/0-0-0-37612.html>
9. Bain, Ben. "DHS to Miss 2012 Deadline to Scan Containers for Radiation." FCW: The Business of Federal Technology. 1105 Media, Inc., 2 Dec. 2009. <http://fcw.com/articles/2009/12/02/dhs-cargo-radiation-scanning-extension.aspx>
10. Bliss, Jeff. "U.S. Backs Off All Cargo Scanning Goal with Inspections at 4%." Bloomberg. Bloomberg L.P. 13 August 2012. <http://www.bloomberg.com/news/2012-08-13/u-s-backs-off-all-cargo-scanning-goal-with-inspections-at-4-.html>
11. "U.S. no longer mandating 100 percent screening of cargo container." Homeland Security News Wire. News Wire Publications, LLC. 24 June 2011. <http://www.homelandsecuritynewswire.com/us-no-longer-mandating-100-percent-screening-cargo-containers>
12. Allison, Graham. "Nuclear Terrorism Fact Sheet." Belfer Center for Science and International Affairs, Harvard Kennedy School. Belfer Center for Science and International Affairs. April 2010. http://belfer-center.ksg.harvard.edu/publication/20057/nuclear_terrorism_fact_sheet.html
13. "Incidents of nuclear and other radioactive material out of regulatory control, 2013 Fact Sheet." IAEA Incident and Trafficking Database (ITDB). International Atomic Energy Agency. 2013. <http://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf>

14. "Container Security Initiative In Summary." U.S. Customs and Border Protection. U.S. Department of Homeland Security. May 2011. http://www.cbp.gov/linkhandler/cgov/trade/cargo_security/csi/csi_brochure_2011.ctt/csi_brochure_2011.pdf
15. Bain, Ben. "DHS to Miss 2012 Deadline to Scan Containers for Radiation." FCW: The Business of Federal Technology. 1105 Media, Inc., 2 Dec. 2009. <http://fcw.com/articles/2009/12/02/dhs-cargo-radiation-scanning-extension.aspx>
16. Bliss, Jeff. "U.S. Backs Off All Cargo Scanning Goal with Inspections at 4%." Bloomberg. Bloomberg L.P. 13 August 2012. <http://www.bloomberg.com/news/2012-08-13/u-s-backs-off-all-cargo-scanning-goal-with-inspections-at-4-.html>
17. Frantz, Douglas. "Port Security: U.S. Fails to Meet Deadline for Scanning of Cargo Containers." The Washington Post. The Washington Post, 15 July 2012. http://articles.washingtonpost.com/2012-07-15/world/35489894_1_port-security-port-vulnerability-cargo-containers
18. Meade, Charles, and Roger C. Molander. Considering the Effects of a Catastrophic Terrorist Attack. RAND Center for Terrorism Risk Management Policy. 2006. http://www.rand.org/content/dam/rand/pubs/technical_reports/2006/RAND_TR391.pdf
19. Mundell, E.J. "U.S. Food Safety: The Import Alarm Keeps Sounding." U.S. News & World Report. U.S. News & World Report, L.P. 15 Jan. 2008. <http://health.usnews.com/usnews/health/healthday/080115/us-food-safety-the-import-alarm-keeps-sounding.htm>
20. "Price Theory Lecture 2: Supply & Demand." California State University. California State University, Northridge. n.d. <http://www.csun.edu/~dggw61315/PTlect2y.pdf>
21. *ibid.*
22. *ibid.*
23. "Container Climbdown." Shiptalk. Shiptalk Ltd, 16 Dec. 2009. <http://www.shiptalk.com/?p=2891>
24. "Researchers propose a new way to scan cargo containers." Homeland Security News Wire. News Wire Publications, LLC. 28 Jan. 2010. <http://www.homelandsecuritynewswire.com/researchers-propose-new-way-scan-cargo-containers>
25. "Supply Chain Security: CBP Needs to Conduct Regular Assessments of Its Cargo Targeting System." United States Government Accountability Office. Report to Congressional Requestors. Oct. 2012. <http://www.gao.gov/assets/650/649695.pdf>
26. Keefe, Joseph. "100% Container Scanning in Ports: It is Possible." Marine Link. Maritime Activity Reports, Inc. 2 April 2013. <http://www.marinelink.com/news/container-scanning-ports353105.aspx>
27. Bain, Ben. DHS to Miss 2012 Deadline to Scan Containers for Radiation. FCW: The Business of Federal Technology. 1105 Media, Inc., 2 Dec. 2009. <http://fcw.com/articles/2009/12/02/dhs-cargo-radiation-scanning-extension.aspx>
28. Bain, Ben. "Commerce versus security." FCW: The Business of Federal Technology. 1105 Media, Inc. 2 July 2008. <http://fcw.com/Articles/2008/07/02/Commerce-versus-security.aspx?Page=1>
29. "Container Climbdown." Shiptalk. Shiptalk Ltd, 16 Dec. 2009. <http://www.shiptalk.com/?p=2891>
30. Schneidmiller, Chris. "Homeland Security to Extend Cargo Nuclear Scanning Deadline." Global Security Newswire. Nuclear Threat Initiative. 9 Feb. 2012. <http://www.nti.org/gsn/article/homeland-security->

