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## **Redefining Maritime Security Threats in the Eastern Indian Ocean Region**

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# **Redefining Maritime Security Threats in the Eastern Indian Ocean Region**

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## **Abstract**

This occasional paper analyzes the general security issues and trends relating to maritime trafficking of radiological and nuclear material using small vessels, minor ports, and unchecked areas of coastline existing in the Eastern Indian Ocean Region today. By the Eastern Indian Ocean Region is meant the area starting from the tip of the Indian peninsula in the west to the Straits of Malacca in the east. It lays focus on the potential sources of nuclear or radiological material that may be trafficked here. It further undertakes a study of the terrorist groups active in the region as well as the multinational or national interdiction organizations that have been created to counter maritime threats. It also seeks to discern the various technologies for detecting materials of concern available in the area. Finally, it ascertains possible methods and technologies to improve the maritime security system in the region.

## ACKNOWLEDGMENTS

The views in this report are those of the author and do not necessarily reflect the position of respective institutions or Sandia National Laboratories. Information used in the study was taken from available, open-source materials as cited either in books, journals, or online.

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## ABOUT THE AUTHOR

The author is Assistant Commissioner with the Indian Revenue Service (Customs & Central Excise). He has a Bachelor's degree in Political Science and a Master's degree in History. He is a prolific writer and reader, who has co-edited/co-authored three books on narcotics, narcotics trafficking, and sniffer dogs in security services, and has published a number of articles on Customs, maritime security, counterfeit money, tax system in India and paperless offices. He is fluent in English, Hindi, and Bengali, and has a working knowledge of German. He has undergone training with various Indian and foreign agencies such as the Indian Navy, Indian Coast Guard, Indo-Tibetan Border Police, the Central Industrial Security Force, Bureau of Parliamentary Studies and Training in the Indian Parliament, Wildlife Institute of India, National Police Academy, and Central Bureau of Narcotics, among others, all in India, as well as at the Lee Kuan Yew School of Public Policy in Singapore.

Before his research tenure at Sandia, the author was Export Control Visiting Fellow for summer 2015, a fellowship for Asian trade officials, in which he was selected for two months' training in the USA by the U.S. Department of Energy. While under training at the Indian National Academy of Customs, Excise and Narcotics (NACEN) he was selected to present a departmental memento to the current President of the Republic of India, Mr. Pranab Mukherjee, along with the then-Chairperson of the Indian Customs. In his free time, the author loves traveling, learning about foreign cultures, philately, and numismatics and he is a dog lover.

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## NOMENCLATURE

ACSD	Advanced Container Security Device
AIS	Automatic Identification System
ASG	Abu Sayyaf Group
BEL	Bharat Electronics Limited
BIFF	Bangsamoro Islamic Freedom Fighters
CBRN	Chemical, Biological, Radiological, Nuclear
CSCAP	Council for Security Cooperation in the Asia Pacific
CSD	Container Security Device
DAT	Distress Alert Transmitter
DHS	Department of Homeland Security
DoD	Department of Defense
E-IOR	Eastern Indian Ocean Region
GAM	Gerakan Aceh Merdeka
GAO	Government Accountability Office
HCC	Hybrid Composite Container
HEU	Highly Enriched Uranium
IAEA	International Atomic Energy Agency
ICG	Indian Coast Guard
IMAC	Information Management and Analysis Centre
IMB	International Maritime Bureau
IMO	International Maritime Organization
IND	Improvised Nuclear Device
IOR	Indian Ocean Region
ISC	Information Sharing Centre
ISIS	Islamic State in Iraq and Syria
ITDB	International Trafficking Database
JAS	Jemaah Ansharusy Syariah
JAT	Jemaah Anshorut Tauhid
JI	Jemaah Islamiyah
LRIT	Long Range Identification and Tracking
MALSINDO	Malaysia, Indonesia, Singapore
MATTS	Marine Asset Tag Tracking System
MILF	Moro Islamic Liberation Front
MMEA	Malaysian Maritime Enforcement Agency
NC3IN	National Command Control and Communication and Intelligence Network
PSI	Proliferation Security Initiative
RDD	Radiological Dispersal Device
ReCAAP	Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia
RED	Radiation Emission Device
RFID	Radio Frequency Identification Device
RPM	Radiation Portal Monitor
R&D	Research & Development
RTG	Radioisotope Thermoelectric Generators

SALW	Small Arms and Light Weapons
SOLAS	Safety of Life at Sea
UNCLOS	United Nations Convention on the Law of the Sea
WMD	Weapons of Mass Destruction

# 1 EXECUTIVE SUMMARY

The current research seeks to cast light on a previously unexplored arena in the Eastern Indian Ocean Region (E-IOR), the potential sources of radiological or nuclear materials, the routes via which such material can be trafficked, and practical recommendations for identifying and reinforcing possible gaps in the regional and global maritime nuclear security environment.

The Eastern Indian Ocean Region is a largely unexplored territory in which to consider maritime terrorism as a realistic threat. A new array of complex problems, including the threat of a CBRN attack, is confronting regional and world navies, coast guards, customs, and other frontline enforcement agencies. A key worry is the possibility that trafficking of nuclear or radiological materials of concern using small boats through unchecked coastlines can ultimately be used towards nefarious ends. Governments or key non-state actors may also potentially acquire radiological or nuclear material and traffic them within the region, and beyond, via ill-defined routes through the Eastern Indian Ocean Region. The ingenuity of terrorists is amply demonstrated by the 9/11 attacks, the USS Cole assault, and recent confirmed incidents of a dozen instances from 2014 involving unauthorized possession and related criminal activities involving nuclear and radiological materials, as enunciated by the International Atomic Energy Agency (IAEA) Incident and Trafficking Database (ITDB). The threat is quickly outpacing legal and policy institutions, security, and detection systems, which require revamping to tackle the evolving threats.

The monitoring of nuclear, radiological, and other materials of concern via regulated commerce such as large, container ship traffic is being addressed through various international programs and efforts. However, small, sometimes illegal, vessels and smaller ports and unchecked coastlines currently are not. The picture is particularly nebulous for the E-IOR. Thus, this research affords an insight into the problem and analysis of the issue, policy, and technology for the potential detection and deterrence of smuggling of nuclear, radiological, and other materials of concern via small vessel and unregulated commerce in the E-IOR presents a new and much needed examination and understanding of a heretofore rather scantily studied threat subject and region.

A few suggestions to effectively preempt or tackle the nuclear trafficking problem are:

- Setting up a “neighbourhood watch” system
- A maritime security strategy conceptualized and subsequently brought to life by legislation and regulations passed at the highest echelons of government in the various E-IOR nations
- Better monitoring of small and Automatic Identification System(AIS)-exempt vessels, including but not only by means of regular patrols of unchecked areas of coastline in the countries of the region bolstered by regulations that allow them to do so
- Improve coordination among national and regional agencies working towards the same end
- Increase manpower and resource allocation, while implementing a risk-informed, targeted approach
- Improve training of concerned security agencies.

As current regulations in most countries in the region do not address the threat of trafficking of radiological and nuclear material, taking note of some or all of these suggestions can likely result in an improved of maritime security in the E-IOR.



## 2 INTRODUCTION

“The sum total effect of America’s involvement in Mesopotamia and in Afghanistan has been to fast-forward the arrival of the Asian century,” observed Robert Kaplan.<sup>1</sup> By the Asian century, Kaplan refers not only to the Asian economic might, which started with the Tiger economies of the Pacific Rim in the late 1970s and early 1980s, but of burgeoning military prowess and post-industrial civil military complexes of several Asian nations. As economies have grown for decades on end throughout world history, militaries have grown as well. This is because as nations start to trade more with the outside world, concomitantly with their growing economies, they develop far-flung interests that lead them to simultaneously militarize to secure those interests.

There is, however, a flipside to the coin of burgeoning economies. Increasing economic prowess and maritime trade leads to not only greater development, but it makes for great fishing grounds for pirates, who wish to make quick money, themselves coming from deprived, stagnant littoral economies without many other means of sustenance. However, far more hazardous is when the threat of maritime terrorism takes the form of a seemingly “normal” pirate attack, albeit with far more devastating consequences. The targets and methods used by pirates will vary from those chosen by terrorists. Unlike pirates, maritime terrorists target vessels that will have some impact on the political objective they are trying to achieve.<sup>2</sup>

Though the United Nations (UN) serves as the representative body for international peace and stability, it has failed to offer a satisfactory definition for either piracy or terrorism. For example, piracy is defined by the UN in Article 101 of its Convention on the Law of the Sea as an act of violence or robbery undertaken for private ends against another ship or person on the high seas.<sup>3</sup> This definition is ambiguous and restricts how states may pursue piratical instances with respect to international law.

Not having a universal definition for terrorism is problematic in itself, but it becomes more difficult when states must distinguish between piracy, terrorism, and other acts of maritime depredation. There are two organizations, however, the International Maritime Bureau (IMB) and the Council for Security Cooperation in the Asia Pacific (CSCAP), that offer noteworthy definitions for piracy and maritime terrorism. The IMB defines piracy as “an act of boarding or attempting to board any ship with the apparent intent to commit theft or any other crime and with the apparent intent or capability to use force in furtherance of that act.” The CSCAP defines maritime terrorism as “the undertaking of terrorist acts and activities (1) within the maritime environment, (2) using or against vessels or fixed platforms at sea or in port, or against any one of their passengers or personnel, (3) against coastal facilities or settlements, including tourist resorts, port areas and port towns or

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<sup>1</sup>Kaplan, Robert, Global Distinguished Lecture, Co-Sponsored by the South Asia Center, African Studies Center and the Middle East Center at the University of Pennsylvania. YouTube, uploaded April 15, 2010. Accessed June 1, 2016. <https://www.youtube.com/watch?v=lru7lcMqNds>

<sup>2</sup>Nelson, Eric Shea, “Maritime Terrorism and Piracy: Existing and Potential Threats,” *Global Security Studies*, Winter 2012, Volume 3, Issue 1, Norwich University.

