Surveying the Vulnerability of the Maritime Cargo Pathway to Nuclear Smuggling

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Motivation
- Radiological/nuclear attacks are some of the greatest threats to United States security
- About 95% of cargo enters the United States through containerized maritime cargo pathways
- Through a comprehensive analysis of incident data and current practices, **vulnerability in the containerized shipping pathway can be identified**

Useful Definition: Orphan nuclear source (ONS) - any amount of nuclear material that has fallen out of proper regulatory control [1]

Background

The Maritime Transportation Security Act 2002; Implements security assessments; plans for personnel and cargo security [2]

Trade Act 2002; Requires manifests for cargo to be received one day before inbound shipments leave port for US [3]

Container Safety and Accountability for Every Port (SAFE) Act 2002; Promotes ATS to calculate risk profiles, stations CBP and allies at foreign ports [4]


- ONS’s can be used nefariously if obtained by adversaries
- US strategy: interdict nuclear smuggling during transport (View relevant legislation above)
- Special attention is paid to ports through use of active (physical search) and passive (radiation portal monitors, radioisotope identification devices) methods
- Detection of in-transport ONS’s in the US between 2013-2016 (below) can be tracked by CNS data

Methods

Use a data-driven approach to (1) find plausible smuggling routes in order to (2) weigh tradeoffs between strategies used by adversaries.

- Use of ONS location data points to likely smuggling pathways from origin to destination (above)
- High concentration of US incidents is due to the country’s thorough reporting
- In-transport ONS reports are shown to follow water routes (below)

Location of Nuclear Material Discovered amidst Transport

Conclusion/Discussion

Maritime Container
- No routing or boating skills required, which may be difficult or time consuming to learn
- Reliable delivery
- Large packaging units, thus units can contain materials to shield the radiation from detection, such as cement or lead
- All containers are passively scanned for radiation at US ports

Private Vessel
- Can potentially bypass port scanning
- Vessel-mounted nuclear material scanners have been successfully implemented at some non-commercial ports
- Requires advanced oceanic knowledge and boating experience
- US CGBP monitors water for small, suspicious boats daily

- Adversaries make two decisions (1) vessel type (above) and (2) port of entry (below)
- Small ports are less fortified with passive nuclear material scanners due to low traffic
- While strong legislation is in place to aid the DHS and other enforcement bodies, the strength of the execution of these laws currently varies
- Maritime containers appear the most attractive method

References


University at Buffalo
University Honors College