The Economic Cost of Somali Piracy 2012

WORKING PAPER

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Forward

BIMCO has carried out a review of the methodologies and the calculations of the ECoP 2012 report. We have found that the report fully lives up to the high standards necessary to earn respect and credibility among all anti-piracy stakeholders in Government and Shipping Industry alike, and for the report to constitute an informed and constructive contribution to the anti-piracy debate.

The findings of the report underscore the importance of the continued focus of Government and Shipping Industry stakeholders on combating piracy, and illustrates also well that problems like the Somali piracy problem can grow extremely costly over time. The implied lesson learned is that there is every reason to tackle similar upcoming problems swiftly and with early determination to avoid the problem becoming institutionalized and to minimize the cost of restoring law and order afterwards.

It is BIMCO's hope that this lesson learned is not forgotten but is taken forward by the international community when dealing with piracy problems elsewhere, currently most notably in the Gulf of Guinea region, where seafarers are regularly confronted with extremely cynical and often deadly attacks by local pirates and robbers.

-- Michael Lund, Deputy Secretary General, BIMCO

This report's calculations were audited by:

BIMCO

Cover photo provided by: NATO's Operation Ocean Shield

The Economic Cost of Somali Piracy 2012

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Founder's Letter

On behalf of the One Earth Future foundation, I am proud to deliver the attached report on the Economic Cost of Somali Piracy 2012. We hope that it can provide useful insights for policy-makers addressing the challenging issue of how to reduce piracy on the global commons that are the world's international waters. As a businessman, I value objective, statistical information as a primary tool to guide my own decision-making, and I believe that others who have found success in business do as well. I hope that both groups, industry leaders and policy-makers alike, will find that the information in the report adds value to their own work at this critical juncture.

In recent reports, we have noted some gaps in our reporting, which come from the inability to isolate second order costs of piracy to regional economies, the lack of detail regarding individual ship behavior, and the lack of consistent data on piracy incidents in the Indian Ocean. However, we felt that it was an absolute necessity that our best estimate of economic costs were available during the height of the crisis, providing some trend analysis for piracy experts to consider. Future reports will hopefully start tracking the terrible costs borne by Somalia and other nations along the Horn of Africa.

One Earth Future also reports on the human cost of this crime at sea. Piracy has affected the seafarers caught up in this violent crime, as well as ordinary Somalis who have suffered the negative effects that pirates have brought to their communities. Some Somali youth, jobless and drawn to the financial rewards of crime, have been recruited to piracy by pirate leaders and financiers. Many Somali teenage lives were lost at sea rather than earning a living on shore. I believe that reporting on the various costs of piracy has been a critical contribution to the public's understanding of this deplorable crime. Hopefully, these reports will call us to collective action.

In this year's report, it has been important for us to recognize that the international community has developed and implemented an effective response to solve the immediate crisis associated with piracy. On one hand I applaud the unprecedented cooperation among nations, international organizations and industry in this endeavor. Nonetheless, the resulting decrease in pirate attacks has created an opportunity to refocus some of the piracy mitigation efforts at sea. Now we must all turn our attention to longer-term investment to build economic opportunity and governance capacity ashore. However, despite the dramatic drop in pirate attacks, we found that over 99% of the cost of piracy is still incurred at sea pursuing short-term mitigation strategies. At a cost of around $6 billion a year, it is evident to me that we are not yet investing in a lasting solution ashore.

As the report also shows, industry is paying dearly to suppress the cost of piracy, contributing almost $5 billion of the $6 billion spent in 2012. At a fraction of the cost, industry could be much better served solving the problem on shore in Somalia. Indeed, members of the shipping industry have already begun considering how their funds could be put towards sustainable solutions in Somalia. In early 2013, K Line, Maersk Line, Stena, NYK Line, Mitsui OSK Line, Shell and BP have donated $1 million in support of job creation and capacity building projects in Somalia. The group has pledged a further $1.5 million to fund those same efforts. I sincerely hope that other members of industry follow this example.

To my mind, 2012 marked the end of Phase 1, where piracy was fought through suppression at sea. We hope that other stakeholders will join us in considering the best way to move into Phase 2, where the international community partners with the Somali people to achieve success on shore.

My team and I have developed the following questions to frame our thinking as we move into Phase 2. I invite the consideration of and feedback from the community of stakeholders regarding each of these important issues:

1. What is required to finally and conclusively break the back of the piracy business model?
2. Is there political support to shift crisis response assets that support piracy suppression at sea to efforts in support of longer term development and governance ashore?
3. How can we reconcile the apparent mismatch between Somalia's goal of maritime security (focused on protection of natural resources and crime at sea) and western goals of countering piracy?
4. Is there a way to incentivize even greater cooperation between maritime industry, international organizations and regional governments?
5. How can the international community best support the Somali desire to control the Somali peoples' maritime resources?
6. What role will maritime stakeholders such as flag states, industry, import/exporting nations, and regional countries and organizations play in the transition from Phase 1 (Suppression) to Phase 2 (Long Term Investment)?
7. How do we convince the international community to remain invested in Somalia?
8. How can we convince philanthropists, industry, and the Somali diaspora that the time is right to invest in Somalia's future?

For our part, I have personally committed to help develop some economic opportunities ashore through the creation of Shuraako. This new initiative brings together prospective investors with promising entrepreneurial projects in Somalia. I am also supporting efforts to create favorable conditions for investment and to encourage the effective governance of financial institutions involved with Somali remittances. I invite other governments, philanthropists, business leaders, and members of the Somali diaspora to join us in investing for a permanent solution for the benefit of the Somali people.

Let's not kid ourselves: suppressing piracy and solving piracy are very different things. In the end, piracy can only effectively be solved on shore. It is time for our efforts to move on ground in Somalia, providing hope in Somalia by providing opportunity. Only when Somali teenagers have greater access to jobs than to guns will they turn to work rather than piracy.

