# Future Issue

## Maritime Piracy

# Maritime Piracy in Brief

In this Future Issue, the focus will be on a threat that by its largely unregulated, opaque and anarchic nature has a profound impact on the maritime realm: *Piracy*. Over 80% of global trade is conducted by sea, with over 46.000 large vessels and around 4.000 large ports making up today's maritime transport system. The maritime environment is nearly 2.5 times larger than our planet's terrestrial surface, composing a complex network of high seas, territorial waters, estuaries and river systems. Piracy occurs in largely ungoverned areas where lawlessness and poor monitoring are the norm. The security challenges arising from piracy are multifaceted and affect a wide array of actors. Piracy not only constitutes a direct threat to the physical security of the shipping crew, piracy also has a direct economic impact in terms of theft of goods, stores and even ships, fraud, delaying effects resulting in higher costs, increased insurance premiums or alterations of international shipping routes. The purpose of this Future Issue is to provide an analysis of the underlying drivers of piracy, a trend analysis, threats, mitigation strategies and the future implications of this phenomenon for security and business interests.

# Drivers - Explaining Variations in Piracy

Piracy is the "*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*".[1]

| Indicators |
| --- |
| Increase in violence at sea; more hijacking of ships and hostage taking of crew; more professionalised attacks; increasing profitability; rise in corruption |
| **Drivers / Underpinning mechanisms** |
| Weak government authority; geographical characteristics; weak international regimes; pirates' increased capabilities and adaptability; profitability increase |
| **Impact on security / business** |
| Increased probability of conflict; threat to economic and physical security; potential re-routing trade flows; possibilities for innovative security measures |

Assessing the future course of a complex phenomenon as piracy is difficult. In this Future Issue, we will use the structural framework shown in figure 1. This framework uses the three main drivers of piracy: *opportunity*, *capability* and *target,* to analyse the developments in relation to piracy. These drivers are not only influenced by a combination of several underlying variables, they also mutually influence each other. It is this interplay between these variables that explain variations of piracy in place and over time.

## Opportunity

Opportunities for criminals to commit acts of piracy arise from a variety of interrelated variables, including weak local government authority, particular geographical characteristics and the weak implementation of international maritime regimes or standards for state behavior.

### Government Authority

Piracy flourishes in areas with weak government authority. The lack of government authority often coincides with underfunded law enforcement agencies, such as police forces and coastal guards, which lack the necessary equipment and personnel to carry out their duties and are thus faster induced to corruption. Naval law enforcement is expensive and consists of radars, boats, command and control centers, as well as well-paid incorruptible personnel with knowledge of the local area. This is usually outside the budget of affected countries. Limited funding for law enforcement agencies leads to high levels of corruption, a typical characteristic of weak and fragile states. In places where government authority has ceased to exist, predation and lawlessness form the foundation for pirates to organise and engage in attacks.



**Figure 1: Framework Underlying Drivers of Piracy**
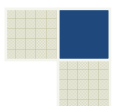
Such areas, which are in the dominion of failed states, are also called ungoverned territories or "black holes". Areas can turn into "black holes" during military conflict (e.g., Lebanon, 1975) or after a military conflict from which no single victory has emerged (e.g. Somalia, after 1991).[2] Therefore, weak local government authority is a key determinant of piracy. It is often closely correlated with underlying factors such as bad governance, and lack of economic development. Lack of authority, capability and political will to combat and prosecute pirates can lead to a further breakdown of its already weak state structures.

*Geography*
Piracy is often associated with somewhat romantic images of rogues with eye patches sailing the high seas under a Jolly Roger flag, but this false image does not correspond to reality today. Piracy attacks usually take place close to coasts or in narrow seas. The vicinity of coasts provides pirates with a safe haven to escape to after an attack. Pirates prefer to attack vessels sailing through narrow seas, since vessels often reduce speed when transiting through such maritime chokepoints. Such chokepoints therefore provide excellent 'hunting grounds' for pirates. However, international waters also provide latitude for pirates. Shipping companies are better insured in these waters and are therefore faster inclined to pay ransom. This means that every maritime zone in the Sea Lines of Communication (SLOC) used for trade, logistics and naval forces becomes vulnerable.

*International Regimes*
Pirates are aided by the absence of a global law enforcement agency and the weak implementation of UN resolutions and maritime security regimes. The 1982 United Nations Convention on the Law of the Sea (UNCLOS) was established as a regulatory maritime regime comprising 320 articles and nine annexes, and is ratified by 157 states as of 28 September 2008.[3] UNCLOS governs all aspects of ocean space, such as the delimitation of maritime zones, the sovereign rights and jurisdictional powers of coastal states in these zones and provides a definition on piracy.[4]

In 1988, the convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation (SUA) came into force. This treaty, which is currently ratified by 150 states, specifically focuses on the security dimension of the maritime environment[5]. It is designed to ensure that "appropriate action is taken against persons committing unlawful acts against ships" and compels states to make more efficient use of national legal

standards.[6] Another international maritime regime, the International Ship and Port Facility Security (ISPS) Code, was adopted in 2004. The Code provides a "standardized, consistent framework for evaluating risk" and describes the minimal requirements for the security of ships and port facilities.[7]

As far as specific maritime regimes go, UN Security Council Resolution 1816, adopted by the Council in relation to piracy off the coast of Somalia, authorises states to "[e]nter the territorial waters of Somalia for the purpose of repressing acts of piracy and armed robbery at sea" and to "[u]se, within the territorial waters of Somalia all necessary means to repress acts of piracy and armed robbery," in fact extending the acts normally permitted at the high seas to the territorial waters, with respect to piracy.[8] Unfortunately, however, so far only a few countries whose naval vessels patrol off the coast of Somalia did this. The International Maritime Bureau (IMB)[9] and the International Chamber of Shipping (ICS) have both stated that there is a "lack of political will" and "abrogation of responsibility" by governments with naval forces capable of acting against Somali-based pirates.[10] Apart from the question whether it is in fact feasible to saturate coast lines of piracy hot spots, the eventual cooperation is dependent on the priority states attach to the threat posed by piracy.