<sup>3</sup>The United Nations, Division for Ocean Affairs and the Law of the Sea, 1982.

cities.”<sup>4</sup> Combining these definitions with the motivations, methods, and targets of terrorists and pirates operating at sea allows us to discern maritime terrorism from piracy.

The terror attacks of September 11, 2001, changed a great deal in the world, and no less so in the maritime world. A real threat to shipping worldwide became an increasingly significant topic. Subsequently, the International Maritime Organization (IMO) has adopted certain mandatory security measures. The monitoring of containers during loading and along the entire transport chain, has been taken especially seriously by the United States, Singapore, and the United Arab Emirates, for example, as just a single breach of security may compromise the entire shipping and logistics chain. The major trading partners of the United States must also comply with these measures to reduce chances of problems with importing container traffic, nationally and internationally. These measures aim to prevent terrorists at sea from acquiring weapons and materials supplies, and simultaneously, to avoid ships from being hijacked and used as weapons – similar to the hijacked aircraft from the September 11 attacks.<sup>5</sup>

The maritime domain poses a security concern and is particularly vulnerable to terrorist attacks because it is largely ungoverned and its ports are inherently difficult to secure.<sup>6</sup> Smaller ports and vessels have received little focus and they often escape attention of national authorities. Risk can be defined as Probability x Consequence and a full analysis of the overall costs and gains of the security measures is still to be carried out. Trafficking of nuclear or radiological materials in the E-IOR may seem unlikely considering the difficulties involved in acquiring fissile material, or taken to the extreme, an intact nuclear weapon. That could be true to a large extent, but we need only one incident to shake the world, as exemplified by the September 11 attacks. When al-Qaeda used commercial airliners to commit these atrocities it became apparent that terrorists are capable of using unconventional means to exploit any potential weakness in a state’s security.

Recent suggestions that a nexus may be forming between pirates and terrorists add further complexity to understanding the similarities and differences between these two groups.<sup>7</sup> Maritime terrorism requires experience and training in the dynamic aquatic environment in areas such as navigation and ship handling.<sup>8</sup> Fortunately, terrorists often are under-skilled when it comes to conducting maritime attacks.<sup>9</sup> There are, however, various ways that this handicap can be overcome by terrorists. They could receive training from adept seafaring pirates. Or pirates could assist them by navigating to the target site on their behalf.<sup>10</sup> Pirates could benefit in terms of monetary rewards, drugs, or arms from terrorists in return for services rendered. In a reciprocal nature, terrorists could aid pirates with safe passage when on shore. Thus, there are some potential

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<sup>4</sup>Chalk, Peter, “The Maritime Dimension of International Security, Terrorism, Piracy, and Challenges for the United States,” RAND Air Force Project, Santa Monica, USA, 2008.

<sup>5</sup>“Obstacles to Global Shipping: Piracy and Terrorism,” World Ocean Review. Accessed June 10, 2016. <http://worldoceanreview.com/en/wor-1/transport/piracy-and-terrorism>

<sup>6</sup>Eric Shea Nelson, op. cit.

<sup>7</sup>Andrew Holt, “Plugging the Holes in Maritime Security,” The Jamestown Foundation Terrorism Monitor, Vol. 2, No. 9, May 6, 2004, p. 7. See also the discussion in Peter Chalk, “The Maritime Dimension of International Security,” pp. 31-33.

<sup>8</sup>Murphy, Martin N., “Small Boats, Weak States, Dirty Money: Piracy and Maritime Terrorism in the Modern World,” Columbia UP, New York, 2008, p. 370.

<sup>9</sup>Murphy, *ibid*, p. 379.

<sup>10</sup>Murphy, *ibid*, p. 161.

give-and-take benefits for these groups to partner with one another. Also to note, terrorists might be more comfortable in trafficking materials of concern via water with training or aid from pirates. Additionally, terrorists sometimes do conduct operations at sea for a financial reward. For example, the Abu Sayyaf Group (ASG) is a Philippine terrorist organization that has used its maritime abilities to attack ships mainly for financial purposes.<sup>11</sup>

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<sup>11</sup>Murphy, *ibid*, p.344.



### 3 GENERAL SECURITY ISSUES AND TRENDS IN THE EASTERN INDIAN OCEAN REGION

In the post-Cold War era, the concept of security has assumed a far wider connotation compared to the older straitjacketed view of a military concept. Challenges relating to international terrorism, drug trafficking, illegal immigration, human trafficking, and trafficking in small arms and light weapons bind national and global security together today.

The Indian Ocean, which has no superpower along its rim, is fast becoming the centre of power dynamics, power conflict, and as a trade and military hub.<sup>12</sup> As such in international affairs, the Indian Ocean Region is of key strategic importance in the 21<sup>st</sup> century. So much so that the US Navy in their late 2007 maritime strategy, as well as the US Marine Corps, with their vision statement in 2008 for the next twenty years, asserted that they would be involved mainly in two oceans, the Indian and the Pacific Ocean.

The Indian Ocean (Figure 1) is the third largest ocean in the world, covering 70,560,000 km<sup>2</sup> (27,240,000 sq. mi.), which is about 20% of the water on the Earth's surface. It has Asia to its north, Africa to the west, Australia on its east and it is bounded on the south by Antarctica, or the Southern Ocean, depending on definition.<sup>13</sup> It is named after the country of India.

The major straits include those of Bab-el-Mandeb, the Straits of Hormuz, the Lombok Strait, the Straits of Malacca, and Palk Strait. The Gulf of Aden, Andaman Sea, Arabian Sea, Bay of Bengal, Great Australian Bight, Laccadive Sea, Gulf of Mannar, Mozambique Channel, Gulf of Oman, and the Red Sea are the main seas in the region. Smaller seas, gulfs, bays, and straits of the Indian Ocean include, among others, the Persian Gulf, the Palk Strait connecting Arabian Sea and Bay of Bengal, Malacca Strait, Great Australian Bight, and the Gulf of Mannar.

Many littoral states of the world have been plagued with challenges and threats stemming from oceans. Various countries have applied suitable measures according to need to counter maritime terrorism and other water-borne criminal activities such as the smuggling of various types of contraband such as drugs and arms as well as illegal migration. The IOR is no exception.

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<sup>12</sup>Kaplan, *op. cit.*

<sup>13</sup>Indian Ocean definition — Merriam-Webster Dictionary Online. Retrieved June 12, 2016.

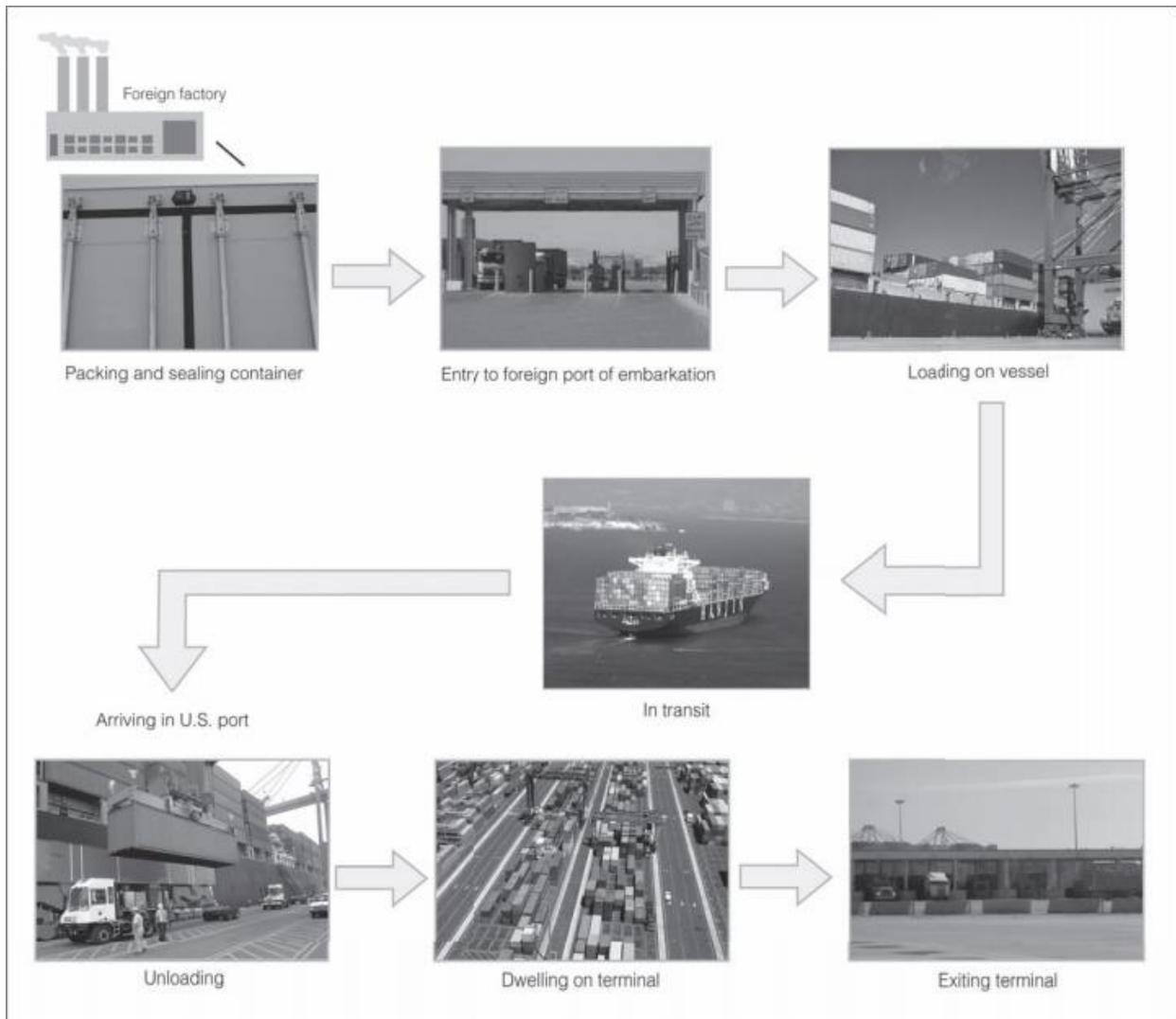


**Figure 1. The Eastern Indian Ocean Region.<sup>14</sup>**

This paper focuses on the scope of potential trafficking of nuclear and radiological material using small vessels, minor ports, and unchecked areas of coastline in the portion of the Indian Ocean starting from the tip of peninsular India and on to its eastern reaches including the Straits of Malacca region and the Great Australian Bight further to the south. For convenience's sake, we shall call this area the Eastern-Indian Ocean Region, as highlighted on Figure 1.