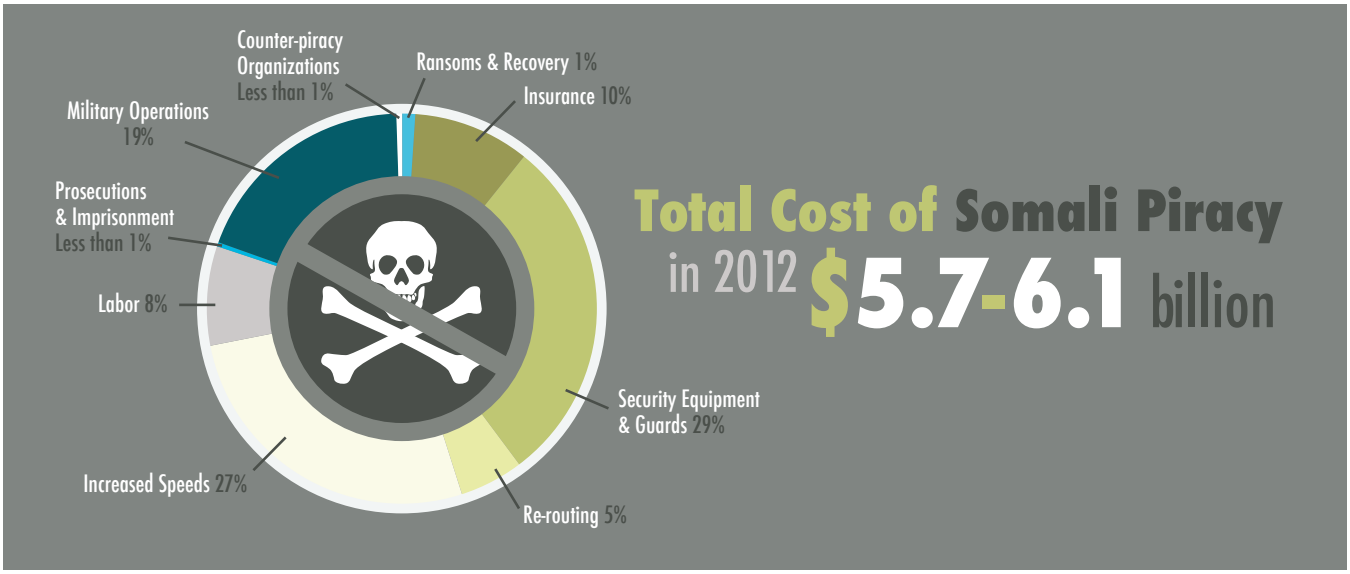
It is not just piracy which hangs in the balance, but Somalia and part of humanity along with it. I am convinced that we will all be back at square one if we refuse to help, if we weaken our resolve, or if we fail in this mission.

Sincerely,

Marcel Arsenault

Executive Summary

Oceans Beyond Piracy (OBP), a project of the One Earth Future foundation (OEF) is pleased to present its third annual assessment of the Economic Cost of Somali Piracy 2012 (ECoP 2012). This year's assessment, like the one before it, considered nine separate, first order cost categories and found that maritime piracy cost the global economy between $5.7 and $6.1 billion in 2012. Our estimate is the result of extensive research, supplemented by contributions from and an extensive audit by independent piracy experts. At between$5.7 and $6.1 billion, the cost of piracy to the global community fell by around $850 million, or 12.6% from 2011.



While 2011 was characterized by a sharp drop in Somalia-based piracy attacks and hijackings at mid-year, 2012 was marked by the continuation of consistent policies to successfully repress piracy at sea. These policies include a largely stable naval presence, supported by the continuation of existing political mandates from the coalition forces. While a more aggressive posture was adopted by the coalition navies, including the first strike on land, the costs associated with the naval presence were estimated to be similar to those incurred last year. The maritime industry's collective response to piracy was marked by a continuation of recommended practices in line with the 4th Revision of the Best Management Practices (BMP4), which were adopted in August 2011. The High Risk Area associated with the latest version of BMP also remained consistent throughout the year, which reflected the assessment that the range of Somalia-based pirate attacks had finally reached their zenith. A final factor leading to the drop in Somali piracy in 2012 was the increased presence of armed guards. In 2011, OBP estimated that around 30% of ships employed private armed security. In 2012 that percentage was revised upwards to 50%. Finally, the analysis of Automatic Information System (AIS) data has caused us to revise our estimates of large-scale commercial shipping traffic in the Indian Ocean from 42,450 vessel transits to 66,612 transits per year.

As mentioned above, the cost of piracy dropped by about 12.6% since 2011. However, this moderate figure, combined with the significant drop of reported piracy attacks in the 2012, means that the "per incident" cost to the international community has risen dramatically.

There were several significant cost observations for 2012, as compared to those incurred during 2011:

- **Increased "per incident" costs:** Between 2011 and 2012, the number of attempts and hijackings fell much more drastically than the cost of combatting piracy. This led to a substantial increase in the "per incident" cost of piracy. In 2011, $28.6 million was spent per pirate attack, and in 2012, that number rose 189.0% to $82.7 million.

- **Increased cost of armed guards:** The most pronounced increase in the cost of piracy came as a result of the increased number of armed guards used to protect merchant vessels transiting the HRA. Between $1.15 and $1.53 billion was spent on armed guards in 2012. In 2011, that figure was $530.6 million. The observed increase comes as the result of an increased proportion of ships employing armed guards (30% in 2011 and at least 50% in 2012) as well as a revised estimate of the number of commercial transits through the HRA each year. Controlling for that latter methodological factor, the cost of armed guards increased 79.7% in 2012.

- **Decreased cost of increased speeds:** The most drastic cost reduction seen in 2012 came from a decrease in the cost of fast steaming through the HRA. In 2011, an estimated $2.7 billion was spent on above optimal speeds, but that figure was down to $1.53 billion in 2012. The observed $1.17 billion dollar decrease comes from a decline in the proportion of ships steaming at above optimal speeds as well as a reduction in the amount by which the average "speeding" ship steamed above the economically optimal level. These estimates were made using Satellite AIS data, which was analyzed to calculate this year's cost and assess last year's figures.

- **Consistent ratio of Recurring Costs vs. Investment:** In 2011, it was estimated that approximately 99.5% of the total cost of piracy was spent on the recurring costs of vessel protection. This figure stood in stark contrast to the money invested in prosecutions and building regional and Somali capacity to reduce piracy. In spite of the success achieved at sea in reducing piracy attacks and hijackings, this ratio remains consistent with last year's figures. In 2012, 99.4% of all funds were spent on recurring suppression costs, with the remaining 0.6% invested in long-term prevention solutions.