It is interesting to note that there is a trend toward more regional agreements in maritime security, instead of relying on the traditional international regimes (i.e. UNCLOS, SUA) alone. For example, on September 4th 2006 the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) came into force. ReCAAP was initiated as the first regional government-to-government agreement to promote and enhance cooperation between sixteen regional countries to combat piracy and armed robbery in Asia[11]. It lays out a framework for cooperation among member countries, with information sharing, capacity building and cooperative agreements as its main pillars. In addition, the South Asia Regional Port Security Cooperative (SARPSCO), composed of nine member countries, was launched on 19 May 2008 to oversee port and maritime security in the Indian Ocean.

When it comes to dealing with the threat of piracy, states continue to prioritise individual security concerns and to hold on to traditional prerogatives. They guard their sovereignty in territorial waters and are reluctant to enforce international security regimes allowing other states' patrol vessels within their coastal zones. With the
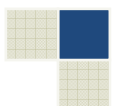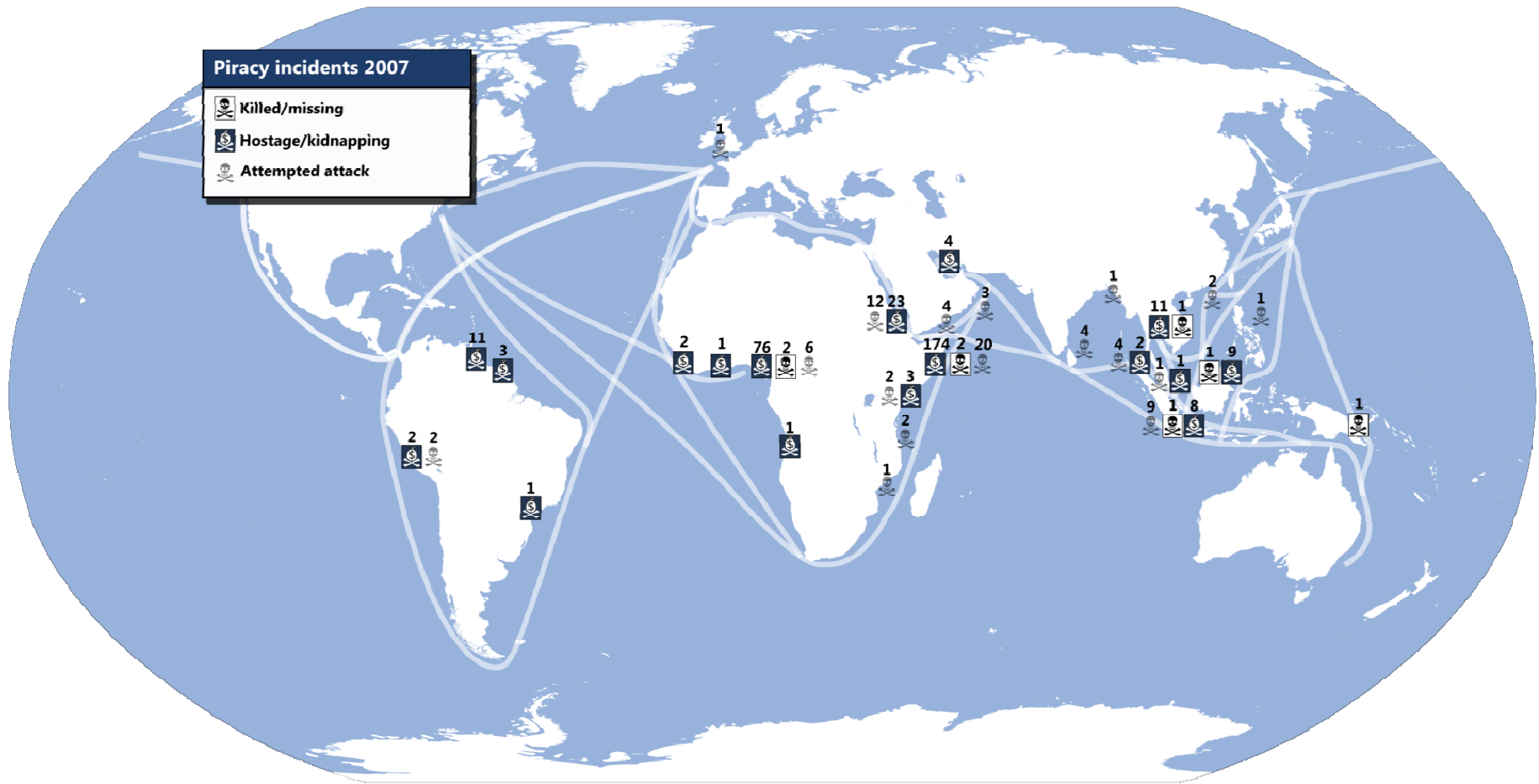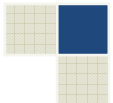
**Figure 2: Major Shipping Routes and Piracy Hotspots in 2007**. Source: IMB (2007); HCSS (2008)

exception of the coast of Somalia, international law upholds the concept of the coastal states' rights in its territorial waters making it difficult to effectively combat piracy. The idea of a global maritime partnership to unite maritime forces, commercial seafarers and international and governmental agencies, the so-called "1000-ship navy"[12], seems far away from becoming reality. As can currently be observed in Somalia, the UN Security Council agreed to authorise escorts for World Food Programme humanitarian shipments; yet only a few countries actually committed themselves to this operation so far.

## Capability

The capability of pirates to attack vessels is a function of the technology and arms they have at their disposal. Faster vessels and more lethal weaponry allow pirates to wage attacks farther from coastlines on a wider variety of vessels. The proliferation of arms and technology after the end of the Cold War, which boosted the black arms market, has tremendously enhanced the capabilities of pirates. Where in the past pirates used knives and guns, today, according to Noel Choong, a director at the IMB, "they come equipped with AK-47s, M-16s, rifle grenades and [rocket-propelled grenades]."[13] Thus, piracy attacks are getting more serious and more violent, leading to an increased awareness amongst policy makers, authorities, insurers and sea farers to combat this threat.[14]

## Target

The type of target chosen by pirates depends on the opportunities and capabilities of the pirates, as well as to what extent target ships are actually 'suited' to attack. The majority of the vessels under attack are the ships above 10,000 Grosse Registered Tonnage (GRT) such as general cargo vessels, container ships, chemical and production tankers as well as oil tankers. It appears that bulk carriers were less targeted in 2007 and 2008 YTD[15] than in previous years.