The graphic shown on Figure 2 portrays how a sealed-goods container typically starts in a Port of Embarkation, is loaded on the vessel for shipment, arrives at the Port of Disembarkation, and finally exits the port for distribution within destination country.

<sup>14</sup>One World Nations Online Project, Map of Southeast Asia Region.  
[http://www.nationsonline.org/oneworld/map\\_of\\_southeast\\_asia.htm](http://www.nationsonline.org/oneworld/map_of_southeast_asia.htm)



Source: GAO (analysis); GAO and DHS S&T (photos).

**Figure 2. The Shipment of Sealed Goods Containers.<sup>15</sup>**

The IMO ship identification number scheme saw the light of the day in 1987 under the Safety of Life at Sea (SOLAS) convention. It was aimed at enhancing "maritime safety, and pollution prevention and to facilitate the prevention of maritime fraud." Further, it was also conceived to assign a unique permanent number to each ship for identification purposes. However, it does not provide identification numbers for most ships below 300 gross tons.<sup>16</sup> "Small vessels" are further characterized by the US Department of Homeland Security (DHS) as any watercraft—regardless

<sup>15</sup>GAO Report GAO-12-422T, "Supply Chain Security; Container Security Programs Have Matured, but Uncertainty Persists over the Future of 100 Percent Scanning," Statement of Stephen L. Caldwell, Director, Homeland Security and Justice Team, US GAO Office.

<sup>16</sup>IMO Identification Number Schemes, Circular Letter No.1886/Rev.5. Accessed Aug. 17, 2016. <http://www.imo.org/en/OurWork/MSAS/Pages/IMO-identification-number-scheme.aspx>

of method of propulsion—less than 300 gross tons, and used for recreational or commercial purposes.<sup>17</sup> Hence, terrorists, smugglers, and other criminals can more easily use small vessels as platforms for their activities because such vessels generally remain unregulated and can pass by undetected or unnoticed. Law enforcement agencies, as a result, face the challenging task of filtering out legitimate small vessel operators from the lesser number of those presumed to be engaged in illicit activities.

Although there have not yet been any major small vessel attacks in the E-IOR, terrorists have used small vessels to facilitate their attacks, such as those on the *USS Cole* in 2000, the French oil tanker *MV Limburg* in Yemen in 2002, and the Japanese tanker *M Star* in 2010. Some larger vessels, such as cruise ships, have pre-planned schedules, which could make them relatively easy targets for terrorists in small vessels. Pirates aboard small vessels have attacked at least three cruise ships with automatic weapons and rocket propelled grenades. Finally, in relation to piracy and terrorism, small vessels have the potential to be used to smuggle weapons of mass destruction (WMD).

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<sup>17</sup>“Small Vessel Security Strategy (SVSS),” US Department of Homeland Security, April 2008.  
<https://www.dhs.gov/xlibrary/assets/small-vessel-security-strategy.pdf>

## 4 TERRORISTS, PIRATES, AND MATERIALS OF CONCERN

Data from the International Atomic Energy Agency (IAEA) suggests that from 1993 through 2012 there have been 2,331 confirmed incidents of unregulated transport or illicit trafficking of nuclear and other radioactive material.<sup>18</sup> These incidents do not all involve the use of small vessels. However, a former US Coast Guard commandant testified that small vessels could be more lethal than cargo containers for smuggling nuclear materials because of limited capabilities to check small vessels for WMD and, thus, small vessels create the possibility of being used by heinous terrorists to transport such dangerous material.<sup>19</sup>

At the eastern end of the IOR, the Straits of Malacca, through which one-third of global shipping trade and one-half of the world's oil cargoes pass, makes a tempting target for terrorists and pirates. An endless procession of tankers, container ships, tugs, fishing boats, ferries, and cruise-liners sails between tiny islets through this shipping lane that narrows to as little as one-and-a-half nautical miles at one point. Roughly 50,000 vessels, bearing around 25% of the maritime trade of the world, traverse the Straits every year. Not just that, but it also bears about 50% of all seaborne oil shipments—a veritable necessity for the economies of Japan, South Korea, and China. As it turns out, this is an ideal location for terrorists to try to severely impact the world economy with a single strike. So reasoned many participants at the 2004 Shangri-La Dialogue, a regional security conference organized by the London-based International Institute for Strategic Studies in Singapore.<sup>20</sup>

As evidence of this concern, Abu Sayyaf, a terrorist group in the southern Philippines, declared itself responsible for bombing a vessel in Manila Bay.<sup>21</sup> In 2001, US forces in Afghanistan discovered a video keeping watch on Malaysian naval vessels and their movements. Additionally, Singaporean authorities described having arrested terror suspects who had apparently planned an attack on US ships in the area.<sup>22</sup>

To the northwest, the shallow waters of the Sunderbans straddling India and Bangladesh have witnessed attacks on fishermen by pirates. Reports of these attacks and incidences come from all over the Sunderbans, Kendudweep, and the whole delta area, which are particularly vulnerable. The Sunderban pirates tend to be Bangladeshi based out of the districts of Jessore, Satkhira, and Khulna.<sup>23, 24</sup> Also, several Bangladeshi infiltrators with arms, ammunition, and explosives have

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<sup>18</sup>International Atomic Energy Agency, "Nuclear Security Achievements 2002-2012," Vienna, Austria, May 2013.

<sup>19</sup>"Maritime Security - DHS Could Benefit from Tracking Progress in Implementing the *Small Vessel Security Strategy*," GAO Report, GAO-14-32. Accessed June 3, 2016. <http://gao.gov/assets/660/658703.pdf>

<sup>20</sup>"Shipping in South-East Asia - Going for the Jugular," *The Economist*, June 10, 2004, Singapore. <http://www.economist.com/node/2752802>

<sup>21</sup>"Philippines Unrest: Who are the Abu Sayyaf Group?" BBC News, June 14, 2016. <http://www.bbc.com/news/world-asia-36138554>

<sup>22</sup>Mydans, Seth, "Singapore Details Terrorist Plot to Bomb U.S. Ships and Soldiers," *New York Times*, January 11, 2002. <http://www.nytimes.com/2002/01/11/international/singapore-details-terrorist-plot-to-bomb-us-ships-and-soldiers.html?mcubz=2>

<sup>23</sup>Pandey, Sanjay, "Pirates of the Bay of Bengal," Al Jazeera Media Network, September 16, 2015. <http://www.aljazeera.com/indepth/features/2015/09/pirates-bay-bengal-150914123258304.html>

<sup>24</sup>Chattopadhyay, Suhrid Shankar, "Terror in the Sunderbans," *Frontline*, Volume 18 - Issue 15, July 21 - August 03, 2001. <http://www.frontline.in/static/html/fl1815/18150390.htm>

been apprehended in this area by the Indian security forces. The relative difficulties of keeping constant vigil in the terrain allow them to enter the Indian side of the Sunderbans, which ideally would have better returns for them.

Also, Indian criminal gangs operating in the region provide support to the pirate groups. While Indian smugglers and their agents often aid Bangladeshi pirates by marking escape routes that could be taken, the pirates, in turn, provide the Indian gangs refuge in Bangladesh when Indian security forces go after them. It ultimately boils down to a “you scratch my back, I’ll scratch yours” policy. Thus, any radiological material or nuclear weapons or components smuggled through this area, including by means of small vessels, would be challenging to detect.

The security of the region faces challenges until and unless the covert link between Bangladeshi pirates and Indian criminal gangs is shattered, because in this way several Bangladeshi terror operatives operating inside Indian territory can be deprived of logistical support.<sup>25</sup> By comparison, over the years, a few transforming factors have improved security along the land borders. First, the increased deployment of security forces; second, increased surveillance equipment and third, construction of fences. In contrast, there is still much to be desired when it comes to securing the ocean domain. The sea has been seen as an alternate route by terrorists to slip into India undetected because of the stringent security measures applied at land borders.<sup>26</sup> Thus, it seems that tightening land borders may be pushing smugglers and terrorists seaward.

In most countries of the E-IOR, such as Malaysia, India, Indonesia, etc., only the larger vessels must mandatorily submit information on their passengers, cargo, crew, and so on, prior to their arrival or departure. This prepares the Coast Guard or Customs, aiding them in conducting risk-based analyses prior to arrival. The International Maritime Organisation, a regulatory body for shipping under the aegis of the United Nations, has laid the rule that all vessels over 300 tons must have on board a tracking device such as an Automatic Identification System (AIS) transponder.<sup>27</sup> These devices broadcast information on the vessels and their locations, so that government authorities can track them. More strictly, Singapore requires the use of AIS trackers for even jet-skis.<sup>28</sup>

However, as a result of limited information on small vessels, the national governments have constrained knowledge regarding the owners and locations of these vessels. Even if AIS requirements for small vessels are mandated, just a small percentage of the international small vessel traffic returning to the country would be likely to report this information due, in part, to a lack of public awareness of the reporting requirements or inspections.

As can be seen, there are numerous challenges for tracking small vessels using available technologies. Small vessel operators have expressed concerns about the cost of requirements that would allow the government to track their movements. For example, the cost of colored markings

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<sup>25</sup>Das, Pushpita, *Coastal Security: The Indian Experience*, IDSA Monograph Series, No. 22, Institute of Defence Studies and Analyses, New Delhi, September 2013, p. 29.

<sup>26</sup>Das, *ibid*, p.10.