Impacts on the Somali Economy

An example of the underutilization of Somali maritime resources

This year's ECoP did not include second order regional impacts of maritime piracy such as effects on tourism and trade. However, OBP would be remiss not to include the impact of Somali piracy on the Somali people. It should not be forgotten that they are some of the biggest victims of the lawlessness occurring off of Somalia's shores.

Maritime piracy has led to several negative economic impacts on the Somali economy. The first is increased fees on containers and other shipments to Somali ports, which can cost as much as $1000 per container. This increased cost leads to lost port revenue due to re-routing of shipments to neighboring ports such as those in Djibouti. Together, these microeconomic impacts add to the macroeconomic effect of price inflation, which negatively affects the Somali people as well.

In addition to these trade-related impacts, piracy has a negative impact on Somali fishermen, who fear going out to sea while piracy remains a threat. Finally, Somalia suffers from lost tourism revenue due to a perceived security threat. Maritime piracy certainly contributes to that perception.

As the economic cost of Somali piracy falls with respect to the international community, we should expect to see the economic cost to the Somali people fall as well.

What follows is a brief summary of the findings from each of the nine cost categories considered:

- **Ransoms and Recovery**: In 2012, OBP estimates that $31.75 million dollars in ransoms were paid to Somali pirates. This represents an 80.1% decline in ransoms paid from 2011, when $159.62 million was paid. The reduction in ransoms is due to the lower number of vessels captured and released in 2012, as well as a lower average ransom than the previous year. In addition to the ransom payment itself, the logistical costs associated with paying ransoms and recovering the vessels – including the cost of delivering the ransom, damage caused to the vessel while it is held, and the cost of negotiators, consultants and attorneys' fees – were estimated at 100% of the value of the ransoms themselves, bringing the total cost attributable to the payment of ransoms and recovery of vessels to $63.5 million in 2012.

- **Military Operations**: The incremental cost of vessel deployments (including reconnaissance aircraft and Unmanned Aerial Vehicles), vessel protection detachments, the administrative budgets of naval operations, and SHADE (Shared Awareness and Deconfliction) meetings amounted to $1.09 billion in 2012. This figure represents a 14% decrease from the $1.27 billion reported in 2011. However, most of the decrease comes as a result of a more conservative methodology used to calculate the cost of UAV deployments. Operationally, the major change that took place between 2011 and 2012 is a decrease in naval assets deployed by the "big three" naval missions – EUNAVFOR's Operation Atalanta, NATO's Operation Ocean Shield, and the Combined Task Force's CTF-151 – alongside a corresponding increase in the assets provided by "independent deployers" including China, India, Japan, Russia, and South Korea.

- **Security equipment and guards**: The total cost of security equipment and guards in 2012 was estimated to fall within the range of $1.65 and $2.06 billion. The cost of security equipment fell a moderate 11%, from around $578.7 million in 2011 to $514.6 million in 2012. Because of a greater acceptance of armed guards by both Flag States and ship owners and operators, the cost of armed guards rose much more dramatically, up 79.7% from 2011 to 2012 when keeping the number of annual transits through the Indian Ocean constant. However, our revised estimate of annual transits resulted in a more dramatic increase, with between $1.15 and $1.53 billion spent on armed guards alone in 2012.

- **Re-routing**: Shipping companies spent $290.5 million re-routing along the Arabian Peninsula and Indian coast as opposed to taking a direct route through the HRA. While Best Management Practices still recommends that vessels re-route, it appears as though fewer ship owners and operators are actually doing so. The sum spent on re-routing is down 47.9% from the amount estimated in 2011. However, the proportion of ships transiting around the Horn of Africa that chose to re-route only dropped by 10%. The rest of the reduction is the result of a change in methodology, whereby fewer tankers and bulk carriers were considered to be candidates for re-routing.

- **Increased speed**: In 2012, OBP estimates that shipping companies spent an extra $1.53 billion on fuel costs associated with steaming at faster than optimal speeds in order to prevent pirate attacks. While there was no change in the industry's recommendations for increased speed through the HRA, the estimated cost of this practice dropped 43.3% from 2011, where the estimated additional cost was $2.7 billion. This $1.17 billion decrease is the largest in absolute terms of all nine cost sections considered, and is the result of a reduction in the proportion of ships going through the High Risk Area at increased speed and a drop in the average speed of those ships steaming at faster than optimal speeds. To calculate the cost of increased speed for 2012, and to confirm the drop in compliance, OBP utilized satellite Automatic Information System (AIS) data provided by ExactEarth™ and licensed to OBP for use in this report.

- **Labor**: The labor-related costs attributable to maritime piracy include the cost of hazard pay as well as the cost of paying seafarers while a vessel is being held hostage. Hazard pay is associated with the

International Bargaining Forum agreement, which affords crews on participating vessels the right to double pay while transiting the High Risk Area. These costs totaled $471.6 million, up significantly from the $195.1 million estimated in 2011. This increase is the result of a revised estimate that 70% of seafarers transiting the HRA are entitled to hazard pay, based on IBF membership or similar arrangements, as opposed to the 30% assumed in 2011. This revised assumption came as the result of conversations with the Anglo-Eastern Group, a leading ship management company. Hazard pay is also affected by the revised estimate of annual transits in the Indian Ocean. Thus all of the observed labor cost increases come as a result of revised methodology as opposed to changes in labor practices.

- **Prosecutions and imprisonment**: In 2012, the cost of prosecution and imprisonment was $14.89 million, down 9.2% from the figure reported in 2011. Broken down further, the cost of prosecutions was $8.84 million, down 24% from 2011, while the cost of imprisonment increased 26.67% from 2011 to $6.04 million in 2012. The reduction in prosecution costs appears to be almost entirely due to a decrease in the number of suspects prosecuted, while the increase in the cost of imprisonment reflects the long term obligations associated with imprisoning a pirate. More new pirates were imprisoned in 2012 than were released.

- **Insurance**: The cost of insurance fell by 13.3%, from $634.9 million spent in 2011 to $550.7 million spent in 2012. This fall is attributable to the increased presence of private armed guards aboard merchant vessels and the resulting premium discount. Moreover, due to a higher number of expensive vessels transiting the Suez Canal in 2012, the costs associated with War Risk premiums rose slightly. Controlling for that change in the composition of the insured property, the cost of piracy-related insurance fell by 14.9%.

