

**Countering Nuclear and Radiological Materials Illicit Trafficking Through Maritime
Security Initiatives: Paper Tiger or Concrete Solution?
A Case Study**

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Abstract

For more than a decade, the threat of weapons of mass destruction (WMD) terrorism has been on the forefront of the international security agenda. In an increasingly globalized society, detecting and interdicting illicit trafficking of radiological and nuclear (RN) materials to prevent individuals and organizations – who are willing to perpetrate the atrocious act of WMD terrorism – from acquiring such materials is of utmost priority and import. In this context, the international community has launched various political and legal initiatives to prevent illicit trafficking of RN materials via maritime means. Indeed, given that over 58 million twenty-foot equivalent units of containers are shipped around the world over 490 maritime trade routes annually, commercial maritime shipping industry is uniquely vulnerable to exploitation by nefarious actors. Yet, are the existing initiatives implemented with efficiency and respected by those connected to the maritime industry, or is the reality far from ideal?

Employing the grounded theory approach, this paper examines ways the international maritime security initiatives (i.e. Proliferation Security Initiative, Megaports Initiative, etc.) are implemented at the Port of Antwerp, Belgium. In doing so, this paper also analyzes the impact different authorities involved in the security and operation of the port have on the implementation of such initiatives. Ultimately, this paper seeks to identify strengths and potential weaknesses of the current legal and political framework designed to curb illicit RN materials trafficking and generate a theoretical foundation and a series of hypotheses that can be tested and utilized to improve the future design of international maritime security initiatives.

Keywords: Weapons of mass destruction, WMD, terrorism, illicit trafficking, radiological and nuclear materials, crime-terror nexus, Port of Antwerp

Conference Topics Addressed:

1. Countering WMD Proliferation and CBRN Terrorism
2. Detecting and interdicting the illicit trafficking of CBRN weapons and materials

Introduction

Preventing and countering the threat of terrorism committed using weapons of mass destruction (WMD) has been on the forefront of the international security agenda for more than a decade. In an increasingly globalized society, detecting and interdicting illicit trafficking of radiological and nuclear (RN) materials to prevent individuals and organizations – who are willing to perpetrate the atrocious act of WMD terrorism – from acquiring such materials is of utmost priority and importance. In this context, it is also critical to take note of the increasing trend of collaboration between the “traditional” transnational criminal organizations (TCOs) and terrorist organizations to traffic commodities such as arms, narcotics, human, wildlife and wildlife parts, and antiquities. Concurrently, there is an emerging trend of hybridization of terrorist organizations where they engage in criminal activities such as illicit trafficking of narcotics to fund their terrorist activities (Picarelli 2006, 2012a; 2012b; Picarelli and Shelley 2007; Sanderson 2004).

In response to the perceived and potential threat of WMD terrorism, the international community has launched various political and legal initiatives to prevent illicit trafficking of RN materials via maritime means. Indeed, given that over 58 million twenty-foot equivalent units of containers are shipped around the world over 490 maritime trade routes annually, and the fact that international deep-sea container ports have been used, and are still being used, by TCOs and terrorist organizations alike to transship and transload illicit goods, commercial maritime shipping industry is uniquely vulnerable to exploitation by nefarious actors seeking to traffic RN materials.

Through a case study of the Port of Antwerp, Belgium, this paper examines ways the international maritime security initiatives (i.e. Proliferation Security Initiative, Megaports Initiative, etc.) are implemented at one of the largest and fastest growing deep-sea container ports in Europe with services to and from the Americas, Africa, the Middle East, and the Indian subcontinent. In doing so, this paper seeks to identify strengths and potential weaknesses of the current legal and political framework designed to curb illicit RN materials trafficking and determine whether the existing initiatives are implemented with efficiency and respected by those connected to the maritime industry, or if the reality is far from ideal. Ultimately, this paper seeks to generate a theoretical foundation, employing the grounded theory approach, and a series of hypotheses that can be tested and utilized to improve the future design of international maritime security initiatives. The paper is organized as follows: 1) Case Selection and Methodology; 2) Background: Physical and Jurisdictional

Complexity; 3) Summary Findings on International Initiatives, Regulations, and Resolutions; 4) Current Security Measures, Procedures, and Protocols; 5) Security Challenges and Potential Issues; and 6) Conclusion.