<sup>27</sup>Safety of Life at Sea (SOLAS), Automatic Identification Systems (AIS), Ch. V, Annex 17. [https://mcanet.mcga.gov.uk/public/c4/solas/solas\\_v/Annexes/Annex17.htm#imo](https://mcanet.mcga.gov.uk/public/c4/solas/solas_v/Annexes/Annex17.htm#imo)

<sup>28</sup>Interview with Jim Feldkamp, Founder JLF Solutions, National Defense University, Washington DC, May 19, 2016.

painted on boats for poor fisher-folk, as envisaged in some of the E-IOR states, much less the expensive transponders would present an objectionable burden. For example, though some of the maritime security agencies in a few nations in the E-IOR may possess technology to track small vessels, that technology does not always work in bad weather or at night. Further, even with systems in place to track small vessels, there is agreement among maritime stakeholders that without any specific, prior information about a small vessel threat, it is extremely challenging to detect any kind of malicious activity on their part. Thus, it remains a daunting task to determine whether a small vessel may be used to smuggle weapons or terrorists, including WMDs into the E-IOR or as a direct delivery of an improvised explosive device on a coastal establishment by water. To further complicate the matter, these threats are not static and are constantly evolving. To effectively address them, it is requisite that policymakers remain abreast of the changing nature of the problem, counter measures, and regularly improve the response mechanisms.<sup>29</sup>

Ship-boarding agreements between individual states, mainly under the Proliferation Security Initiative (PSI) spearheaded by the United States, could be another possible tool to counter nuclear or radiological trafficking if there is reliable prior intelligence targeting a specific vessel. However, this clashes with the United Nations Convention on the Law of the Sea (UNCLOS) – as the latter does not permit boarding of a ship flying a flag of any nation without the concerned nation’s explicit permission – and hence, still remains largely unacceptable to many nations. Nonetheless, there have been numerous instances of ship boarding on the high seas by various countries this side of the new millennium. Table 1 provides a brief list of some of the major instances reported.

**Table 1. Major Interdictions of Weapons and Weapon Technology in the Maritime Domain.**

Incident Name and Year	Interdicting Nation	Results/Findings
2014 - Operation Full Disclosure <sup>30</sup> 2014 - <i>Victoria</i> Affair <sup>31</sup> 2009 - Francop Affair <sup>32</sup> 2002 - <i>Karine A.</i> Affair <sup>33</sup>	Israel	Long-range missiles destined for Gaza  Weapons, radar systems, etc.
December, 2009 <sup>34</sup>	Thailand	Shipment of mixed arms & missile technology

<sup>29</sup>Das, *ibid*, p.81.

<sup>30</sup>“Israel Navy Raid Seizes Gaza-Bound Iranian Arms,” *The Indian Express*, March 5, 2014.

<http://indianexpress.com/article/world/middle-east-africa/israel-naval-raid-seizes-gaza-bound-iranian-arms>

<sup>31</sup>“Israel Navy Uncovers Weaponry On-Board Cargo Vessel,” Israel Ministry of Foreign Affairs, March 15, 2011.

[http://www.mfa.gov.il/mfa/foreignpolicy/terrorism/palestinian/pages/israel\\_navy\\_uncovers\\_weaponry\\_cargo\\_vessel\\_15-mar-2011.aspx](http://www.mfa.gov.il/mfa/foreignpolicy/terrorism/palestinian/pages/israel_navy_uncovers_weaponry_cargo_vessel_15-mar-2011.aspx)

<sup>32</sup>White, Jeffrey, “Iran and Hizballah: Significance of the *Francop* Interception,” *The Washington Institute for Near East Policy*, *PolicyWatch*, No.1600, November 12, 2009. <http://www.washingtoninstitute.org/policy-analysis/view/iran-and-hizballah-significance-of-the-francop-interception>

<sup>33</sup>Whitaker, Brian, “The Strange Affair of *Karine A.*,” *The Guardian*, *World News*, January 21, 2002.

<https://www.theguardian.com/world/2002/jan/21/israel1>

<sup>34</sup>Sanger, David E. and Thomas Fuller, “Officials Seek Destination of North Korean Arms,” *The New York Times*, December 13, 2009. <http://www.nytimes.com/2009/12/14/world/asia/14thai.html>

September, 2009 <sup>35</sup>	South Korea	North Korean anti-chemical clothing
2003 - <i>BBC China Case</i> <sup>36</sup>	Germany	Uranium centrifuge parts
2002 - <i>So San Incident</i> <sup>37</sup>	Spain (based on US intelligence)	15 Scud missiles

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<sup>35</sup>Nikitin, Mary Beth, Mark E. Manyin, Emma Chanlett-Avery, and Dick K. Nanto, "North Korea's Second Nuclear Test: Implications of U.N. Security Council Resolution 1874," Congressional Research Service, 7-5700, R40684, Federation of Atomic Scientists, April 15, 2010. <https://fas.org/sgp/crs/nuke/R40684.pdf>

<sup>36</sup>Boese, Wade, "Key U.S. Interdiction Initiative Claim Misrepresented," *Arms Control Today*, July 1, 2005. [https://www.armscontrol.org/act/2005\\_07-08/Interdiction\\_Misrepresented](https://www.armscontrol.org/act/2005_07-08/Interdiction_Misrepresented)

<sup>37</sup>Munson, Mark, "The Current State of Maritime Global Counter-Proliferation," Center for International Maritime Security, Reprinted July 8, 2014. <http://cimsec.org/the-current-state-of-maritime-global-counter-proliferation/6373>

## 5 POTENTIAL SOURCES OF NUCLEAR AND RADIOLOGICAL MATERIALS

Nuclear materials are attractive and, therefore, governments, institutions, and other police forces, have taken measures in physical protection, insider threat procedures and policy, to keep these materials under regulatory control and to prevent their theft, sabotage, or misuse. However, slight the chance, the world community must be prepared for any eventuality, and hence the need for mitigation measures to protect nuclear materials.

Charles Ferguson and William Potter in their book, *The Four Faces of Nuclear Terrorism*, observe that with respect to stolen nuclear devices or improvised nuclear devices (INDs) as of 2004 only a few groups can pursue an act of nuclear terror and possibly none are able to meet all the criteria for carrying out an attack in a foreign country incident.<sup>38</sup> However, former US Senator Sam Nunn highlighted the concern about tactical nuclear weapons before the Senate Foreign Relations Committee thus: “Tactical nuclear weapons are another piece of unfinished business. These weapons have never been covered in arms control treaties. We can only guess at the numbers in each other’s inventories as well as the locations. Yet these are the nuclear weapons most attractive to terrorists—even more valuable to them than the fissile material and much more portable than strategic warheads.”<sup>39</sup>

Theoretically, an active, unmated warhead or inactive weapon could be far more easily transported by terrorists. However, these devices are given the utmost in handling, protection, and security. Furthermore, and fortunately, the financial backing and technical knowhow required for a terrorist group to detonate an intact nuclear weapon would be a tremendous challenge. It would require buying a weapon, raiding a weapons storage site, and covertly transporting the weapon to its intended target. Though the process is extremely difficult as mentioned, it is conceivable if a few critical factors can be taken care of by the terror organization.

For example, a state might voluntarily share or sell a nuclear weapon to terrorists for various reasons, including sympathy. Under another scenario, a senior government official with access to the weapons might hand them over for ideological or other motives without government consent. Or, the immediate custodians of the weapons under duress, financial gratification, or ideological causes may help the terrorists lay their hands on the weapons. A well-trained terrorist group could possibly take the weapon from a guarded location by force or stealth. Finally, nuclear weapons could fall into the hands of terrorists at a time of political turmoil in a country that may have suffered a coup or some other kind of major unrest.

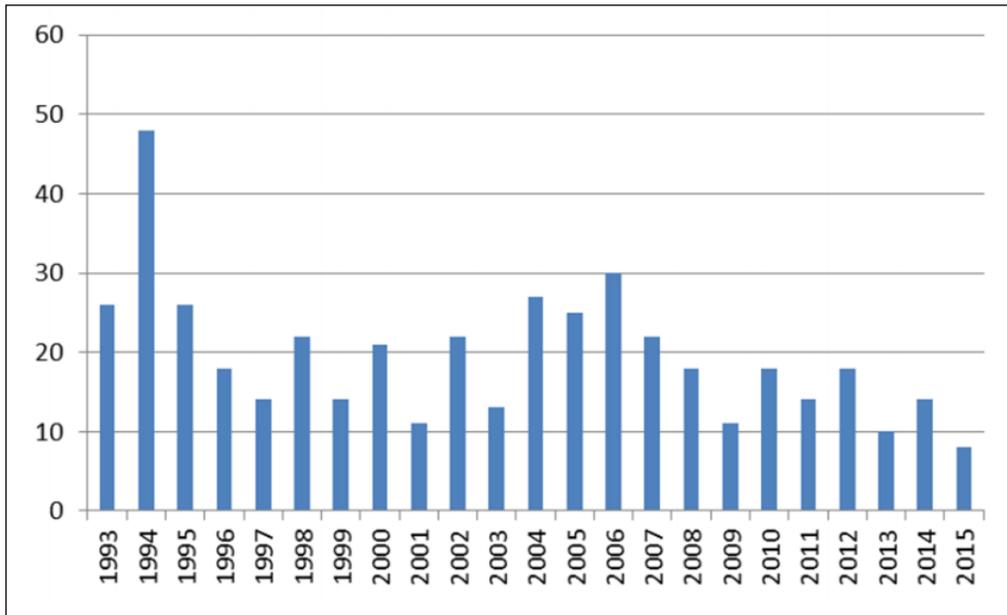
Figures 3 and 4 show statistics on record with the IAEA relating to different types of instances where the nuclear or radiological material was discovered out of the regulatory control of

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<sup>38</sup>Ferguson, Charles D., William C. Potter, and Amy Sands, *The Four Faces of Nuclear Terrorism*, Routledge, New York, 2005.