extend-nuclear-scanning-deadline/

31. "About Us." Decision Sciences. Decision Sciences Corp. n.d. <http://www.decisionsciencescorp.com/about-us/>
32. Weber, Scott. "Long Beach Port Gets Superhero-Like Security Upgrades." NBC Los Angeles. NBC Universal Media, LLC. 10 Feb. 2010. <http://www.nbclosangeles.com/news/local/Long-Beach-Port-Gets-Security-Superhero-like-Upgrades-84062322.html>
33. "Securing America's ports." Homeland Security News Wire. News Wire Publications, LLC. 10 Mar. 2011. <http://www.homelandsecuritynewswire.com/securing-americas-ports?page=0,0>
34. "Buoy system helps protect U.S. ports." Homeland Security News Wire. News Wire Publications, LLC. 15 Aug. 2011. <http://www.homelandsecuritynewswire.com/buoy-system-helps-protect-us-ports>
35. "Ship Cargo Containers – Finding Out What's In Them Before There's Trouble." U.S. Department of Homeland Security. U.S. Department of Homeland Security. <http://www.dhs.gov/ship-cargo-containers-%E2%80%93-finding-out-what%E2%80%99s-them-there%E2%80%99s-trouble>
36. *ibid.*
37. *ibid.*
38. "About Us." Decision Sciences. Decision Sciences Corp. n.d. <http://www.decisionsciencescorp.com/about-us/>
39. Frantz, Douglas. "Port Security: U.S. Fails to Meet Deadline for Scanning of Cargo Containers." The Washington Post. The Washington Post. 15 July 2012. http://articles.washingtonpost.com/2012-07-15/world/35489894_1_port-security-port-vulnerability-cargo-containers
40. *ibid.*
41. *ibid.*
42. "Container Climbdown." Shiptalk. Shiptalk Ltd, 16 Dec. 2009. <http://www.shiptalk.com/?p=2891>
43. "Incidents of nuclear and other radioactive material out of regulatory control, 2013 Fact Sheet." IAEA Incident and Trafficking Database (ITDB). International Atomic Energy Agency. 2013. <http://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf>
44. Bain, Ben. "DHS to Miss 2012 Deadline to Scan Containers for Radiation." FCW: The Business of Federal Technology. 1105 Media, Inc. 2 Dec. 2009. <http://fcw.com/articles/2009/12/02/dhs-cargo-radiation-scanning-extension.aspx>

Building a New American Arsenal

The American Security Project (ASP) is a nonpartisan initiative to educate the American public about the changing nature of national security in the 21st century.

Gone are the days when a nation's strength could be measured by bombers and battleships. Security in this new era requires a New American Arsenal harnessing all of America's strengths: the force of our diplomacy; the might of our military; the vigor of our economy; and the power of our ideals.

We believe that America must lead other nations in the pursuit of our common goals and shared security. We must confront international challenges with all the tools at our disposal. We must address emerging problems before they become security crises. And to do this, we must forge a new bipartisan consensus at home.

ASP brings together prominent American leaders, current and former members of Congress, retired military officers, and former government officials. Staff direct research on a broad range of issues and engages and empowers the American public by taking its findings directly to them.

We live in a time when the threats to our security are as complex and diverse as terrorism, the spread of weapons of mass destruction, climate change, failed and failing states, disease, and pandemics. The same-old solutions and partisan bickering won't do. America needs an honest dialogue about security that is as robust as it is realistic.

ASP exists to promote that dialogue, to forge consensus, and to spur constructive action so that America meets the challenges to its security while seizing the opportunities the new century offers.



www.americansecurityproject.org