Case Selection and Methodology

Other than the previously stated reason that the port is one of the largest and fastest growing deep-sea container ports in Europe with services to and from the Americas, Africa, the Middle East, and the Indian subcontinent, there were three other major characteristics that led us to select the Port of Antwerp as the subject of our case study. Firstly, geospatial analyses have identified the Port of Antwerp as the potential European maritime chokepoint where multiple licit and illicit pathways converge (Boyd and Sin 2014). Secondly, the Port of Antwerp represents an excellent example of the latest security measures implemented at a large European international maritime cargo handling facility. Finally, the port reflects the convergence of national Belgian, EU, and international policies, which provided a unique opportunity to observe the operation of multiple types of security policies in a single location.

Several key officials involved in the operations and security of the Port of Antwerp were interviewed to provide insights to our case study. We also researched all available open source media and academic literature pertaining to the Port of Antwerp's operations and security measures as well as reports produced by governmental and non-governmental organizations. Additionally, an analysis was conducted of all relevant international and European security regimes, legislations, and regulations that Belgium – therefore the Port of Antwerp – is obligated and/or has agreed to adhere to.

Background: Physical and Jurisdictional Complexity

In 2013, Belgium ranked 10th and fourth in the world and Europe, respectively, in the liner shipping connectivity index¹, making it one of the most connected maritime freight processing countries in the world (UNCTAD 2013). The Port of Antwerp, the largest container port in Belgium, ranked 15th and third busiest container port in the world and Europe², respectively, with approximately 8.58 million Twenty-foot Equivalent Units (TEUs) processed in 2013 (Port of Hamburg 2014), which accounted for 75.89 percent of total goods processed at

¹ The Liner Shipping Connectivity Index captures how well countries are connected to global shipping networks. It is computed by the United Nations Conference on Trade and Development (UNCTAD) based on five components of the maritime transport sector: number of ships, their container-carrying capacity, maximum vessel size, number of services, and number of companies that deploy container ships in a country's ports. For each component a country's value is divided by the maximum value of each component in 2004, the five components are averaged for each country, and the average is divided by the maximum average for 2004 and multiplied by 100.

² In 2013, the Port of Rotterdam (Netherlands) was the busiest container port in Europe, processing 11.62 million TEUs, followed by the Port of Hamburg (Germany), processing 9.26 million TEUs (Port of Hamburg 2014).

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Belgian maritime port facilities³ (Eurostat 2014). It is about 80 kilometers (129 miles) inland from the North Sea on the River Scheldt, a location that provides the port with a competitive advantage over other European ports by being located closer to the European consumer markets (World Port Source 2014a), and there are currently approximately 900 private companies active at the port (Port of Antwerp 2014a).

Although one may conceive the Port of Antwerp as a singular entity falling under one jurisdictional authority, several jurisdictional lines are present within the area in reality. The port is located in two Belgian provinces (Antwerp and East Flanders), three municipalities (Antwerp, Beveren, and Zwijndrecht), and two judicial districts (Antwerp and Dendermonde). The multifaceted nature of securing a large international port is a complex endeavor that requires the involvement of multiple actors at several levels. This dynamic is complicated even further for the Port of Antwerp due to it straddling multiple administrative and judicial boundaries. Within the Port of Antwerp area, nine government agencies have a role in some aspect(s) of the port security, including the Belgian Ministry of Home Affairs; the Belgian Ministry of Justice; the Flemish regional government; the Governor's Offices of the Provinces of Antwerp and East Flanders; the Mayor's Offices of the City of Antwerp and the municipalities of Beveren and Zwijndrecht; and the Antwerp Port Authority. There are also eight law enforcement agencies – three local (Antwerp, Beveren, and Zwijndrecht) and five federal (The Federal Judicial Police of Antwerp and Dendermonde; the Federal Administrative Police of Antwerp and Dendermonde; and the Federal Maritime Police) – operational at the Port of Antwerp. Additionally, there are two prosecutor's offices (Antwerp and Dendermonde) that lay claims to the jurisdiction over the port; the Belgian intelligence and security services, and the Federal Agency for Nuclear Control also play a large role in port security. Other agencies that comprise the port's security team include the Customs, the Environmental Inspection, and the various local fire departments. (DeBoeck, et al. 2014)