- **Counter-piracy organizations**: The cost of various counter-piracy organizations, ranging from United Nations agencies to independent NGOs, was $24.08 million in 2012. This figure represents a 13% increase from the $21.3 million reported in ECoP 2011. The organizations included in this section are the Trust Fund to Support Initiatives of States to Counter Piracy off the Coast of Somalia, the United Nations Office of Drugs and Crime (UNODC), the Contact Group on Piracy off the Coast of Somalia (CGCPS), the Djibouti Code of Conduct, the United Nations Development Programme – Somalia, EUCAP NESTOR, Regional Anti-Piracy Prosecution & Intelligence Coordination Centre (RAPPICC), the PiraT Project, and OBP.

Acknowledgements

OBP has many experts and stakeholders to thank for their guidance leading up to the publication of this report. We would like to thank Chan Smith from ExactEarth, not only for his help in licensing the AIS data, but also for his invaluable assistance in bringing the data into useable form and sharing his expertise on industry practice regarding AIS usage. We would also like to thank Raphael Kahn of Secure-Marine for his insights into the market for vessel self-protection hardware, as well as Anuj Chopra at Anglo-Eastern Group for providing such valuable information on the seafaring labor market. Once again, OBP would like to thank Michael Frodl of C-Level Maritime Risks for continuing to provide us with the latest on piracy-related trends.

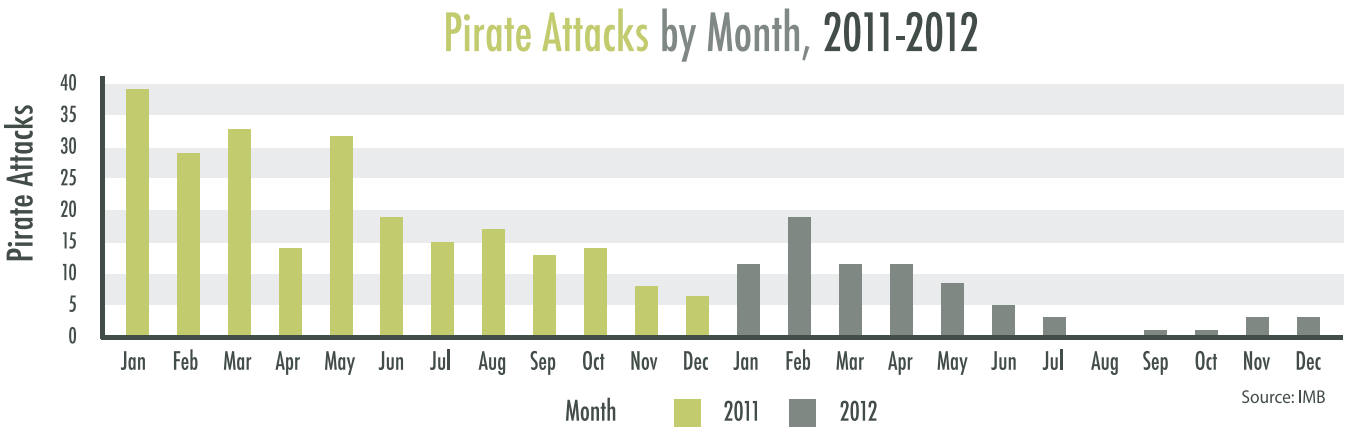
Finally, special thanks are due to the Baltic and International Maritime Council (BIMCO), and especially to its Chief Shipping Analyst Peter Sand, for conducting such a thorough audit of ECoP 2012's findings. Peter diligently reviewed each of ECoP 2012's nine cost sections, questioning our assumptions where warranted and improving upon our methodology when his experience counseled in favor of doing so. His work over the months before the release of ECoP 2012 added a great deal to the final product.

Acronyms

AIS	Automatic Information System
AMISOM	African Union Mission to Somalia
ASIS PSC.4	American Society for Information Science Private Security Company Operations
BIMCO	Baltic and International Maritime Council
BMPv4	Best Management Practices (version 4)
CGPCS	Contact Group on Piracy off the Cost of Somalia
DWT	Dead Weight Tonnage
EUNAVFOR	European Union Naval Force
GCC	Gulf Cooperation Council
HRA	High Risk Area
IAMSP	International Association of Maritime Security Professionals
IMB	International Maritime Bureau
IMO	International Maritime Organization
INTERPOL	International Police Organization
ISO 28007	International Organization for Standardization: 28007 “Guidelines for PMSC’s”
ITF	International Transport Worker’s Federation
K&R	Kidnap and Ransom Insurance
LMA	Lloyd’s Market Association
MOU	Memorandum of Understanding
MMSI	Maritime Mobile Service Identity
MSC HOA	Maritime Security Center, Horn of Africa
NATO	North Atlantic Treaty Organization
OBP	Oceans Beyond Piracy
OEF	One Earth Future Foundation
PAG	Piracy Action Group
PiraT Project	Piracy and Maritime Terrorism as a Challenge for Maritime Trade Security
PMSC	Private Maritime Security Company
PCASP	Privately Contracted Armed Security Personnel
RAPPICC	Regional Anti-Piracy Prosecution & Intelligence Coordination Centre
SAMI	Security Association for the Maritime Industry
SHADE	Shared Awareness and Deconfliction
TFG	Transitional Federal Government
UAV	Unmanned Aerial Vehicle
UN	United Nations
UAE	United Arab Emirates
EUCAP NESTOR	European Union Capacity “Nestor”
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNODC	United Nations Office of Drugs and Crime
UNPOS	The United Nations Political Office for Somalia
UNSCR	United Nations Security Council Resolution
VLCC	Very Large Crude Carrier
VPD	Vessel Protection Detachment
WFP	World Food Program

Introduction

Around 2005, Somali pirates began hijacking commercial vessels transiting near the Horn of Africa at an alarming rate. A combination of geography and a lack of economic opportunity on shore led thousands of Somalis, most of them young men, out to sea to engage in the world's oldest international crime. In keeping with maritime piracy's international character, a truly international and diverse community of stakeholders – including individual governments, regional organizations, intergovernmental organizations, the shipping industry, and members of civil society – sought to stem the crisis.