<sup>39</sup>US Senate, Committee on Foreign Relations, “The Treaty Between the United States of America and the Russian Federation on Strategic Offensive Reductions,” Testimony by Sam Nunn, Co-Chairman of the Nuclear Threat Initiative, July 23, 2002. Accessed May 23, 2016. <https://www.gpo.gov/fdsys/pkg/CHRG-107shrg81339/html/CHRG-107shrg81339.htm>

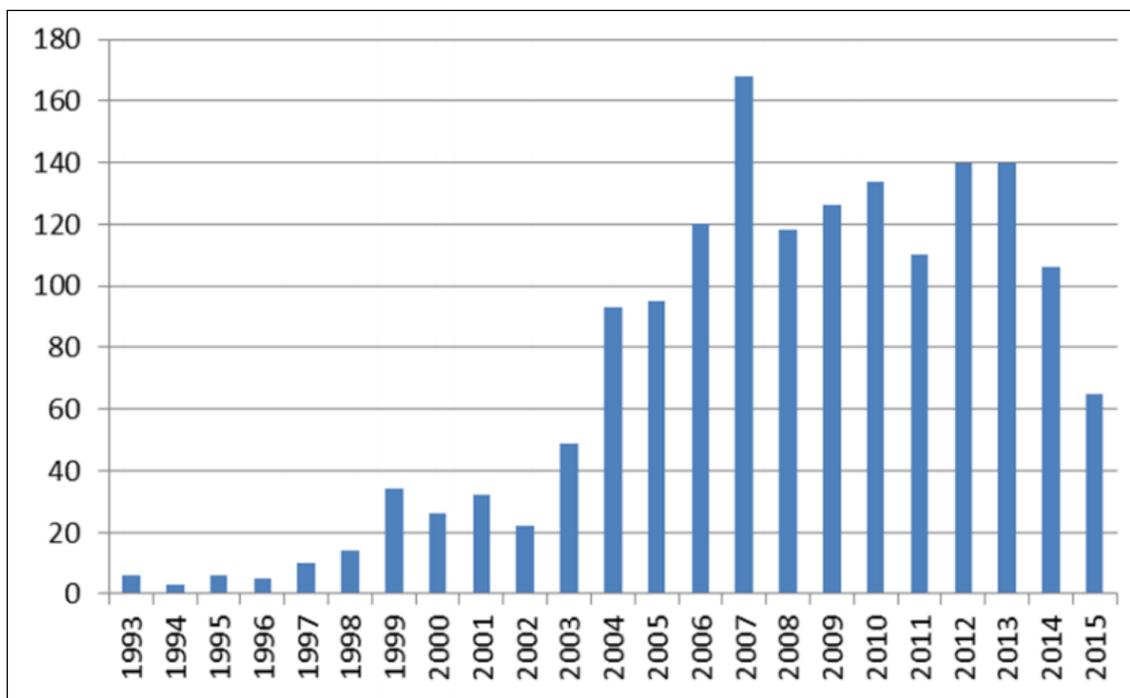
authorities. Incidents included here involve the illegal possession and movement of nuclear material or radioactive sources and attempts to sell, purchase, or otherwise use such material for illegal purposes. The persistence of these incidents indicates a continuing nuclear or radiological security concern. It is often due to a time lag between the incident occurring and the reporting of the same that figures for the latter years look lower than those for earlier years.<sup>40</sup>



**Figure 3. Confirmed Incidents Involving Unauthorized Possession and Related Criminal Activities, IAEA, 1993-2015.<sup>41</sup>**

<sup>40</sup>IAEA, ITDB Database. <https://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf>

<sup>41</sup>IAEA, *ibid.*



**Figure 4. Incidents Involving Other Unauthorized Activities and Events, IAEA, 1993-2015.<sup>42</sup>**

The majority of incidents involving “other unauthorized activities or events” fall into one of three categories: the unauthorized disposal (e.g., radioactive sources entering the scrap metal industry), unauthorized shipment (e.g., scrap metals contaminated with radioactive material being shipped across international borders), or the discovery of radioactive material (e.g., uncontrolled radioactive sources). The occurrence of such incidents may point to deficiencies in the systems used to control, secure, and properly dispose of radioactive material. There is evidence that the increase in reporting of these incidents in the 2003-2005 periods is related to the increased number of radiation portal monitoring systems that were deployed at national borders and scrap metal facilities. However, over the last 10 years the number of reported incidents of this kind has stabilized to between 100 and 140 incidents per year. It is often due to a time lag between the incident occurring and the reporting of the same that figures for the latter years appear lower.<sup>43</sup>

In April 2013, a North Korean official told his US counterpart that Pyongyang might be prepared to take physical action such as testing or transferring nuclear material to others if the United States did not agree to a non-aggression pact and other concessions.<sup>44, 45</sup> Although North Korea did not

<sup>42</sup>IAEA, *ibid.*

<sup>43</sup>IAEA, *ibid.*

<sup>44</sup>Kessler, Glenn, “N. Korea Says It Has Nuclear Arms at Talks with US, Pyongyang Threatens ‘Demonstration’ or Export of Weapons,” *The Washington Post*, April 25, 2003. [https://www.washingtonpost.com/archive/politics/2003/04/25/n-korea-says-it-has-nuclear-arms/43bc7e65-2c2a-407e-bf71-64e9e52ac3c9/?utm\\_term=.7dd99a55ad2f](https://www.washingtonpost.com/archive/politics/2003/04/25/n-korea-says-it-has-nuclear-arms/43bc7e65-2c2a-407e-bf71-64e9e52ac3c9/?utm_term=.7dd99a55ad2f)

<sup>45</sup>Sanger, David E., “North Korea Says It Now Possesses Nuclear Material,” *New York Times*, April 25, 2003. Accessed May 22, 2016. <http://www.nytimes.com/2003/04/25/international/asia/north-korea-says-it-now-possesses-nuclear-arsenal.html>

specifically mention sales to terrorists or sales of intact nuclear weapons, such statements are highly disturbing, especially in view of its past ties to international terrorism and history of selling strategic goods, in particular ballistic missiles, to the highest bidder. Such transactions raise the risk that Pyongyang may decide to sell nuclear materials, either directly or indirectly, to terrorist groups. Thus, every effort must be made to close any gaps in the security architecture as rapidly as possible.

If terrorists are unable to acquire an intact nuclear weapon, or are daunted by the numerous challenges the mission entails, they may instead seek to acquire fissile material by diversion, force, or purchase to craft a crude nuclear bomb or Improvised Nuclear Device (IND).

Fissile material could possibly be acquired by terrorists in a variety of ways:<sup>46</sup>

1. Deliberate transfer by a national government.
2. Unauthorized insider assistance: Government official or facility custodian.
3. Looting during times of political or social unrest.
4. Licensing fraud.
5. Organized crime. For example, a criminal gang in Ecuador stole five Iridium-192 sources from Esmeraldas, northern Ecuador.
6. Theft from facilities. For instance, a theft in three Russian lighthouses in the Arctic region, housing radioisotope thermoelectric generators (RTGs).
7. Transportation links. For instance, a Sandia National Laboratories report from October 2003 cautions that “during transfer, SRSs [sealed radioactive sources] are particularly susceptible to theft since the sources are in a shielded and mobile configuration, transportation routes are predictable and shipments may not be adequately guarded.”<sup>47</sup>

Sources containing a large amount of radioactivity have the potential to create a more harmful Radiological Dispersal Device (RDD) than those containing a source with a small amount. High-activity sources include radioisotope thermoelectric generators (RTGs), tele-therapy machines, blood irradiators, industrial radiography equipment, food irradiators, and irradiators used in research applications.

Furthermore, according to the IAEA, there are certain radioisotopes which pose great security risks as they can be lethal even if carried in small quantities. There are varying methods of dispersing them to cause maximum damage, but they all have high specific activities per gram of material, exposure to which is harmful to living beings. A few examples are provided in Table 2.

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<sup>46</sup>Ferguson, Charles D., William C. Potter, and Amy Sands, *The Four Faces of Nuclear Terrorism*, Routledge, New York, 2005.

<sup>47</sup>Cochran, John R., Susan Longley, Laura Price, and Kendra Lipinski, “The Adequacy of Current Import and Export Controls on Sealed Radioactive Sources,” Sandia National Laboratories Report, SAND2003-3767, October 2003. [http://infoserve.sandia.gov/sand\\_doc/2003/033767.pdf](http://infoserve.sandia.gov/sand_doc/2003/033767.pdf)

**Table 2. Harmful Radioisotopes.<sup>48</sup>**

<b>Radioisotope</b>	<b>Specific Activity (Curies/gram)</b>	<b>High Energy (HE) Alpha Emissions</b>	<b>HE Beta Emissions</b>	<b>HE Gamma Emissions</b>
Cobalt-60	1,100	NA	Low energy	Yes
Caesium-137 Barium-137m	88 540 million	NA NA	Low energy Low energy	NA Yes
Iridium-192	>450 (std.) >1,000 (high)	NA NA	Yes Yes	Yes Yes
Strontium-90 Yttrium-90	140 550,000	NA NA	Yes Yes	NA Low energy
Californium-252	536	Yes	No	Low energy

The likelihood of terrorists to construct and use a RDD or a Radiological Exposure Device is higher than the likelihood of using an IND. Radioactive material in the form of commercial radioactive sources are used by virtually every nation in various applications, such as cancer treatment, industrial radiography, oil well logging, and scientific research. Although some naturally occurring radioactive substances such as radium are employed, most commercial applications use radioactive materials that are produced in particle accelerators and nuclear reactors. The accelerator-produced materials tend to be short-lived and generally do not last long enough to present an RDD threat. Of the dozens of radioisotopes in use, only a small number of these radioisotopes are sufficiently energetic to pose a high health concern. If terrorists intend to use unshielded nuclear waste, such as spent fuel, the material would likely be lethal to them long before an RDD attack could be implemented. Although an unlikely possibility, if the spent fuel has been out of the reactor long enough, and the amount of radioactive fission products contained within the spent fuel is relatively small, then it may be plausible to handle.

Easily transportable sources are vulnerable to theft from a legitimate user. High-dose-rate brachytherapy devices used to treat cancer, for example, are quite portable and may contain radioactivity sufficient to raise security alarms. Industrial radiography equipment, gauging sources, and smoke detectors are also small and can be carried easily, but as the first houses relatively high radioactivity compared to the other two, smuggling becomes a risky venture.