The Port of Antwerp currently covers an area of 13,057 hectares (approximately 32,265 acres or approximately 20,000 football fields), which is divided into the Right Bank and the Left Bank. The Right Bank covers 7,239 hectares (approximately 17,888 acres) and the Left Bank covers 5,818 hectares (approximately 14,377 acres). Within this area, there are 409 kilometers of roads, 1,061 kilometers of railroads, 1,000 kilometers of intraport pipelines, and 157 kilometers of quays. The port also has six locks, 21 bridges, and 30 docks within its

³ In 2013, Belgium processed 226.62 million tons of goods via maritime transport (Eurostat 2014).

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boundaries (Port of Antwerp 2014b, 2014c). The port operates five types of specialized terminals: containers, liquid bulk goods, dry bulk, break-bulk, and roll-on/roll-off (RO/RO). All terminals at the port operate 24 hours a day, 7 days per week, with workers working in shifts (Port of Antwerp 2014d).

The port accounted for roughly 80 percent of all containers shipped to the United States and Canada from Europe (Port of Antwerp 2014e), and approximately 94.5 percent of all exported goods from Belgium shipped to the United States (Bureau of Transportation Statistics 2013). Ports of Greater Baton Rouge, Chester, Newark, Houston, and New Orleans ranked as top five destinations in the United States for goods originating from Belgium, accounting for roughly 70 percent of all inbound shipments from Belgium (World Port Source 2014b).

Summary Findings on International Initiatives, Regulations, and Resolutions

Recognizing the salience of WMD terrorism threat posed and its implications, Belgium participates in various international and regional initiatives, codes, regulations and directives to prevent WMD terrorist incidents and to curb illicit trafficking of RN materials.

Proliferation Security Initiative (PSI); Megaports Initiative; Container Security Initiative (CSI); International Ship and Port Facility Security Code (ISPS); European Union (EU) Regulation EC/725/2004, “Enhancing Ship and Port Facility Security”; EU Directive 2006/65/EC, “Enhancing Port Security”, and EU Regulation EC/324/2008, “Procedures for Conducting Inspections in the Field of Maritime Security” are international and regional initiatives, legal codes, and legislations Belgium has joined and implemented that are most relevant to the prevention of WMD proliferation through increased security measures, policies, and procedures at seaports. Belgium has also joined the following international initiatives relevant to prevention of nuclear and WMD proliferation and terrorism: G8 Global Partnership against the Spread of Weapons of Mass Destruction and their Delivery Means (GP); Global Initiative to Combat Nuclear Terrorism (GICNT); the Nuclear Security Summit (NSS); and the United Nations Security Council Resolution 1540. As the largest deep-sea container port in Belgium, it is subject to all of the conditions and terms of the international and regional initiatives, legislations, codes, directives, and resolutions Belgium has agreed to and/or is required to adhere to.