*Protective measures*
The extent to which ships use technology and protection against piracy varies significantly and with this the chance to fall victim to an attack. Piracy can be prevented via surveillance mechanisms and through actively detecting pirates early and fending them off with non-lethal means. Some non-lethal mitigation strategies and breakthrough technologies that can be used as security measures are elaborated on later in this Future Issue.

*Profitability*
The majority of pirates are ultimately driven by profit motives.[16] Piracy will be around as long as there are profits to be made in the piracy business. The vast majority of piracy attacks are committed by petty thieves who often operate along clan or family lines. More professionalised organisations kidnap crews for ransom or steal the commodities transported by the vessels, and in some cases even hijack the entire vessel. They have a great and growing number of high value targets due to a massive increase in commercial maritime traffic over the years. While the value range varies significantly, it is estimated that pirates at present pocket an average of $10,000 USD per attack for a classical armed robbery attack.[17] However, the going rate for ransom payments is between $300,000 USD and $1.5 million USD.[18] A dramatic recent example is the seizure of the Ukrainian ship *MV Faina* - carrying 33 T-72 tanks and other military equipment - for which a ransom of $ 20 million USD is demanded.[19] Profit rather than poverty is the driver of piracy, although poverty produces a larger pool of willing recruits. This happened in the aftermath of the Asian financial crisis of 1997-1998, for example, when severe political instability and massive unemployment induced poor workers to seek for illegal means. Piracy opportunity and profitability are not only enhanced by an increase in the size of world trade transported by sea, it is also influenced by the increased willingness of companies and insurers to pay ransom for their crews and the tradability of stolen commodities.

## Trends of Contemporary Piracy

Piracy is of all eras but comprehensive piracy records have only been kept for a short period of time. This makes it difficult to confidently identify clear trends over time.[20] Moreover, scholars in the field of piracy point to the limitations of collecting statistics on actual and attempted piracy attacks.[21] In spite of these limitations, a short term trend analysis covering the period 2003-2008 YTD[22] is illustrative.

On the basis of IMB data, after 1998 there has been a rise in reported and attempted piracy attacks worldwide peaking in 2000 and 2003. Thereafter the number of reported attacks has begun to revert to the levels of the late 1990s (see figure 3). However, in the last half year there is a spectacular rise in piracy incidents off the coasts of Somalia and Nigeria. Besides, these attacks are increasingly getting more violently and professionally executed than a few years ago, resulting in increased
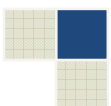
media attention for and thus public awareness of this phenomenon.
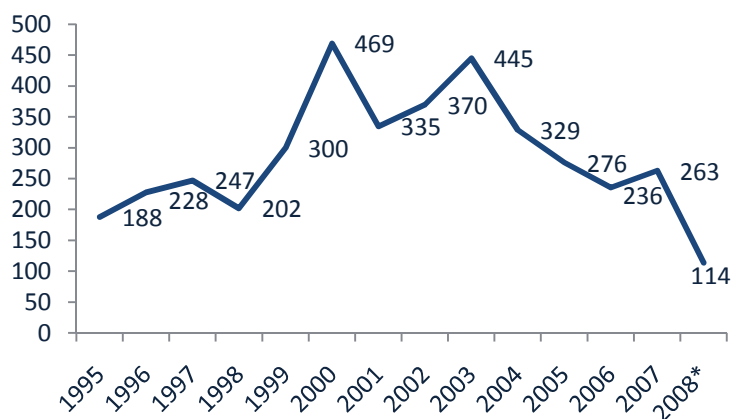


**Figure 3: Recorded actual and attempted piracy incidents worldwide since 1995 onwards.**
Source: IMB (2008). *Year-To-Date: 30 June 2008.*

### Physical Security

The physical and psychological consequences of piracy attacks are serious. It is estimated that from 1995 to 2006, around 510 persons were killed or are presumed dead, approximately 3.300 seafarers were held hostage, over 120 were kidnapped, nearly 500 were seriously injured and hundreds more were threatened with guns and knives.[23] In most cases, the act of piracy falls in the category of armed robbery, where pirates board the ship and remove the valuables from the crew. During the last two years there has been a slight increase in attacks committed for purposes of hijacking a ship and kidnapping crew members for ransom. Especially in Somalia and the Gulf of Aden region, this type of violence accounted for 70% of the world total in 2007 and 80% in 2008.

Figure 4 depicts the number of piracy attacks per region and the amount of people kidnapped or taken hostage. In these attacks, the preferred types of weapons are machine guns and RPGs, indicating that pirates are becoming increasingly violent in these areas.

### Geographic Location

The waters off Indonesia, the Caribbean and Latin America were amongst the highest risk areas in 2003, but witnessed a significant decrease in piracy in the following years (90% and 95% respectively). The Malacca Straits have also seen a decrease in reported piracy attacks during the last couple of years (from 38 reported attacks in 2004 to 7 in 2007). The opposite occurred in

Nigerian waters (from 12 reported attacks in 2006 to 42 in 2007) and the Somalia, Gulf of Aden, Red Sea region, where there has been a significant increase of piracy activity over the last one and a half years (from 20 reported attacks in 2006 to over 90 as of 30 June 2008). Reported incidents in the Indian Subcontinent including India and Bangladesh, remained relatively stable, but are still responsible for a large proportion of total incidents worldwide (averaging around 45 incidents per year since 2003).

Most piracy incidents worldwide take place near fragile or failed states, where there exist large ungoverned areas, weak state structures and 'black holes'. These areas include Somalia, Nigeria, the Indian Subcontinent and areas in the South China Sea. Figure 5 illustrates the ports and anchorages with the most piracy incidents worldwide.

## The Evolution of Piracy

In the past, the majority of piracy attacks could be described as moderate or low level, but over the years there has been a shift towards more advanced, sophisticated and professionalised forms of piracy. Although most piracy attacks are conducted for purposes of economic gain, the politically motivated piracy should not be overlooked.