The sources that contain readily dispersible radioactive material present a greater RDD risk than those sources that use less dispersible, solid materials. For instance, Cesium-137 in large radioactive sources is usually in the form of powdered Cesium Chloride and could potentially, but

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<sup>48</sup>Ferguson, *ibid.*

inefficiently, be dispersible. The IAEA Illicit Trafficking Database (ITDB) highlights Cobalt-60, Cesium-137, Iridium-192, and Strontium-90 as isotopes frequently found in illegal transactions. Although Uranium tops the list of radioactive materials detected in illicit trafficking, Cesium-137 is the second-most common, with 53 seizures between 1993 and 1998, which contributed to 22.6% of all radioactive material seizures worldwide. These are all gamma and beta emitters that are easier to detect than alpha emitters, which implies that many alpha emitters are possibly being missed at security stations.<sup>49</sup> As a note, alpha particles are easily shielded, even by paper, but if ingested they can cause internal damage to lungs and other organs.

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<sup>49</sup>Ferguson, *ibid.*

## 6 ACTIVE TERROR GROUPS IN THE E-IOR AND FORMS OF MARITIME TERRORISM

In the E-IOR, along with the Golden Triangle of Myanmar, Thailand, and Laos in the vicinity there is a strong nexus between narcotics, arms, and terrorist organizations. The resultant cocktail of narco-terrorism could likely be a catalyst for further maritime terrorism in the region, which includes the inland and coastal states.<sup>50</sup>

In recent history, we have seen that the presence of the Liberation Tigers of Tamil Eelam (LTTE) militants posed a problem for India's internal security as they started indulging in the smuggling of goods, including drugs and arms, to sustain their war in Sri Lanka. They also smuggled Sri Lankan refugees from India to other nations. LTTE smugglers diversified into the trafficking of narcotics and drugs in the coastal areas of the E-IOR nations; and, in more recent years, they have turned to the trafficking of arms, explosives as well as people in Myanmar, Bangladesh, Thailand, and the entire E-IOR seaboard.<sup>51</sup>

The Prime Minister of Singapore, Lee Hsien Loong, has called Southeast Asia a "key recruitment area for ISIS."<sup>52</sup> Terrorism, however, is not new to Southeast Asia. For much of the Cold War, the stability of the region was under duress from the various religious and militant groups operating there. Ever since the 1990s, sub-state militant extremism has had a major increase as a response to both the modernization of many Southeast Asian nations as well as radical Islamic influence.

There are a number of terrorist organizations active in the region, which could be a source of grave concern as they have all demonstrated some degree of maritime capabilities, some more advanced, some less so. They are briefly described, below:

- **Jemaah Islamiyah (JI)** has long dominated Indonesia's terror landscape, and is responsible for the 2002 Bali bombings, among other things. Its mission is to establish an Islamic Caliphate in Bali. After a decade-long police crackdown on the group, JI as a whole is currently dormant. Today the JI has fragmented into the Jemaah Anshorut Tauhid (JAT) in 2008, and a sub-group called the Jamaah Ansharusy Syariah (JAS) in 2014. Both are in favor of the implementation of the Islamic law known as the Sharia, but they differ in terms of their stance towards the ISIS. The JI has been active in the maritime zone and exhibited interest in attacking large vessels traveling through the Malacca Straits. It had apparently planned to attack US naval warships in the region around 2001.<sup>53</sup> Recent in the southern Philippines the JI has been

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<sup>50</sup>Satyavir Singh, "Terrorism and Counter-terrorism Challenges in South Asia: Challenges and Policy Options," *India Quarterly: A Journal of International Affairs*, July 2002, Vol. 58, No. 3-4, p. 151.

<sup>51</sup>Das, Pushpita, "Coastal Security Arrangement: A Case Study of Gujarat-Maharashtra Coast," *IDSA Occasional Paper No. 6*, November, 2009, p. 19.

<sup>52</sup>Al Makhzoomi, Khairuldeen, "Terrorism in Southeast Asia and the Role of Ideology," *THE BLOG*, Huffington Post, March 10, 2016, Updated Mar 10, 2017. Accessed April 29, 2016. [http://www.huffingtonpost.com/khairuldeen-al-makhzoomi/terrorism-in-southeast-as\\_b\\_9396942.html](http://www.huffingtonpost.com/khairuldeen-al-makhzoomi/terrorism-in-southeast-as_b_9396942.html)

<sup>53</sup>Mydans, Seth, "Singapore Details Terrorist Plot to Bomb U.S. Ships and Soldiers," *New York Times*, January 11, 2002. Accessed June 25, 2016. <http://www.nytimes.com/2002/01/11/international/singapore-details-terrorist-plot-to-bomb-us-ships-and-soldiers.html>

training to develop capabilities for underwater destruction.<sup>54</sup>

- The **Moro Islamic Liberation Front (MILF)** in the Mindanao area is one of the most active and largest groups in the Philippines demanding an independent Islamic state within that nation. They have been negotiating with the Filipino government for more autonomy for Muslims in the area. A breakaway faction called the Bangsamoro Islamic Freedom Fighters (BIFF) has the same goals but has conducted attacks to discourage any peace treaties. The MILF has been held responsible for attacking shipping in the Philippines, mainly placing bombs on inter-island ferries. The group has handed over the first batch of arms in 2015 as part of a peace process agreed with the Philippine government earlier in 2012.<sup>55</sup>
- **Abu Sayyaf Group (ASG)** was originally inspired by the Al Qaeda and sought to establish an Islamic Caliphate, as well, but changed its focus later to raise money for arms through kidnappings. ASG was responsible for what has been labeled the most lethal maritime terrorist incident since the *USS Cole* attack - viz., its attack on the *MV Superferry 14* in Manila in 2004, resulted in the death of more than one hundred persons.<sup>56</sup> ASG is suspected to have links with other IS-related groups in the region and suspected of supporting their activities, for example, ties with Mujahidin Indonesia Timur and the JI.
- The **Gerakan Aceh Merdeka (GAM)** or Free Aceh Movement attacked an Exxon Mobil vessel in 2002 in Aceh. Being resource hungry like the other groups, it has conducted some kidnap-for-ransom operations off the Indonesian coast.<sup>57</sup>

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<sup>54</sup>Raymond, Catherine Zara, "The Threat of Maritime Terrorism in the Malacca Straits," published by the Jamestown Terrorism Monitor. Accessed June 12, 2016.

<http://www.conflicts.rem33.com/images/terrorism/Raymond.htm>

<sup>55</sup>"MILF Rebels Hand Over Arms in the Philippines," BBC News, June 16, 2015. <http://www.bbc.com/news/world-asia-33144749>

<sup>56</sup>Raymond, *ibid.*

<sup>57</sup>"The Roots of Piracy in Southeast Asia," APSNet Policy Forum, The Nautilus Institute, October 22, 2007. Accessed July 10, 2016. <http://nautilus.org/apsnet/the-roots-of-piracy-in-southeast-asia>

## 7 COMBATTING TERRORISM AND PIRACY IN THE E-IOR

Over the last thirty years, only two percent of all terrorist attacks have been maritime-related, as a RAND database has determined.<sup>58</sup> High cost, unpredictability of the waters and expertise required have been some of the factors which have not allowed maritime terrorists to so far exploit the oceans to their full potential. Adding to this are the relatively low publicity of maritime attacks. Despite these considerations, concerns about sea-borne terrorist attacks have been heightened the world over. After much study of the patterns of maritime terrorism, the primary potential targets for terrorist attacks seem to be commercial centers, ports and other strategic facilities, and ships.

1. **Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP)** – Finalized on November 11, 2004 and in force since September 4, 2006, ReCAAP is the first regional intergovernmental pact to combat piracy and armed robberies at sea in Asia. Its members are termed Contracting Parties and till date there are twenty. They are Australia, Bangladesh, Brunei, Cambodia, the People’s Republic of China, Denmark, India, Japan, South Korea, Laos, Myanmar, the Netherlands, Norway, Philippines, Singapore, Sri Lanka, Thailand, the United Kingdom, the United States of America, and Vietnam. It received formal recognition on January 30, 2007 as an international organisation. The ReCAAP Information Sharing Centre (ISC) serves as a platform for information exchange between member countries; facilitates communications and information exchange to improve response time to incidents through a secure web-based Information Network System (IFN); analyses statistics of the piracy and armed robbery incidents that help governments understand the Asian scenario better; focuses on improving capacity building efforts; and conducts joint exercises with like-minded parties. The ReCAAP-ISC was launched in Singapore on November 29, 2006. Through the IFN, the ReCAAP Focal Points (which are basically nodal agencies of the countries that are part of the ReCAAP) are connected to one another and simultaneously to the ReCAAP-ISC at all times, and facilitate necessary responses to incidents. Each country responds to the incident report as per its own policies and procedures, and helps out the victim ship wherever feasible. The agency of the particular nation that receives the incident report, in turn, informs their ReCAAP Focal Point, which then submits the report further to the ReCAAP-ISC and neighboring Focal Points.<sup>59</sup>
2. **Malaysia, Singapore, and Indonesia(MALSINDO)** - This is a trilateral patrol force started in 2004 to counter piracy in the Straits of Malacca and functions in territorial waters by the Malaysian, Singaporean, and Indonesian Navies. The agreement was made onboard the Indonesian warship *Kri Tanjung Dalpele* on July 20, 2004. An official permission from any of the three countries is all that is required for a vessel of one country, including warships, to pursue pirates into the territorial waters of the country giving the permission. Ships of other nations can join in these patrols with prior permission from all three governments. Each Navy has agreed to provide five to seven ships for patrolling in the region as part of the

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<sup>58</sup>Greenberg, Michael D., Peter Chalk, Henry H. Willis, Ivan Khilko, David S. Ortiz, “Maritime Terrorism, Risk and Liability,” RAND Center for Terrorism Risk Management Policy, RAND Corporation, Santa Monica, 2006, p.9.

[http://www.rand.org/content/dam/rand/pubs/monographs/2006/RAND\\_MG520.pdf](http://www.rand.org/content/dam/rand/pubs/monographs/2006/RAND_MG520.pdf)

<sup>59</sup>About the ReCAAP and the ReCAAP Information Sharing Centre (ISC). Accessed June 13, 2016.