Table 1. Prevention of Nuclear and WMD Proliferation and Terrorism Relevant International Initiatives, Codes, and Legislations Signed by Belgium

Name of International and Regional Initiative	Year Launched	Year Belgium Joined
Container Security Initiative (CSI)	2002	2003
G8 Global Partnership Against the Spread of Weapons of Mass Destruction and their Delivery Means (GP)	2002	2004
Global Initiative to Combat Nuclear Terrorism (GICNT)	2006	2006
Megaports Initiative	2003	2004
Nuclear Security Summit (NSS)	2010	2010
Proliferation Security Initiative (PSI)	2003	2005
Name of Code/Legislation/Directive/Resolution	Year Adopted	Year Belgium Signed
European Union Directive 2005/65/EC	2005	2005
European Union Regulation EC/324/2008	2008	2008
European Union Regulation EC/725/2004	2004	2004
International Ship and Port Facility Security Code (ISPS)	2002	2002
United Nations Security Council Resolution 1540	2004	N/A

Current Security Measures, Procedures, and Protocols

The port of Antwerp unites multiple security actors at several levels due to the multi-faceted nature of the concept ‘security’ and the administrative and judicial complexity of the port area⁴. There are over 20 governmental bodies, justice and policing bodies, and inspection and rescue actors (DeBoeck, et al. 2014). Although no single security actor or agency specifically focuses on the detection of illicit trafficking of RN materials, this issue falls within the broad scope of four key operational agencies charged with the daily operational mission of securing the port: Customs and Excises; the Federal Maritime Police; the Federal Agency for Nuclear Control (FANC); and the Harbor Master’s Office.

The primary RN materials inspection tool for container traffic in the port is the Megaports portal monitors. In 2004, Belgium joined the Megaports Initiative and has contributed approximately \$17 million to the initiative between its two ports, Antwerp and Zeebrugge (NNSA 2013). As a Megaports Initiative participating port, all major terminals of the port are equipped with Megaports Initiative scanners, and the majority of the containers processed at the port goes through these scanners. The port is also equipped with secondary fixed scanners

⁴ On one hand, *security* consists of port-related crimes such as illicit trafficking of goods, human smuggling, and scams with vehicles and waste. The port is a ‘logistical gateway’ to carry out other types of crime. On the other hand, *security* is related to the protection of the port itself from, primarily, a physical attack by terrorists.

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and tertiary mobile scanners that can be used to conduct a more detailed inspection of containers. (Pellens, et al. 2010)

In 2012, the Port of Antwerp developed a new security protocol, which was implemented and exercised in 2012 under the observation of the European Commission representatives. The “Exercitium, Drill and Exercise Handbook,” drafted by the Port Authority after the completion of the exercise at the request of the European Commission, has been adopted throughout European Union as a model. (Port of Antwerp 2012) In 2013, the Port Authority introduced a game called “Serious Game” that port users and public can download and play on their computers or mobile devices to learn about how they can contribute to the safety and security of the port (Port of Antwerp 2013a).

In an effort to allow for earlier intervention of police in the investigation of suspicious or possible criminal/terrorist activities at and around the port area, the Port Authority established a Local Information Network (LIN) at the end of 2013, which brings private companies, various port agencies, and local authorities together in a collaborative information sharing environment. The LIN not only allows the private companies and the port agencies to report suspicious activities to the local authorities, but it also allows the local authorities to share information with the companies and port agencies about possible threats at and around the port area. As of February 2014, the mayors of Antwerp, Beveren, and Zwijndrecht, as well as the Antwerp port alderman, the Belgian Federal Policy, the Shipping Police, senior police officers of the local jurisdictions, and the Port Authority have all signed the LIN protocol. Since the development of LIN, the Port Authority has approached 650 companies to join the network, and currently there are over 450 companies participating in the LIN protocol. (Port of Antwerp 2014f, 2013b)

To counter the constantly increasing cyber threat faced by the Port, and as a response to the hacking incident that was uncovered in 2013 (as previously described in this study), the Port Authority, in concert with the Antwerp Port Community System (APCS) and the Belgian Federal Cyber Emergency Response Team (CERT) has set up a special cyber security taskforce at the end of 2013 (Port of Antwerp 2013b). In addition to setting up the cyber security taskforce, the port has implemented additional container security measures. One of the new measures include the Container Release System – originally developed by MSC – where the users have to log onto a secure portal that is hosted on an independent network from the Port’s network in order to gain access to the container release data (Port of Antwerp

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2013c). Other security measures at the container terminals include integrated electronic data management (EDI), International Ship and Port Security (ISPS) certification, and the Secured Alpass card management system (Port of Antwerp 2014d).