### Moderate, Low-Level Piracy

The bulk of attacks take place in bays, estuaries and archipelagos, where favourable geographic circumstances offer the best opportunities for pirates.[24] In regions where targets are close to shore, berthed in ports or sailing through swampy river systems, such as the Niger Delta, South American Amazon and Malacca Straits, low-level piracy is dominant. Obviously, these geographical characteristics are not only present in those areas, e.g. the Everglades and Northern Territory share these as well. However, the former are characterised by a high degree of lawlessness, poverty and a range of other variables that drive piracy, which have been discussed earlier. Pirates are often armed with only knives and pistols operating from rubber boats or small wooden motor boats. The intention of these armed culprits, occasionally disguised as naval officers or harbour police, is to ransack and remove the crew of their valuables before disappearing again in the darkness and protection of their proximate sanctuaries. In the majority of cases, violence is limited to assault and threatening of victims.
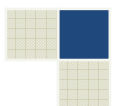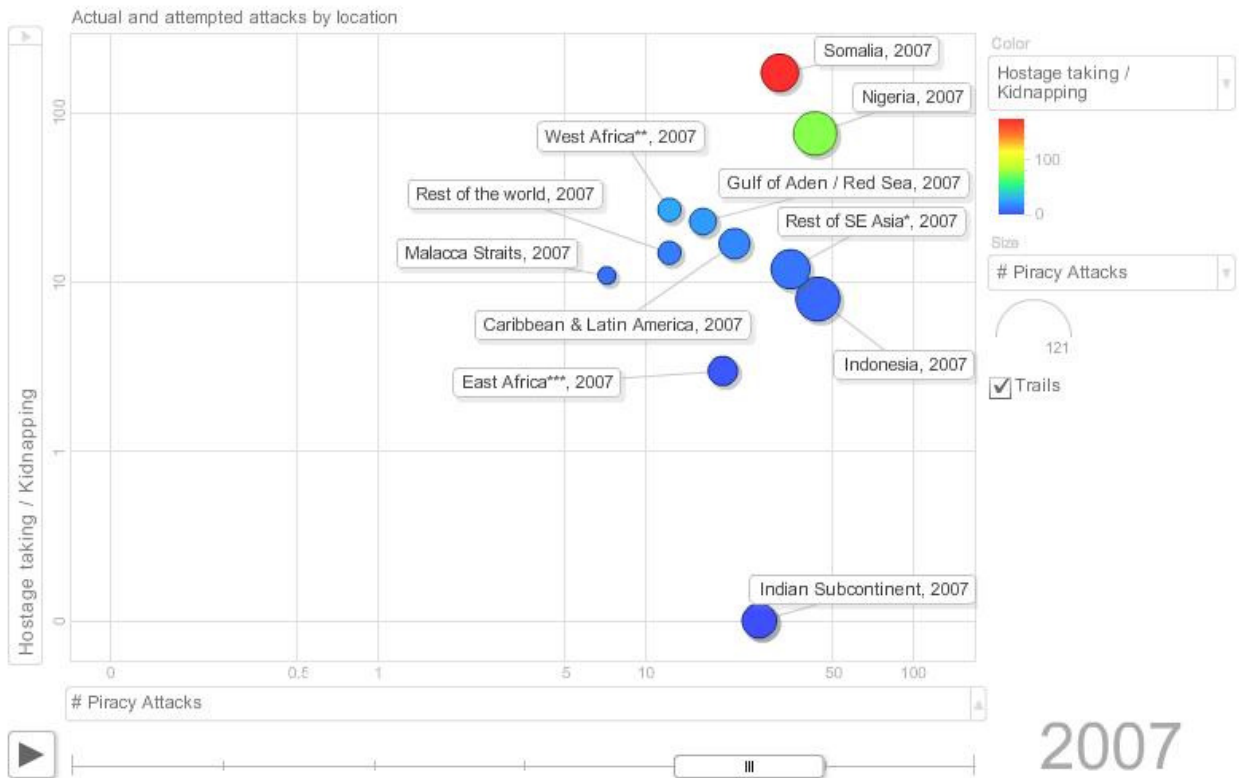
**Figure 4: Number of Piracy Attacks and Hostage Taking / Kidnapping by Region in 2007.** Source: IMB (2007); HCSS (2008)
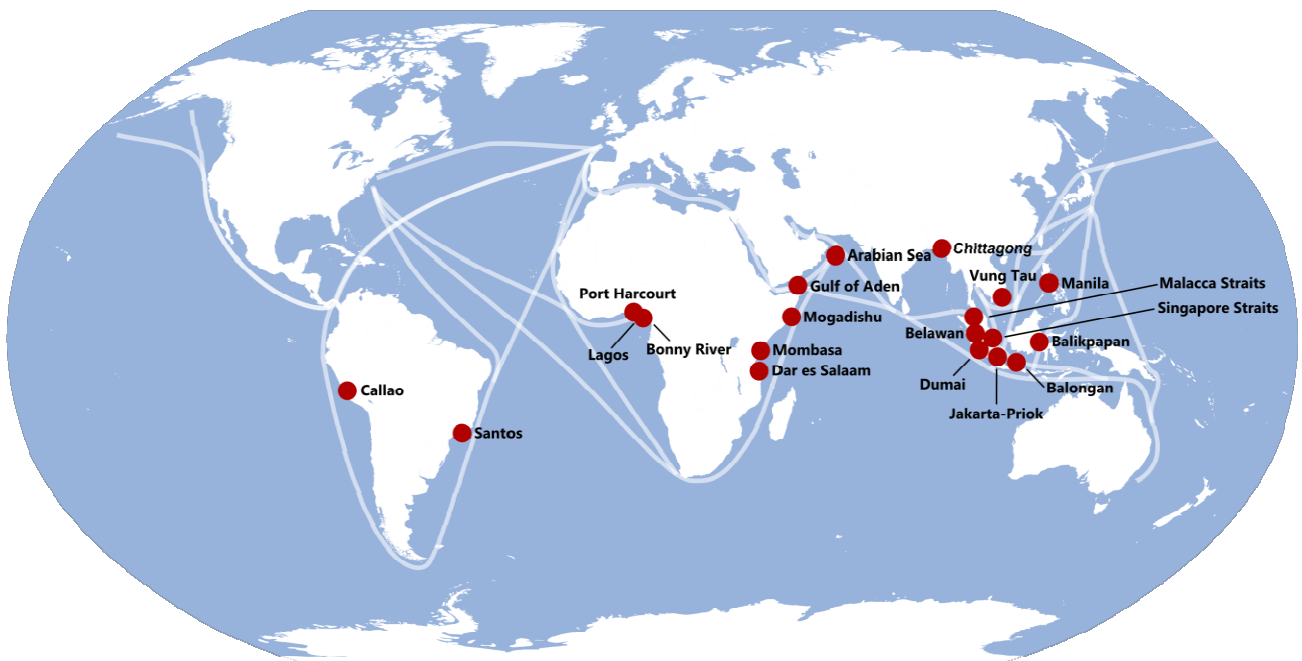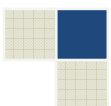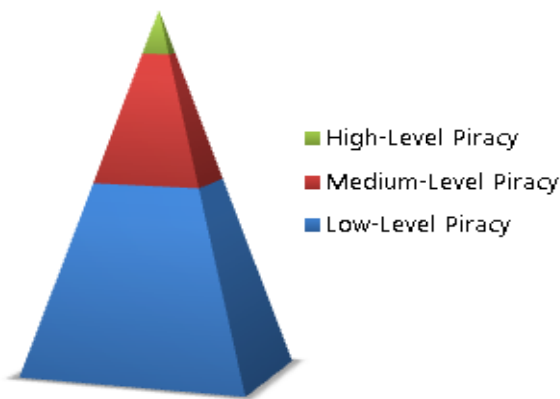