<http://www.recaap.org/AboutReCAAPISC.aspx>

operation, and has established a hotline for better coordination as well, particularly during times of hot pursuit. Indonesia and Malaysia had earlier denied a Singaporean proposal to include a fourth country, viz. the United States, to participate in patrolling the strait, as they considered it a type of extra-regional foreign intrusion. But they agreed to accept US help in the form of advice, equipment, and training.<sup>60</sup> In addition to joint maritime patrols, Indonesia, Malaysia, and Singapore also started joint aerial patrolling over the Straits.<sup>61</sup>

3. **Malaysian Maritime Enforcement Agency (MMEA)** - Regional states have also undertaken efforts to increase their own naval capabilities. The year 2004 saw the genesis of another brainchild of the Malaysian government, the MMEA, which is similar to the Coast Guard of a country, and patrols the Malaysian maritime zone. The MMEA runs around forty vessels and takes responsibility for a significant portion of the Malacca Straits. The Royal Malaysian Navy has also added several patrol vessels and mine warfare units over the last decade-and-a-half. As pirate activity in the Straits peaked, the Thai Navy became seriously involved in countering this scourge by starting maritime police operations, its budget increasing significantly since 2000. Additionally, several nations of Southeast Asia have agreed to participate in various fora with extra-regional countries. In 2002, the Republic of Singapore Navy ordered its first locally-built *Formidable*-class frigate. The rest of Singapore's Navy went through a major facelift simultaneously. In early 2005, Indonesia also announced plans for the expansion of its Navy, by the addition of 60 patrol vessels, along with an expanded maritime air patrol capability. Indonesia has also started programs to dissuade piracy, thus attempting to weed out the problem from its root.<sup>62</sup>
4. The inauguration of the **Information Management and Analysis Centre (IMAC)** at Gurgaon, India on November 23, 2014 was setup after the heinous Mumbai attacks of 2008 to function as the focal point of various radars and sensors planned to be installed along the roughly 7,500 km Indian coastline. As part of the Coastal Surveillance Network (CSN), IMAC tasks include analyzing maritime information, including satellite imageries, to ensure a flawless surveillance of the entire coastline. The Center is part of the National Command Control and Communication and Intelligence Network (NC3IN). Twenty Naval and 31 Coast Guard stations developed jointly by the Indian Navy, the Indian Coast Guard, and the Bharat Electronics Limited (BEL) are connected by this network. Presently, the IMAC has the ability to track movements of vessels between the Persian Gulf and the Straits of Malacca and trigger of any alarms in case of suspicious activity.<sup>63</sup>
5. The **US-India Joint Strategic Vision for the Asia-Pacific and Indian Ocean Region** was launched during Obama's India trip in January 2015.<sup>64</sup> US backing has been very much present

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<sup>60</sup>"Going for the Jugular," *The Economist: Shipping in South-East Asia*, Singapore, June 10, 2004.

<http://www.economist.com/node/2752802>

<sup>61</sup>Southgate, Laura, "Piracy in the Malacca Strait: Can ASEAN Respond?" *The Diplomat*, July 8, 2015.

<http://thediplomat.com/2015/07/piracy-in-the-malacca-strait-can-asean-respond>

<sup>62</sup>Farley, Robert M., "Fighting Piracy: Experiences in Southeast Asia and off the Horn of Africa," *Journal of Strategic Security*, Volume 2, No. 1: February 2009, Article 1, p.9.

<sup>63</sup>Das, Pushpita, "Why Marine Police Remains the Weakest Link in India's Coastal Security System?" *IDSA*, New Delhi, November 26, 2014.

<sup>64</sup>Dipanjan, Roy Chaudhury, "India, US likely to Conclude White Shipping Agreement during PM Narendra Modi's Visit," *Economic Times*, June 2, 2016. <http://economictimes.indiatimes.com/industry/transportation/shipping/-/>

in the area, with the US providing financial support and facilitation of communication between countries in the region. A White House Press Statement from January 2015 among other things mentions, “We [*India and the USA*] will oppose terrorism, piracy, and the proliferation of weapons of mass destruction within or from the region.... We affirm the importance of safeguarding maritime security....” The US and India wish to build further on this Joint Strategic Vision and hence discussed expanding maritime cooperation to combat threats in seas in the form of a “white shipping agreement.”<sup>65,66</sup> The agreement aims to enhance data sharing on cargo ships, expanding US-India maritime cooperation, and partnership across the Indian Ocean region and the Pacific.

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[transport/india-us-likely-to-conclude-white-shipping-agreement-during-pm-narendra-modis-visit/articleshow/52545649.cms](http://transport/india-us-likely-to-conclude-white-shipping-agreement-during-pm-narendra-modis-visit/articleshow/52545649.cms)

<sup>65</sup>The White Shipping Agreement (WSA) establishes an information network protocol that allows the navies of both countries to exchange information about ships in their oceanic territories. Classified into white (commercial ships), grey (military vessels), and black (illegal vessels). The nodal center for WSA is the Information Management and Analysis Centre at Gurgaon, India. <http://byjus.com/free-ias-prep/white-shipping-agreement>

<sup>66</sup>“What is White Shipping and How Does It Help in India's Maritime Security?” Institute for Defence Studies and Analyses (IDSA) Ask an Expert, Posted on September 2, 2016. <http://www.idsa.in/askanexpert/what-is-white-shipping-and-how-does-it-help-in-india-maritime-security>



## 8 TECHNOLOGY AND METHODOLOGIES FOR DETECTING MATERIALS OF CONCERN

Shipping containers provide a potential window for terrorists to smuggle WMD material, illegal arms, stowaways, as well as illegal narcotics into a country. To counter threats of materials of concern, the United States Department of Homeland Security (DHS), for instance, conducted research and development for several container security technology projects. From 2004 through 2009, the US Department of Science & Technology spent approximately 60 million US dollars in Research & Development (R&D) for related R&D. They are the DHS Advanced Container Security Device (ACSD) that can detect intrusion on all six sides of a container; the more basic DHS Container Security Device (CSD) that detects the opening or removal of container doors only; the Department of Defense (DoD) Hybrid Composite Container (HCC) also detects intrusion on all six sides of the container using a lightweight sensor grid; and the DHS Marine Asset Tag Tracking System (MATTS) tracks individual containers. The ACSD and HCC technologies are still undergoing laboratory testing, but the CSD and MATTS are ready for operational environment tests, which will ultimately determine the feasibility of the use of these technologies in the real field of global supply chain from exporter to consumer. In most of the E-IOR nations, however, technologies such as these are far from ready and the security benefits from the utilization of these technologies is absent.<sup>67, 68</sup>

Preventing a nuclear or radiological attack by terrorists is a top priority. National efforts against water-borne nuclear smuggling have laid emphasis on established ports of entry, such as seaports and land border crossings at varying levels. A well chalked-out plan for installing radiation portal monitors (RPMs) and other similar radiation detection equipment at all border crossings and ports of entry in the E-IOR nations, including minor ports, is critical. The littoral nations should develop, acquire and deploy radiation detection equipment to bolster the efforts of the maritime security agencies. Examining nuclear detection strategies along other potential pathways in the architecture, including land border areas between ports of entry into the various nations, and small maritime craft, such as recreational boats, and commercial fishing vessels is of the essence.

There is limited scanning of containerized cargo entering seaports of a number of nations for nuclear and radiological materials. Smaller seaports that receive cargo are almost never equipped with RPMs. Increased cargo volumes may necessitate the installation of additional RPMs to avoid delays in moving cargo through the larger ports in which RPMs already exist in primary inspection lanes, through which the bulk of container traffic passes. These monitors are meant to detect radiation emanating from a package, vehicle, or shipping container and sound the alarm. The cognizant authorities then conduct secondary inspections to determine the cause of the alarm and decide whether it is of concern. Handheld radiation detectors complete the security shield and can be used to frisk individuals or smaller items in ports of entry. The maritime agencies, Customs

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<sup>67</sup>“Supply Chain Security – DHS Should Test and Evaluate Container Security Technologies Consistent with all Identified Operational Scenarios to Ensure the Technologies will Function as Intended,” GAO-10-887, September, 2010. Accessed June 23, 2016. <http://www.gao.gov/new.items/d10887.pdf>

<sup>68</sup>“Combating Nuclear Smuggling – DHS has Developed Plans for Its Global Nuclear Detection Architecture, but Challenges Remain in Deploying Equipment,” GAO-12-941T, July 26, 2012. Accessed June 23, 2016. <http://www.gao.gov/assets/600/593027.pdf>

inspectors, and other concerned authorities all ideally need to be equipped and trained with such tools.

AIS technology was originally designed to improve maritime safety, including the prevention of collisions among vessels. The system was designed to transmit identification, location, and maneuvering information (1) between vessels, and (2) between vessels and land-based stations that are typically within 20 to 30 miles of one another. AIS equipment, are generally required for larger vessels on international voyages. AIS is applicable for (1) self-propelled vessels over 65 feet long, other than passenger and fishing vessels that are engaged in commercial service; (2) passenger vessels of 150 gross tons or more; (3) tankers, regardless of tonnage; and (4) other vessels of 300 gross tons or more on international voyages. IMO requirements for the installation of AIS equipment include passenger vessels irrespective of size, vessels that weigh 300 gross tons or more on international voyages, and cargo vessels of 500 gross tons or more not on international voyages.<sup>69</sup>

The Long Range Identification and Tracking (LRIT) system is an international system that uses onboard radio equipment to transmit identification and position information to satellites. From the satellites, the information is forwarded to ground stations and then on to recipient countries, including those in the E-IOR. While the system requires cooperation from the vessel, i.e., the radio equipment must be turned on, it is a closed system in that only countries with rights can receive the information. As a flag state, the contracting government may purchase LRIT information on a vessel anywhere in the world as long as the vessel is entitled to fly its flag. As a port state, a contracting government may purchase LRIT information on a vessel calling at its port after the vessel has indicated its intention to do so, unless the vessel is within the internal waters of another contracting government. As a coastal state, the contracting government may purchase LRIT information on a vessel that is within a specified distance—not more than 1,000 nautical miles—off the coastal state’s baseline, unless the vessel is within its territorial sea or the internal waters of another contracting government.