Security Challenges and Potential Issues

Although the majority of the containers processed at the port go through the Megaports Initiative scanners when entering and leaving the port, there still are quite a number of the containers that do not get scanned. There are two primary reasons for this: 1) due to extremely high volume of the containers flowing through the Port of Antwerp, however, substantially less than 20 percent of the containers are inspected using the secondary and tertiary scanners; and 2) those containers that are directly transloaded from one ship to another (both international and domestic shipping transfers) do not have to be scanned, and those containers can then be offloaded at another port that is not a part of the Megaports Initiative.

Additionally, primarily attributed to the extremely high volume of the containers needing to be processed, when a container is selected for further scanning, the time permitted for the transporter to submit the container to further scanning is quite long, which means the material of interest could be dumped or transferred to other means of transportation prior to the container being submitted for scanning. (Volders 2014)

It should also be noted that the function of the customs office, the agency that receives the monitor alarm information from the Megaports portal scanners, is to detect and curb illicit trafficking of goods (i.e. narcotics and counterfeit goods) and not necessarily to look for RN materials. Likewise, the Federal Maritime Police's main task is to actively control the port area to prevent and investigate "conventional" crimes. In cases of alarms deemed serious⁵, the Federal Agency for Nuclear Control (FANC)'s Security & Transport Department will be notified for assistance. Although the FANC's Security & Transport Department is the central point of contact for the port authorities in an event of "serious" RN alarm, its mission is to protect the people in the potentially affected area from radiation and/or contamination, in accordance with the IAEA's guidance document. Again, like the customs office and the maritime police, though FANC must respond to a potential RN event, its focus is not in preventing illicit trafficking of RN materials. Finally, The Harbor Master Office's Port Security & Safety Department, while having an important responsibility of monitoring all port

⁵ It should be noted that false alarms are common occurrences. Some products such as bananas, broccoli, and toilets often trips the monitor's alarm because they give out a weak radioactivity signal. The Customs and Excises currently has the authority to arbitrarily decide whether or not to conduct a secondary and/or tertiary scanning of a particular container.

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terminal operators' and port tenant companies' correct implementation of the ISPS-guidelines, it is still not charged with proactively monitoring attempts of illicit RN materials trafficking. (Volders 2014)

The Maritime Security Law (2007) and the Royal Decree on Maritime Security (2007), pursuant to the EU Regulation EC/725/2004 and the EU Directive 2005/65/EC, establishes two overarching bodies responsible for proactively securing the port and establishing preventive measures against terrorist threats: the National Authority for Maritime Security; and the Local Committee for Maritime Security (in the Port of Antwerp's case, the Port of Antwerp Local Committee for Maritime Security). Although these two organizations are designed to integrate intelligence and interdiction capabilities to prevent terrorism, there is not clear guidance on which agency is overall in charge of orchestrating the operations on the ground.

Another area of challenge is that the Port of Antwerp is considered an open port, meaning most of the port area is not controlled or has very limited control. In fact, there are some parts of the port where there are private residences located within its boundary. Although the immediate terminal areas and other sensitive areas are secured and controlled, the openness of the port does present a significant security challenge – not only for prevention of illicit trafficking but also in terms of the port's facilities and infrastructure being the physical target of terrorist attack. It is also worth noting that all commercial ports have an economic finality, meaning that economic interests of the ports will almost always supersede all other concerns – to include security. Security of the ports, at the most fundamental level, is vital only because it ensures the economic viability and the interests of the ports as well as those private entities operating within and around them. (Fanielle and Volders 2014)