**Figure 5: Overview of Ports and Anchorages with High Piracy Activity.** Source: IMB (2007); HCSS (2008)

**Figure 6: Indicative Relative Distribution of Each Type of Piracy.** Source: HCSS (2008)

## Advanced, Medium-Level Piracy

Over the last several years, there seems to be a rise in the level of violence. Pirates are increasingly using heavier firearms and occasionally end up in gunfights with local authorities and naval forces. Mostly, the raids are hit-and-run attacks, but next to personal valuables specific cargo are stolen as well. Therefore, it seems that pirates' intelligence is getting better. Occasionally, crew members are the prime target for demanding ransom or are used as bargaining chips for the release of political rebels. By using high-speed boats these armed assaults not only take place in close proximity to shore, but also at ships anchored several nautical miles off coast or even in the exclusive economic zone (see figure 7). An interesting observation is that in the last year in some areas, for example in Nigerian waters, pirates are becoming more audacious, even committing attacks in broad daylight.
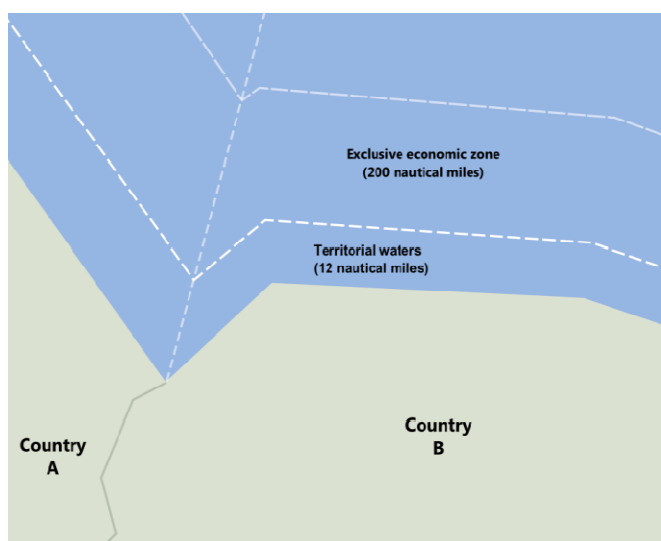


**Figure 7: International Maritime Boundaries.** Source: HCSS (2008)

## Professional, High-Level Piracy

In some areas there is a rise of a particular type of pirate, with an even more sophisticated modus operandi than in the medium-level type of piracy. In the professional, high-level category, pirates use AK-47 automatic machine guns and rocket-propelled grenade launchers (RPGs) that operate from so-called 'motherships' to launch smaller crafts on the high seas, allowing pirates to target vessels farther out at sea.[25] At present, the poorly policed waters off the Somali coast, Gulf of Aden, the Philippines and Southern India are particularly prone to this type of attack. The use of these mother ships has the implication that the 'threat-zone' for ships has expanded significantly. A few years ago this 'threat-zone' was approximately 50 NM off coast, but is already around 200 NM off coast Somalia for example.[26] These pirates tend to favour larger vessels, above 10,000 GRTs, in order to commit major criminal hijackings and kidnapping of ship and crew.[27] The preference for large ships can be explained by the fact that they yield some important advantages for the pirates. They generally have more crew on board to kidnap or take hostage, meaning a higher ransom, and usually carry goods and commodities, such as palm oil and sugar, which sell fast on the market.[28] Also, shipping companies that are attacked in international waters have, in general, a greater willingness to actually pay ransom, since they are better insured in such waters.

## Politically Motivated Piracy

In certain cases piracy attacks are politically motivated. This manifestation of piracy differs significantly from the varieties described earlier. These types of pirates are better described as militants attacking ships or oil facilities as a result of local grievances. In some cases these piracy attacks may constitute resembles maritime terrorism. Their modus operandi classifies them in the medium-level and high-level forms of piracy. For example, the well trained and equipped Movement for the Emancipation of the Niger Delta (MEND) uses M-16 assault rifles, AK-47 machine guns, bombs and RPGs to attack government and oil industry targets.[29] A similar situation existed in the oil rich Indonesian province of Aceh, where the side effects of lucrative oil business in the country created comparable grievances and resistance amongst local population against foreign oil companies and central government. The so-called Free Aceh Movement (GAM) specifically targeted Exxon Mobil, which in the past led to multiple natural gas and oil production shutdowns at the refineries in the Lhok Seumawe Industrial Zone.[30]

## Impact of Piracy

Piracy not only directly hits seafarers and shipping crew, it also negatively affects general economic well-being, global trade and the insurance sector.