Over the next several years, these stakeholders employed measures ranging from naval patrols to vessel self-protection to prosecuting pirates captured at sea in hopes of suppressing pirate activity. For the first several years of the international effort, the ultimate outlook remained unclear. In fact, pirate attacks and hijackings steadily increased from 2005-2011, with the number of hijackings peaking in 2010 and the number of overall attacks peaking in 2011.

It was in the pinnacle year of pirate hijackings – 2010 – that OBP released its first Economic Cost of Piracy report. In that first year, OBP used a series of informed estimates and publicly available information to conclude that maritime piracy cost the global community between $7 and $12 billion. In 2011, OBP honed its methodology and gained increased access to industry and government insiders, which resulted in a narrower and more rigorous estimate of $6.6 - $6.9 million.

The year 2012, however, saw a sea change in the global response against maritime piracy. Between naval operations, improved international coordination, continued observance of industry best practices, and increased use of private armed guards, the number of hijackings dropped 50% from 2011, and attempted attacks fell by just over 70%. Thus the concerted, cooperative effort on the part of the community of stakeholders appears to have moved the global fight against maritime piracy out of the crisis management phase and into an era of reduced east African piracy numbers.

This year's Economic Cost of Piracy report continues to build upon the methodology developed since the 2010 report to once again calculate the cost of maritime piracy to the international community, concluding that piracy cost the global economy between $5.7 and $6.1 billion in 2012.

Though the number of attacks and hijackings is down along with the cost of piracy overall, the outlook is not entirely positive. This is because the incidence of piracy fell much faster than the cost of combatting the problem. In fact, the cost-per-hijacking and the cost-per-attempt rose 68.6% and 199.5%, respectively, between 2011 and 2012. In 2011, $250.0 million was spent per successful hijacking. In 2012, that number rose to $421.4 million.

As one journalist put it, this discrepancy suggests that the pirates' "effort to profit from their proximity to the world's shipping is hugely inefficient."[1]

This observation strongly suggests that continuing with current approaches to counter-piracy efforts is economically unsustainable in what may be a new phase of reduced pirate attacks and hijackings. It is time to move away from short-term, crisis management approaches to piracy and towards a long-term, sustainable solution. Before undertaking the cost calculation for 2012, an overview of the scope of the costs studied and the methodology used to obtain the final result should be considered.

Scope of Costs Studied

ECoP 2012's cost of piracy figure includes the first order direct costs of maritime piracy from the perspective of the international community at large. Where possible, it considers opportunity costs provided that they are significant and easily attributable to maritime piracy. The study does not consider investments made by those who finance pirate action groups. In considering which costs to include, ECoP seeks to avoid double counting and errs on the side of conservative cost estimates. The scope of ECoP is outlined in detail below:

- **First order:** first order costs are distinguishable from second order costs because they are spent specifically on piracy rather than arising indirectly as a result of piracy. An example of a first order cost is a ransom payment, while second order costs include reductions in trade or tourism.
- **Direct costs:** direct costs are costs that would not exist but for maritime piracy. The cost of ransoms, piracy-related insurance, security equipment and guards, re-routing, increased speeds, extra labor fees, and prosecution and imprisonment are all direct costs.
- **Opportunity costs:** also included in the economic cost of piracy are opportunity costs, provided that they are significant and easily attributable to maritime piracy. These costs are those that would exist regardless of the presence of piracy, but would be put to other productive use. The cost of military operations and counter-piracy organizations are the opportunity costs included in ECoP's final calculation.
- **No double counting:** many of the costs of piracy are passed downstream from the party that incurs the cost directly to that party's consumers. ECoP is cognizant of that fact and avoids double counting throughout the report.
- **From the perspective of the international community:** it is a basic economic truth that one individual's cost is another's income. ECoP looks at the cost of maritime piracy from the perspective of the entire international community, excluding the gains to pirates and those who profit from piracy. The above costs are included in the ultimate calculation even though they could also be characterized as income from another perspective.
- **Exclusion of pirates' costs:** pirate action groups (PAGs) need fuel, food, fresh water, and *khat*, among other provisions, to conduct their operations. These costs are not included.
- **Conservative estimates:** given incomplete information, when in doubt, ECoP errs on the side of a more conservative cost estimate.

ECoP's analysis is conducted this way for several reasons. First, ECoP seeks to provide information to relevant stakeholders and the public at large regarding the economic cost of the global response to piracy. As such, it aims to present information in a way promotes the efficient use of resources with an eye towards a sustainable

and equitable solution. Second order costs and costs borne by the pirates are not required for this purpose. Second, isolating the portion of second order costs that result from piracy as opposed to some other force is nearly impossible without a great deal of speculation. Rather than sacrificing accuracy, these second order costs are left out entirely. Third, second order costs, while not included in the total cost calculation, are described in the various case studies throughout the paper to emphasize their importance to the community of stakeholders. Finally, ECoP is not written to inflate the cost of piracy in the minds of the international community. It is meant to be a sober reflection upon costs incurred by the relevant stakeholders, and its conservative cost estimates reflect that aim.

The decision to include only first order direct and opportunity costs and to exclude costs incurred by the pirates thus ensures relevance, accuracy, and practical utility to the community of stakeholders.

Methodology

Since the release of ECoP 2011, there have been several studies seeking to quantify the economic cost of piracy to the global economy. Each has come from a different organization with different areas of expertise, and each has taken a different approach to calculating the cost of piracy.

One paper, by Timothy Besley, Thiemo Fetzer and Hannes Mueller, estimate the cost of piracy by analyzing shipping contracts in the dry bulk market and conclude that the "welfare loss" due to Somali piracy is between $0.9 billion and $3.3 billion.[2] Another, by Sami Bensassi and Inmacula Martinez-Zarzoso, uses the gravity model of trade to estimate the trade-related effects of piracy at around $24.5 billion.[3] Finally, P.J. Middlebrook took 2010 data and applied a "pirate value chain approach" to conclude that piracy cost between $4.9 and $8.3 billion in that year.[4] OBP welcomes all of these cost of piracy studies, as each looks at the problem differently to reach different, though not incompatible, conclusions.