Finally, cyber security – and the potential danger a cyber-attack could pose on the port's security – and insider threat – where someone affiliated with the port could be corrupted or recruited to facilitate illicit trafficking – are emerging security challenges for the port. Several officials commented cyberspace could be the weakest link in the port's security posture. Cyberspace, together with a corrupted/recruited insider, could represent the best chance of success for any potential adversary attempting to illicitly traffic radiological or nuclear material through the port. (Fanielle and Volders 2014)

Conclusion

Through our examination of the security measures and procedures at the Port of Antwerp, we were able to gain valuable insights into the strengths and potential weaknesses of the current international maritime security initiatives designed to curb illicit RN material trafficking.

The current international and regional maritime security initiatives, as designed, appears to provide for appropriate level of security requirements and recommended implementation measures to curb illicit RN material trafficking; however, the “long poles” in the tent appear to be a) active engagement of officials and private partners; b) specific mandate; and c) sustainability. Irrespective of the initiatives’ design, if one of the previously identified criteria is not met, the collective power of the initiatives’ measures will not be as strong.

The authorities and private partners at the Port of Antwerp exhibited great enthusiasm about implementing security measures to address the threat of WMD terrorism and illicit trafficking of RN materials. To that end, the Port of Antwerp has implemented various security measures, procedures, and protocols as required and recommended by the international and regional initiatives, regulations, and resolutions that Belgium is party to – it has a well implemented ISPS certification program and Megaports Initiative scanning procedures, for example. The authorities and civilian partners of the port are also actively engaged in countering the cyber security threat posed by individual hackers and organized criminal groups. Additionally, the Port Authority is extremely active in constantly raising the awareness of the operators and tenant companies about the security measures as well as the potential threats.

Despite all of its successes, the large physical size, extremely voluminous commercial throughput, and jurisdictional complexities pose unique challenges to the authorities charged with implementing the security measures and procedures and potential vulnerabilities to the port facilities and infrastructure. One of the most unique challenges stems from the jurisdictional complexities of the port. Although a variety of measures and procedures have been implemented at the Port of Antwerp in response to the threat of WMD terrorism and illicit trafficking of RN materials, no one agency at the port has a specific mandate to focus on or is designated as the lead agency to monitor and coordinate the responses to a potential illicit RN materials trafficking or WMD terrorism incidents. While it seems the Port of Antwerp Port Authority is responsible for coordinating all of the relevant agencies’ response to any terrorist activities in and around the port once an incident occurs, it is still unclear

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which agency has the specific mandate to monitor and respond to illicit RN materials trafficking.

Balancing the scale between security and operational efficiency has always been one of the most difficult decisions managers of facilities, companies, and organizations faced; and the Port of Antwerp is no different. The managers and security officials toil with these difficult decisions every day – while the security of the port infrastructure and facilities are important; and stopping illicit trafficking of RN materials is paramount; the security measures and procedures cannot degrade the operational efficiency of the port to the point where it becomes economically unsustainable. This harsh reality of seemingly inversely correlated relationship between security and operational efficiency not only presents a challenge for the authorities as they attempt to find the “right” balance, but it also presents openings that can potentially be exploited by the adversaries.

Constant communication and information sharing among the different agencies, offices, and private partners operating in and round the port, as well as the continuous outreach programs designed to increase the awareness of all parties about the potential and consequences of illicit RN materials trafficking, are extremely valuable in mitigating potential weaknesses of the initiatives derived from jurisdictional complexity and economic sustainability. One can compare this to the direct correlation DeCanio (1993) observed about the implementation of Energy Star program and the level of outreach activity conducted by local Environmental Protection Agency in the United States – the more active the port authorities are in communicating (outreach activity) with the private partners and public in and around the port about the nature of the threats faced and the security measures and procedures designed to counter those threats, more effective those measures will be.

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Appendix 1. Satellite Imagery of the Port of Antwerp and Major Transportation Infrastructure in and around the Port