### Economic Impact

Integrated supply chains and Just-In-Time-management techniques are imperative in today's global economic environment, meaning that materials, components and commodities need to be at the place of arrival in the right amounts at the right time. Disruptions of supply chains and increased freight rates have strong implications for the companies involved and affect business confidence.[31] The IMB estimates that costs related to piracy vary between 0.01% and 0.2% of the annual value of maritime commerce which totals almost $ 8 trillion USD.[32] However, systematic studies to get a substantiated indication of the magnitude of economic costs have yet to be undertaken.[33] To date, contemporary piracy has resulted in only temporary ceasing or re-routing shipping trade flows. However, some argue that increased costs due to piracy can act as a non-tariff barrier to trade, because the costs of using dangerous ports can be sufficiently high that ship owners are dissuaded to ship cargo there, which in effect creates a form of boycott.[34] Value losses should also include the indirect economic costs that piracy poses. For example, begin October 2008, the European Union agreed to set up a costly anti-piracy military operation off the coast of Somalia. Eight countries, including the Netherlands, have already agreed to participate.

### Insurance Aspects

A string of piracy hotspots in the waters off Somalia, the Gulf of Aden, Nigeria and the Indian Subcontinent are currently marked as areas of enhanced risk, allowing insurance companies to levy an additional surcharge on vessels transiting these waterways up to 0.10 percent of the total value of their cargo while the baseline premium imposed on seaborne freight is 0.05 percent.[35] The affected shipping companies are increasingly pressing littoral states to improve the risk situation. For example, after the Malacca Straits were marked as very risky in 2005, shipping companies were forced to pay for this enhanced risk. To counter this additional burden, they demanded better control, more frequent patrols by the authorities and a better cooperation with neighbouring countries. Remarkably, in the years after the initiation of ReCAAP and the concept of the "Eye in the Sky" joint security-initiative to provide cooperative air surveillance over the Malacca Straits, piracy attacks in this region began to drop significantly. Consequently, some

insurance markets, such as Lloyds of London, reversed their previous decision and deleted the region from the list of enhanced risk areas.[36] Since costs of piracy are transferred to the insurance sector, it has actively supported initiatives for loss prevention and measures to combat piracy attacks. In response to different risk situations, varying types of coverage is being developed or adapted[37].

## Mitigation Strategies

Under current international maritime law it is forbidden for seafarers to carry firearms for self-defence.[38] With more sophisticated technology available to pirates, ranging from state of the art weapons to the fastest speed boats, there is a great incentive for shipping companies to increase their level of protection by other means. Depending on the type of target, type of attack, weapons used and geographical location, different solutions may be appropriate. In this section, an overview is given of breakthrough technologies in the maritime domain as well as non-technical risk control measures to avert and combat contemporary piracy. These mitigation strategies mainly aim to influence the driver 'target', as earlier described in the explanatory framework. In appendix B, a list of already broadly applied technologies is provided. Business opportunities exist in developing technologies that might be effective in the fight against piracy.

### Advanced Imaging Techniques to Detect Small Maritime Targets

A major advantage in fending off piracy attacks is to anticipate them as early as possible. An advanced imaging technique already applied in the maritime realm is called SeaDarq, which is able to detect small nearby objects in difficult weather conditions and sea clutter.[39] Although this application needs to have information derived from prior images to detect the backscatter signature, it can increase early detection capability. A technology that tries to circumvent the problem that prior imaging data is needed for proper detection is called polarimetric scheming. The so-called synthetic aperture radar (SAR) imaging technique has the advantage to distinguish targets from an obscure background and is sensitive to moving targets in all weather types and independent of daytime.[40] The applicability of this kind of technology for maritime surveillance is currently being researched and becomes particularly useful when it is able to detect a suspicious ship approaching at night miles away.

### LiDAR Technology and Harbor Facilities Protection

To protect ships berthed in ports or anchored several miles off coast, a threat detection system is needed that can easily spot suspicious activity close to the ship. The darkness of night, waves and small surface objects obscures clear detection with current sensor technology. However, so-called Light Detection And Ranging (LiDAR) technology works on the same principle as radar technology, but instead of microwaves, LiDAR uses pulses of light that reflect off the terrain and other objects to collect positional data of the target at pre-defined time intervals (see figure 8).[41] Although LiDAR is mainly used for environmental and ecological services - measuring climate change, flooding, erosion, et cetera - it has huge potential as a surveillance measure for harbour protection and offers berthed ships greater security coverage.
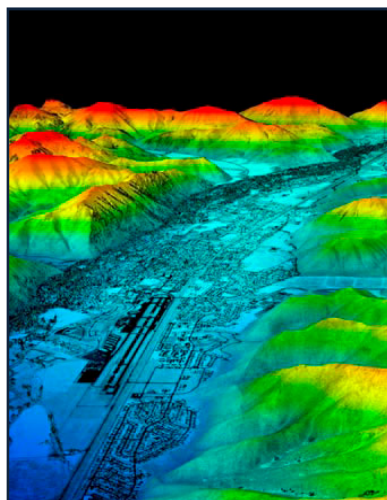


**Figure 8:  Image Data from LiDAR Technology.** Source: Science (2008)

### Deter Piracy with Acoustic Sounds: LRAD Technology

A Long Range Acoustic Device (LRAD) is capable of issuing long-range directed acoustic tones designed to influence behavior or determine intent. It can issue particular instructions in excess of 500 meters and is able to send out warning tones.[42] LRAD has already been deployed on US naval patrol forces in Iraqi ports, where it could effectively send out instructions to unknown vessels in shipping lanes and around oil terminals. When pirates tried to attack a large cruise ship on November 7, 2005, LRAD was used for the first time to foil the piracy attack. As part of the ship's defence system, the LRAD



**Figure 9: Passive Microwave Remote Sensing**. Source: Dill et al. (2007)

was activated when the pirates tried to attack with RPGs 100 NM off the coast of Somalia. Since the bombing of the USS Cole off Yemen in 2000, LRADs were quickly applied in the maritime environment to keep suspicious boats from approaching US warships.[43]