The gravity of the risks associated with smuggling materials of concern should be reason enough to implement the such technologies with utter seriousness, careful thought, prior implementation experiences from malafide activities, and with a dash of common sense thrown into the fray. Nations stand a far better chance of stemming smuggling of materials of concern with the use of superior technology and equipment, and to remain one step ahead of miscreants in this game.

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<sup>69</sup>International Maritime Organization, “AIS Transponders.”  
<http://www.imo.org/en/OurWork/safety/navigation/pages/ais.aspx>

## 9 CONCLUSIONS

The following key conclusions from this study form the sum and substance of the concerns demanding attention associated with smuggling nuclear and radiological materials in the Eastern Indian Ocean Region.

- Pirate-terrorist collaborations are likely to occur and can be malignant – Although there is no proven nexus operating between piracy and maritime terrorism, the link between the two is plausible and is a definite concern for Southeast Asian security strategists.
- The same routes used for trafficking of SALW, human beings, and drugs can be used for smuggling radiological material – If there can be harmful materials like drugs or even human beings slipping past the scanners of border authorities through certain routes, whether because of insider collusion or a lack of appropriate monitoring abilities, it is quite likely that materials of concern might also be smuggled using the same routes.
- Small vessels are largely going unchecked and/or unregistered – Most small vessels below 300 gross tons do not have AIS systems on board and do not have any IMO registration numbering. They are extremely hard to track and can serve as ideal conduits for terrorists to ferry materials of concern.
- A host of minor ports and coastal areas are far from secure – There are many long stretches of coastline all along South and Southeast Asia, including minor ports, which are still not thoroughly patrolled 24 hours per day, year round.
- Dated technology and training used in most littoral E-IOR states – Most states of the E-IOR, with the exception of a few, do not have the necessary manpower, strong Navies, and up-to-date technologies such as RPMs, Handheld Radiological Detectors, and so on, to be able to check smuggling effectively.

Taking into consideration the seriousness of the conclusions described above, there are some potentially effective methods to address these serious concerns. Recommendations are outlined in the following section.



## 10 RECOMMENDATIONS TO COUNTER POTENTIAL SMUGGLING OF MATERIALS OF CONCERN IN THE E-IOR

No stone can be left unturned to design and implement potential and robust anti-terror mechanisms and technologies, especially in the maritime vector. There is absolutely no margin for error, for chinks in the armour, or for leaving an Achilles' heel exposed in the raging battle against terror. The plan must be chalked-out at multiple levels, from the grassroots and most local to all-encompassing international engagement.

Educating small vessel stakeholders about E-IOR maritime security is important. This would include providing national fora for small vessel stakeholders and government officials to brainstorm and exchange ideas on countering small vessel threats in the maritime domain and prepare a report for public, industry, and government to work together on national-level decisions that could effectively detect, deter, and defeat small vessel threats in the E-IOR.

It is instrumental to develop a strong partnership with the small vessel community, the public and the private sectors in order to bolster maritime domain awareness; use a layered and innovative approach to empower organizations dealing with maritime security; leverage current technologies to neutralize small vessel threats; and to put into place an effective “3C approach” of better communication, cooperation, and coordination between all maritime security stakeholders in a country, the private sector, and international partners on radiological and nuclear detection and interdiction; and explore research and development of a permanent sensor and monitoring system to detect and track unknown, suspicious, or non-cooperative vessels. Further, when it comes to technologies such as RPMs, cost-sharing arrangements could be made whereby the government of the concerned country and port operators could share the cost of extra portal monitor deployments.

The following are a few suggestions, none of which are foolproof as standalone, but each one can be imagined as a strand of thread in a spider web, that helps weave a complete and effective security system to timely apprehend smugglers.

1. **“Neighbourhood Watch”**: An important factor that could be an impediment to the effective functioning of a coastal security architecture is the discontent among fishermen. However, if a cooperative atmosphere is fostered, the fisher-folk and other coastal locals can be the “eyes and ears” at the grassroots level of the coastal security architecture, and therefore, an integral part of the overall effectiveness of the system. Keeping the fishermen happy and cultivating them for the same purpose is of the essence. A good example is that of the fishermen groups in India, christened Sagar Suraksha Dal<sup>70</sup> (a loose translation in English would be Sea Security Force), comprising of trained volunteers who monitor the seas and coastal waters, share information about any suspicious activities or vessels at sea with security and law enforcement agencies, and also participate in coastal security exercises conducted by the Indian Coast Guard (ICG). They can be incentivized in one way or another, even if that means something as seemingly small (but important to them) as providing phone credits or data for participation. By extension, state authorities should

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<sup>70</sup>Shubhlakshmi Shukla, “Sagar Rakshak Dal to Monitor Fishing Vessel Movement,” *The Indian Express*, October 12, 2009. <http://archive.indianexpress.com/news/sagar-rakshak-dal-to-monitor-fishing-vessel-movement/527805>

increase awareness among the populace about what measures have been adopted in the maritime security domain and the agencies involved in monitoring security systems without giving out sensitive information. Apart from the goal of countering the threat of trafficking of radiological and nuclear materials, this system is applicable against any kind of illegal foreign intrusion and resultant illicit trade in narcotics, human trafficking, SALW, and so on.

2. **Monitoring:** There needs to be a comprehensive system of tracking the thousands of fishermen and their fishing boats and trawlers out in the seas every day to ensure a gapless security of a nation's coastal areas. The fact that ten Pakistani terrorists hijacked a small Indian fishing vessel, the *MV Kuber*, disguised as Indian fishermen after killing the real crew is a source of security concern, as that event culminated in the 26/11 Mumbai terror attacks.<sup>71, 72</sup> In India, fishing trawlers equal to or greater than 20 metres in length are currently being fitted with AIS Class B transponders (slightly lower performance standards as compared to the Class A). As for smaller fishing vessels, fitting them with the Radio Frequency Identification Device (RFID) should be seriously considered. Also, colour codes can be assigned to them for easy visual identification at sea, with different colours used for vessels from different regions of a country. If funds allow, Distress Alert Transmitters (DATs) should be provided to fishermen so that they can alert the maritime authorities if they are in distress at sea. Even the simple use of mobile phones with an appropriate "app" can lead to more effective signaling methods in times of crises. Attempted detection of anomalies, though a Herculean task, is of the essence.
3. **Increase Coordination:** The number of agencies working in the same domain should be reduced to a bare essential. Standard Operating Procedures (SOPs) are required to be formulated between all responsible agencies to achieve an optimum level of coordination for coordinated patrol and the conducting of combined operations. Joint coastal security exercises involving all the maritime stakeholders should be regularly conducted in all the coastal states nationally and in multi-national partnerships as well.
4. **Increase Manpower and Resource Allocation:** The shortage of manpower and adequate technology is directly proportional to lack of resources. Countries having insufficient funds for such programs either need aid to have good defence systems in place or channel funds towards maritime security programs when they are able. Schemes to recruit newly retired Navy, Customs, or Coast Guard personnel may alleviate the problem.

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<sup>71</sup>US Congressional Hearings, "Protecting the Homeland Against Mumbai-Style Attacks and the Threat from Lashkar-E-Taiba," Subcommittee on Counterterrorism and Intelligence; Committee on Homeland Security; House, Committee on Homeland Security Serial No. 113-21, Washington, June 12, 2013.

<https://www.gpo.gov/fdsys/pkg/CHRG-113hhr85686/html/CHRG-113hhr85686.htm>

<sup>72</sup>Prepared statement of Christine Fair, "Antecedents and Implications of the November 2008 Lashkar-e-Taiba (LeT) Attack Upon Several Targets in the Indian Mega-City of Mumbai," RAND Corporation Testimony Series; Testimony presented before the House Homeland Security Committee, Subcommittee on Transportation Security and Infrastructure Protection on March 11, 2009. <https://www.rand.org/pubs/testimonies/CT320.html> (Part of Congressional Hearing before the Subcommittee on Transportation Security and Infrastructure Protection; Committee on Homeland Security entitled "Mumbai Attacks: A Wake-Up Call for America's Private Sector," 2009, p.41. <https://www.gpo.gov/fdsys/pkg/CHRG-111hhr49944/pdf/CHRG-111hhr49944.pdf>

5. **Improve Training:** An insufficient number of trained personnel adept at sea patrolling and maritime combat operations is yet another problem that plagues some countries. Training should be more in sync with world events and the responsibilities entrusted upon officials.
6. **Regular Patrols:** Difficult terrain, seasonal weather patterns, administrative lapses and other issues all contribute towards introducing gaps in surveillance and monitoring mechanisms. One of the areas along the Indo-Bangladesh coast, and a good example of this kind of a problem are the Sunderbans, as discussed earlier. It is a daunting challenge to check the entire area at all times.<sup>73</sup> However, regular patrolling along its whole stretch is must, come rain or shine, supported by regulations that allow them to do so.
7. **More and Comprehensive Research:** It is crucial to gauge the problem in its entirety and ascertain possibilities of proliferation of nuclear or radiological material from source point to end point. That is, from where they could be manufactured or acquired by terrorists, to putting checks on how they can possibly be shipped, whether using containers or using small vessels harder to track, and by paying attention to those countries which may be seeking such material.
8. **Comprehensive Policy for Maritime Security:** This requires interest at the upper echelons of government. Once there is legislative backing for a comprehensive maritime security system, it is far easier to construct it in a nation. Current regulations and legislations in most E-IOR countries do not address the threat of radiological and nuclear weapons.

Timely following some or all of these suggestions could possibly provide a much-needed denouement, and greatly reduce chances of a nuclear or radiological attack causing death and destruction, the kind which mankind cannot afford. There needs to be the strictest controls in place and security agencies of every nation fighting this scourge must compulsorily be highly vigilant for any indicators of trafficking of such devastating material. Hopefully can we then look forward to a bright, safe, and prosperous future for all in the Eastern Indian Ocean Region and, by extension, the rest of the world.

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<sup>73</sup>Das, *Coastal Security: The Indian Experience*, op. cit., p.78.



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