As stated in the section concerning the scope of costs studied, OBP only considers first order direct costs and, where available, opportunity costs of maritime piracy. Even when limited to those costs, the methodological difficulties inherent in calculating the cost of Somali piracy remain challenging. The vast majority of the data that could be used to calculate the cost of Somali piracy is closely held by governments and the shipping industry. Official statistics related to piracy are few and far between, and working around that limitation is key driver of our methodology.

For the most part, our estimations come from analyzing hundreds of reports, news articles, and other open sources, talking to stakeholders from industry, government, and civil society, and using proxies to fill in the gaps. Each section of the paper describes the methodology used and notes any methodological differences between last year's paper and this year's. With the exception of two sections, the 2012 methodology is very similar to that used in 2011. This is not only because the methodology used in 2011 was a generally sound one, but also to allow for "apples to apples" comparisons of cost changes between 2011 and 2012.

The primary change in methodology is a fundamentally different approach taken to calculating the cost of re-routing and increased speeds. These changes have improved the accuracy of our methodology and will provide truly novel insight to interested stakeholders. The source of these improvements is over 1 million AIS messages collected by ExactEarth's satellites and provided to OBP for use in our research. This data has proven to be exceptionally useful in moving ECoP towards a more definitive analysis. The details of the methodologies used to calculate the cost of re-routing and increased speeds will be outlined in detail in those sections.

Another major change between the 2011 and 2012 versions of ECoP is the estimated number of commercial

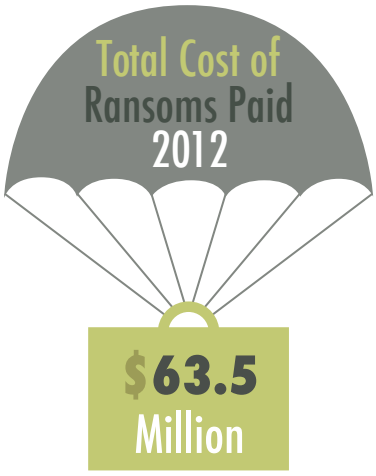
transits in the High Risk Area each year. Last year, OBP used 42,450 as the estimated total. Though this figure could be found in several different sources, several piracy experts had suggested that an estimate of 42,450 might be too low. This year, the introduction of AIS data corroborated those experts. As a result, we have revised our estimate of the annual number of commercial transits in the HRA to 66,612. Yet this figure will not be used in every possible instance. For example, we continue to use 42,450 commercial transits in the cost of insurance section, as that is the most appropriate estimate of ships that take out War Risk and Kidnap and Ransom Insurance. Moreover, we use the even smaller estimate of 6,575 commercial transits subject to re-routing. This figure represents only bulk carriers and tankers that pass through the Suez Canal. The changes will lead to cost variances in a number of sections that do not reflect a change in behavior, but it will also result in more accurate cost calculations overall.

As always, we invite input from all sectors as we continue to hone our methodology in hopes of producing increasingly precise estimates in the future.

First Order Costs of Somali Piracy

1. The Cost of Ransoms and Associated Payments

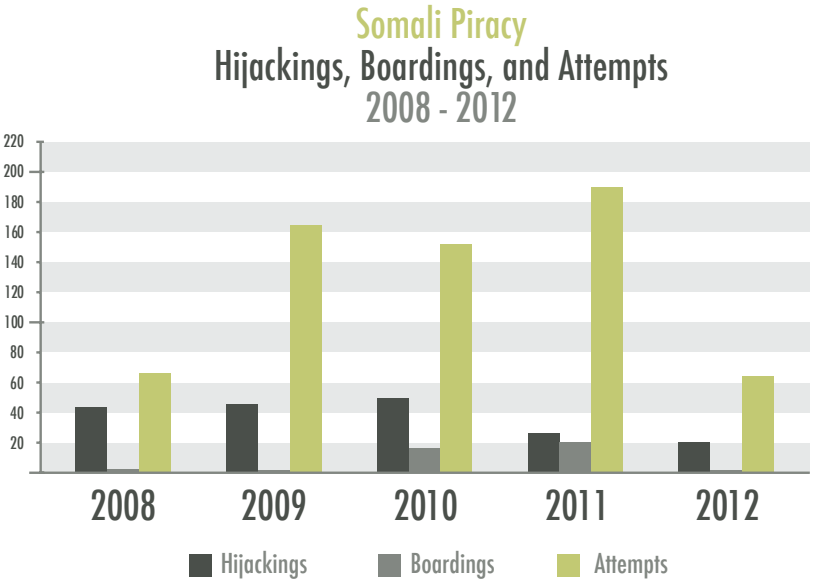
- Average hostage situation duration: 316 days
- Average ransom paid: $3,968,750.00
- Total ransoms paid: $31,750,000.00



The image of a light aircraft dropping a parachuted capsule filled with millions of dollars into the Indian Ocean is the most visible reminder the piracy comes at an economic cost. This is true despite the fact that, year after year, the payment of ransoms is but a tiny fraction of the total economic cost of piracy. In 2010 and 2011, the cost of ransoms comprised just over 2% of the total cost of piracy; in 2012, ransoms made up less than 1% of the total cost.[5]

Both the number and the average value of ransoms have dropped in each of our reports. In 2010, 44 ransoms were paid totaling $238 million, with an average of roughly $5.4 million per ransom.[6] In 2011, the number of ransoms paid was reduced to 31 and totaled $159.62 million, with the average ransom payment falling to $4.97 million.[7] And in 2012, the number of ransoms paid dropped yet again to only 8, averaging $3.97 million and totaling $31.75 million.[8] The change in total ransom cost observed in 2012 represents a precipitous 80% reduction from 2011's total.