### Passive Microwave Remote Sensing

New technologies are emerging to improve surveillance and security of shipping. One technology is called 'passive microwave remote sensing.' This technology allows an unnoticed, non-destructive observation and examination of the objects of interest at any time of the day without artificial exposure under nearly all weather conditions.[44] Figure 9 shows the imaging result of a person carrying a concealed firearm under his clothing, which can be transparent even to millimeter-waves. Although currently mainly used at checkpoints to identify suspicious objects and anomalies during personal inspection, passive microwave imaging systems are potential candidates for complementary sensors in future maritime security applications. Still, to be of most value to seafarers, image data has to be delivered close to real time in order to anticipate quickly concordant with procedures of other surveillance tasks. In addition, the costs of new and innovative systems as a complement to existing ones have to be acceptable.

### Non-Technical Protective Measures

Up until now most high-tech equipment such as electronic tracking devices and high-voltage fences installed outboard the ship's rail have been only affordable for large merchant shippers.[45] Satellite based security systems (e.g. 'ShipLoc' and 'Maritime Domain Awareness') are becoming more interesting because of the relative low costs and their ability to easily identify and communicate data anomalies. It is able to alert the ship's crew, commander, and appropriate authorities if a suspicious vessel is approaching the ship. In addition to technical mitigation strategies, other security measures that can be taken by shipping companies are the following:[46]

- Development of a security risk briefing and de-briefing protocol for personnel deployed in piracy hotspots;

- Monitoring and tracking of security incidents and kidnapping cases in these hotspots to support decision making processes;
- Randomising timings of ship and personnel movements;
- Creation of security procedures and on board security drills and exercises;
- Development of Standard Operating Procedures (SOP's) to reduce the chances of kidnap and make vessels more secure. For example: gang way patrols, secure vital areas and systems, install lighting, install CCTV, maintain clear fields of view, etcetera;
- Installing a decoy safe with 'robbery money' aboard the vessel. The main safe and any document repository should be disguised;
- Doubling the deck watch when entering a risk area and keep non-essential personnel down below. Ship compartments should be secured when entering and transiting a risk area;
- Armour or 'harden' critical shipboard systems and operating spaces by installing bullet proof glass and Kevlar blankets. This will stop small arms fire; even anti-RPG meshing could be put up.

## Conclusion – Future Piracy

Based on our analysis, the following factors will influence the future developments of piracy:

- The number of areas characterized by weak governmental authority, with underfunded law enforcement agencies, no law enforcement agencies at all (so called "black holes");
- The willingness of a leading state or group of states to tackle piracy is crucial for the effectiveness of international regimes and their implementation;
- The extent to which states will value traditional security concerns and hold on to traditional prerogatives – i.e. national sovereignty in territorial waters – or whether they will allow other states' patrol vessels to enter their coastal zones to deal with the non-state threat of piracy;
- The profitability of piracy, which is a partly a function of the size of world trade and the seas as major hub of transportation of world trade (currently 80 % of world trade is transported over seas);
- The choice of sea routes by vessels as piracy attacks predominantly take place along coasts or in narrow seas which are currently navigated by commercial vessels; Re-routing of SLOC is only likely to happen if

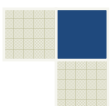piracy attacks keep increasing in maritime chokepoints.
- The proliferation of modern arms and technology in enhancing the capacity of pirates;
- Protection and safety measures implemented by ports and ships;
- The extent to which organized criminal organisations will concentrate on piracy as a source of income (opposed to the present where attacks are still predominantly waged by petty thieves).

In conclusion, the level of interaction between the various drivers and variables as determinants of piracy is complex. Yet, all are fundamentally related and a change in one factor will generally have an effect on the other factors. Technologies already prevalent in the military realm and the aviation industry are increasingly used in the maritime environment, but further efforts are required to improve their usefulness in countering piracy. Meanwhile, such efforts are ongoing and industry is continuously testing new technologies thereby offering a range of opportunities for innovation and business development in deterring or combating piracy.

## Endnotes

[1] Definition used by International Maritime Bureau (IMB). It is broader in comparison to the conceptualisation adopted under the 1982 United Nations Convention on the Law of the Sea (UNCLOS). The latter restricts its focus only to attacks that occur on the high seas, which is problematic since the majority of piracy incidents take place in territorial or coastal waters. For reasons of brevity, an actual or attempted armed robbery directed at a ship that is berthed, anchored or at sea is also included under the header of 'piracy' in this Future Issue.

[2] Korteweg, R. (2008) *Black Holes: On Terrorist Sanctuaries and Governmental Weaknesses*, Civil Wars, 10:1, pp. 60-71

[3] http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#The United Nations Convention on the Law of the Sea, September 2008

[4] Definition of piracy given by UNCLOS 1982, see: http://www.imo.org/Safety/mainframe.asp?topic_id=1514&doc_id=7602. [see also endnote 1]

[5] http://www.imo.org/Conventions/mainframe.asp?topic_id=247, 2008

[6] SUA 1988: http://www.imo.org/Conventions/mainframe.asp?topic_id=259&doc_id=686

[7] ISPS Code 2004: http://www.imo.org/Safety/mainframe.asp?topic_id=583&doc_id=2689#code

[8] http://www.mgn.com/news/dailystorydetails.cfm?storyid=9097, accessed August 22nd 2008

[9] The IMB is the specialized anti-maritime crime division of the International Chamber of Commerce

[10] http://www.mgn.com/news/dailystorydetails.cfm?storyid=9151, accessed September 11th 2008

[11] http://www.recaap.org/index_home.html, 2008

[12] http://www.armedforcesjournal.com/2006/12/2336959, 2007

[13] http://www.forbes.com/2008/06/09/piracy-logistics-shipping-biz-logistics-cx_wp_0610piracy.html, accessed September 2008

[14] Peter Chalk, international security analyst at RAND: http://www.maritimesecurityagency.com/blog/?p=101, accessed September 24th 2008

[15] Year-To-Date: 30 June 2008

[16] Some maritime security analysts dispute the existence of an ideological nexus between pirates and terrorists. Eric Frecon (2007): see http://www.recaap.org/news/pdf/news/sep07_tackle_piracy.pdf

[17] Chalk, P. (2008) *The Maritime Dimension of International Security – terrorism, piracy, and challenges to the United States*, Project Air Force, RAND

[18] http://news.bbc.co.uk/2/hi/africa/7623329.stm, accessed September 2008

[19] http://news.bbc.co.uk/2/hi/africa/7674268.stm, accessed October 2008

[20] Piracy reports are only readily available since the 1990s, with very little recording before this period. These reports are issued on a regular basis by organizations as the International Maritime Bureau (IMB), the International Maritime Organization (IMO), the UK's Defence Intelligence Staff (DIS) and the US National Geospatial Intelligence Agency's Anti-Shipping Activity Message database.

[21] See appendix A for an overview of problems with piracy statistics.

[22] 2008 Year-To-Date is 30 June 2008.

[23] Murphy, M. (2007) *Contemporary Piracy and Maritime Terrorism*, Adelphi Paper, International Institute for Strategic Studies, Routledge

[24] *Ibid*.

[25] Munich Re (2008) *Piracy – Threat at Sea*, Münchener Rückversicherungs-Gesellschaft, Germany

[26] The 200 NM still does not seem sufficient: late June 2008, the Spanish-owned Playa de Bakio, a fishing trawler, was seized by Somali pirates 247 nautical miles off Somalia's coast.

[27] Although not their prime targets, pirates do increasingly attack private yachts and cruise ships in these waters, whereby seriously wounding or even killing unarmed sailors becomes more frequent.

[28] Munich Re (2008) *Piracy – Threat at Sea*, Münchener Rückversicherungs-Gesellschaft, Germany

[29] In their most recent attacks on platform rigs and oil pipelines, the oil production is brought down with nearly 1 million bpd, thereby triggering global oil prices upwards again. http://www.bloomberg.com/apps/news?pid=20601102&sid=aJhJeQ.t3MDk&refer=uk, accessed September 18th 2008

[30] Finally, as of late December 2005, the GAM and the Indonesian government reached a peace agreement, after 26 years of fighting; http://www.bbc.co.uk/worldservice/learningenglish/newsenglish/witn/2005/12/051214_aceh.shtml

[31] Michael Richardson (2004) *A Time Bomb for Global Trade: Maritime-related Terrorism in an Age of WMD*, Institute of South East Asian Studies

[32] IMB (2007); Chalk, P. (2000) *Maritime Piracy: A Global Overview*, Jane's Intelligence Review, Vol. 12, No. 8

[33] *Ibid*.

[34] Dillon, D. (2000) *Piracy in Asia: A Growing Barrier to Maritime Trade*, Heritage Foundation.

[35] Chalk, P. (2008) *The Maritime Dimension of International Security – terrorism, piracy, and challenges to the United States*, Project Air Force, RAND

[36] Munich Re (2008) *Piracy – Threat at Sea*, Münchener Rückversicherungs-Gesellschaft, Germany

[37] *Ibid*.

[38] Currently, only Russian and Israeli ships are allowed to have firearms.

[39] http://www.seadarq.com/ , 2008

[40] M. Hurtado and A. Nehorai (2008) *Polarimetric Detection of Targets in Heavy Inhomogeneous Clutter*, IEEE Transactions on Signal Processing, Washington Univ., St. Louis

[41] Cracknell, Arthur P. & Hayes, Ladson (2007), *Introduction to Remote Sensing* (2 ed.), London: Taylor and Francis

[42] http://www.defense-update.com/products/l/LRAD.htm, 2007

[43] *Ibid*.

[44] S. Dill *et al.* (2007) *Passive microwave remote sensing for security application*, Radar Conference, EuRAD 2007

[45] Murphy, M. (2007) *Contemporary Piracy and Maritime Terrorism*, Adelphi Paper, International Institute for Strategic Studies, Routledge

[42] HCSS GeoRisq Solutions, 2008

- Movement detectors and light barriers
- Installation of water guns
- Satellite-aided tracking systems enabling shipping companies to keep track of their vessels at all times
- Air surveillance ("Eye in the Sky")
- Unmanned remote-controlled robot ships to patrol and monitor threatened sea lanes and to pursue and fight pirate vessels

*Source*: Munich Re (2008) *Piracy – Threat at Sea*, Münchener Rückversicherungs-Gesellschaft, Germany

## Appendix A: Problems with Piracy Statistics

Many piracy incidents are not reported at all - only an estimated 20% of piracy attacks on vessels are reported worldwide. Piracy data should therefore be approached with some caution due to several reasons:

- Interpretative discrepancies of piracy definitions between piracy reporting centres resulting in different piracy reporting;
- Intimidation of victims by pirates, particularly in cases of kidnapping;
- Death of witnesses due to the attack;
- States and ports are often fearful of being seen as having a piracy problem;
- Shipping companies under-report to guard against reputation damage, avoiding additional pay for crew sailing into piracy-prone areas and to prevent expense costs due to investigation delays;
- This reluctance is exacerbated by the fear that reporting piracy incidents will merely increase maritime insurance premiums, especially when shipping companies acknowledge that not all basic security measures are in place.

*Sources*: Murphy, M. (2007) *Contemporary Piracy and Maritime Terrorism*, Adelphi Paper, International Institute for Strategic Studies, Routledge; Chalk, P. (2008) *The Maritime Dimension of International Security – terrorism, piracy, and challenges to the United States*, Project Air Force, RAND.

## Appendix B: Important Technological Developments

The industry has introduced a number of more or less sophisticated technical solutions in recent years to protect against piracy. The following security measures can be recommended:

- Conversion of the vessel's railing, use of electric fencing and lubricant foam to make it more difficult for pirates to board the vessel
- High-security containers to protect the cargo
- Creation of security zones to protect the crew, such as doors which cannot be opened from the outside
- Highly sensitive radar systems which can detect approaching pirates at close range
- Floodlights to illuminate the vessel
- Special night-vision equipment and heat cameras
- Miscellaneous acoustic and visual alarm systems