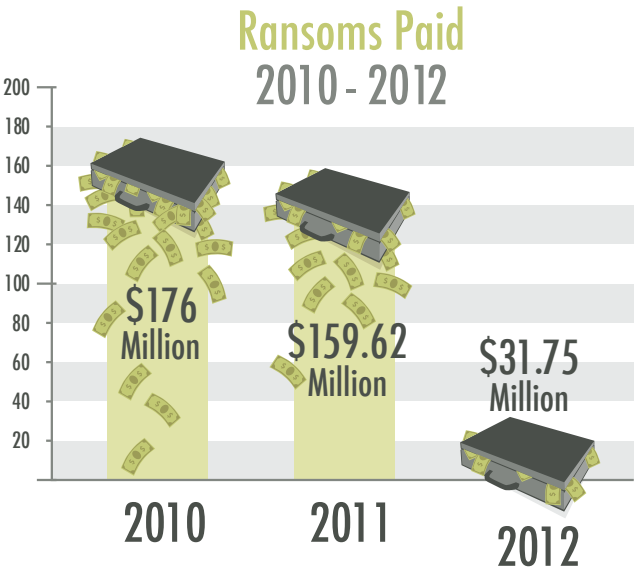
There are several factors that have contributed to the sharp reduction in ransoms paid, including increased naval patrols, enhanced international cooperation, adherence to industry best practices for vessel self-protection, and the use of armed guards aboard merchant ships. No single policy has achieved the reduction in east African piracy alone. Only a concerted, cooperative, international effort is up to the task of combatting maritime piracy, both on the high seas and within the EEZs of the littoral states of the Indian Ocean. To that end, the Piracy Ransom Task Force – made up of 14 nations supported by 17 industry groups – released its first report with the stated goal of "reach[ing] a point where pirates are no longer able to profit from ransom payments and thus abandon the practice of kidnapping for ransom."[9]



However, simply eliminating ransom payments is not as easy as might sound. Once a hijacking takes place, the shipping companies whose seafarers are being held hostage are in an extremely difficult position. On one hand, ship owners and operators do not wish to perpetuate a cycle of hijackings and profitable ransom payments. On the other, shipping companies must do all they can to reduce the human cost of piracy by ensuring the safe release of their seafarers. Simply refusing to pay a ransom once seafarers have been taken is not a humanitarian option. In sum, though the Piracy Ransom Task Force's desired end state has not yet been reached, the 80% reduction in ransom values from 2011 to 2012 shows that the international community is moving towards that goal.

Ransoms do not exist in a vacuum; they are ultimately a function of the number of successful hijackings. It is therefore unsurprising that the number of hijackings fell to 20 in 2012, a 28.5% reduction from the 28 hijacking observed in 2011[10]. The reduction in attempted attacks was even greater with only 62 such attempts, down from 189 in 2011. Developments in the success rate have been more mixed. In 2012, the pirates' success rate was 24%, up significantly from the 13% reported in 2011 but down from the 27% reported in 2010[11].

Yet the statistics concerning pirate success rates are complicated by issues of reporting. Multiple reporting centers, the difficulty of distinguishing pirates from bona fide fishermen,[12] and an alleged tendency to underreport pirate activity[13] all serve to reduce the number of reported attempts. This, of course, has a direct effect on the reported versus actual pirate success rate. Due to these reporting complications, the best that can be said is that one of two phenomena is occurring. Either the tendency to underreport pirate attacks increased fairly dramatically from 2011 to 2012, or the pirates who are still actively operating in the HRA – though smaller in number – are adapting to the improved international response seen since 2010.[14] On balance, the evidence suggests that increased underreporting between 2011 and 2012 is the main driver of the variance in success rate between 2010 and 2012.



Yet piracy is not a purely economic phenomenon, and human costs abound. In our 2011 report we noted that the amount of time spent negotiating ransoms was on the rise, a trend that looks to be continuing. In 2011, it took an average of 178 days,[15] or around six months, for a ransom to be negotiated and a ship to be released. While the number of ransoms paid has decreased dramatically in the last year, the average time for ransom negotiations increased to 312 days.[16] Sometimes, the

negotiations take much longer. In the case of the Panama-flagged Bulk Carrier, *M/V Orna*, the crew and vessel were held for 674 days. When a $600,000 ransom was finally negotiated on October 19, 2012, only 13 of the 19 crew members were released; the other 6 remain in captivity.[17]

The *M/V Orna* was not the only ransom situation that resulted in a partial release of the crew. The *Albedo*, a Malaysia-flagged container ship, was hijacked on November 25, 2010. After 20 months in captivity and a $1.2 million ransom payment, only 7 crew members were released. 15 crew members still remain held.[18] Generally speaking, these longer duration hostage situations arise in the case of a less well-off ship owner, possibly lacking adequate insurance coverage.

Until recently, the longest ongoing hijacking and ransom incident was the now infamous *Iceberg I*. The Panama-flagged RO/RO vessel and its 24 member crew were hijacked in March of 2010.[19] Over the course of their nearly 3 years in captivity, the crew was reported to have suffered severe psychological and physical abuse. One crew member was also said to have committed suicide by jumping overboard in October of 2010.[20] The remaining crew members and the vessel were freed in late December, 2012 following a rescue operation launched by Puntland's Maritime Police Force. According to available sources, no ransom was paid.

OBP continues to take a robust approach to assessing ransoms and has tracked and accounted for each individual ransom paid in 2012, where such data was available. However, it should be noted that these ransoms are not officially reported. Rather, the figures invariably come from the pirates themselves who are eager to boast about the ransom they negotiated. Ship owners and insurance companies, on the other hand, tend to prefer not to release these values publicly – sometimes because such secrecy is contractually required and sometimes as a result of a strategy whereby the true "market" for ransoms is left obscure to other would-be pirates. Below is a list of ransoms paid in 2012:

RANSOMS PAID IN 2012					
Ship Name	Date Hijacked	Date Released	Days Held	Ship Type	Ransom Amount (millions)[12]
Free Goddess	February 7, 2012	October 11, 2012	247	Bulk Carrier	$5.7
M/T Liquid Velvet	October 31, 2011	June 5, 2012	218	Chemical Tanker	$4
MV Olib G	September 8, 2010	January 8, 2012	487	Chemical Tanker	$3
MT Fairchem Bogey	September 20, 2011	January 12, 2012	114	Oil/Chemical Tanker	$8
MT Enrico Ievoli	December 27, 2011	April 23, 2012	118	Oil/Chemical Tanker	$9
Leila	February 15, 2012	April 11, 2012	56	Roll on, Roll off (RO/RO)	$.25
Albedo	November 25, 2010	July 31, 2012	614	Container Ship	$1.2
Orna	December 15, 2010	October 19, 2012	674	Bulk Carrier	$.6
				TOTAL	$31.75

As noted in our previous reports, the cash value of the ransom is not the only direct cost of a successful hijacking. Other factors include the cost of delivering the ransom, damage caused to the vessel while it is held, and the cost of negotiators, consultants and attorneys' fees.[22] Additionally, according to the Cyprus Shipping Chamber, ship owners and operators incur between $10,000 and $50,000 in damages to hull and cargo per attack.[23] Finally, there is a high cost associated with having ships held out of service. For example, at a charter hire rate of $17,500 per day, a bulk carrier held hostage for six months could cost as much as $3.15 million in unrealized rates alone.[24] Indeed, according to Stephen Askins of Ince & Co., the excess costs of having ships held

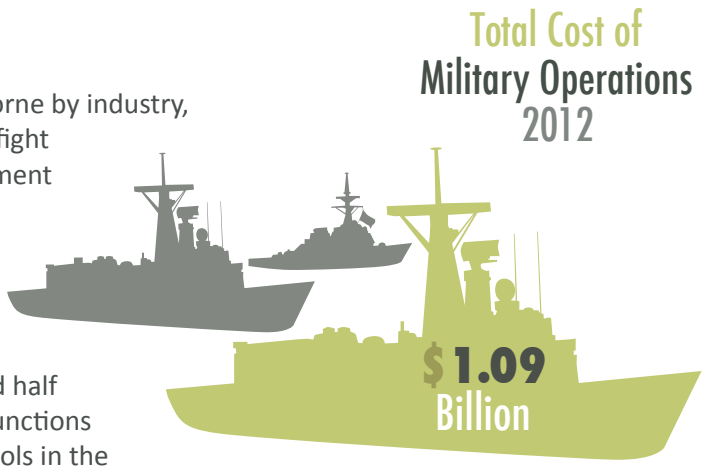
hostage for months on end is potentially as large as $20 million for a $4 million ransom. Each ship owner and insurance company therefore must conduct a delicate cost-benefit analysis when negotiating for a ship's release. The incentive to drive down the ransom price and "wait out" a reasonable negotiation must be contrasted with the high cost of having ships out of service, and the considerable impact on the crew.[25]

A hijacking could therefore cost a shipping company up to five times the value of the ransom paid in associated costs. Moreover, because the ransom itself tends to be paid by an insurance company, these associated costs – both human and economic – are what worry ship owners and operators over and above the ransom payment itself. With that said; shipping companies have a strong incentive to keep ransom payments as low as possible. The market for ransoms is real, and pirate leaders are keenly aware of the "going rate." Controlling the trajectory of ransom values is one way to mitigate the financial incentives underlying the pirate enterprise, at least over the immediate term. Further complicating matters is the fact that Somali pirates are not "businessmen" in the proper sense of the word. Between cultural differences, desperation to repay financiers, and general lack of business acumen, Somali pirates have little aversion towards reneging on an agreement. Only if the pirates feel that there is absolutely nothing more that can be gained will they conclude a ransom negotiation. This psychological aspect adds yet another layer of complication to the process of negotiating a ransom.

In sum, both the cost of the ransom itself and the ancillary costs associated with ransom payments are factored into the cost of ransoms in 2012. Because the ransom is generally defrayed by an insurance company, the $31.75 million in actual payments will be deducted from the total insurance costs. Rather than using the reported estimate that for every dollar spent on the ransom, five are spent on associated costs, we use a much more conservative one-to-one ratio. Using this calculation, the cost of ransoms in 2012 was $63.5 million, split evenly between ransom costs and ancillary costs.

Costs not included: *As mentioned above, industry analysts have cautioned that OBP has not represented the full value of costs associated with ransom payments. Some industry estimates place this number as high as five times the cost of the ransom payments themselves. However, OBP could not find compelling and publically available evidence to support this higher ratio. Therefore, OBP considered the true ratio of ransom costs to associated costs to be too speculative, and including a higher ratio than one-to-one would run counter to the conservative methodology used in this study.*

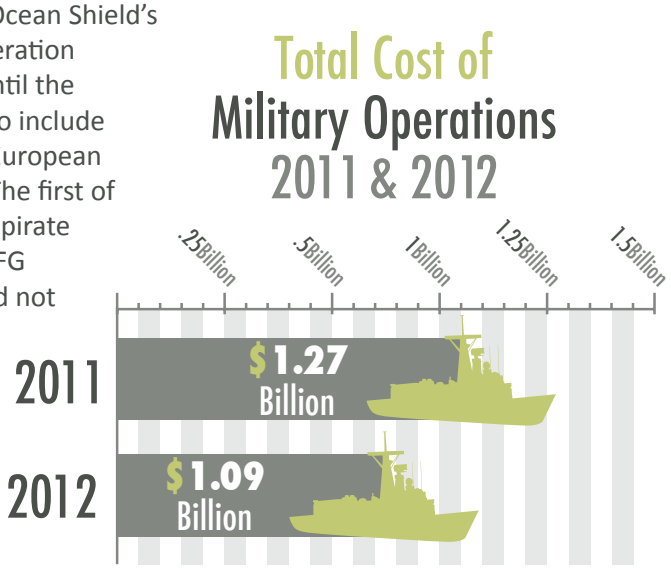
2. The Cost of Military Operations



Although the majority of reported piracy costs are borne by industry, governments make a substantial contribution to the fight against maritime piracy. The largest driver of government costs by far is that associated with military assets patrolling the Indian Ocean. On any given day during 2012, there were between 21 and 30 vessels participating in east African counter-piracy efforts.[26] These vessels were patrolling an area that is about 2 million square miles – around one and half times the size of continental Europe.[27] The primary functions of these naval deployments include: operational patrols in the Gulf of Aden and Somali basin, maintenance of the Internationally Recognized Transit Corridor, escorting humanitarian aid vessels, and responding to reported attacks.[28]

There have been several interesting developments on the military front in 2012. The first was a reduction in the assets deployed by the EU's Operation Atalanta (from 5-10 vessels in 2011 to 4-7 in 2012),[29] and by NATO's Operation Ocean Shield (from 4 in 2011 down to 2 by the end of 2012).[30] This reduction came alongside an increase in assets deployed by independent navies from China, India, Japan, Russia, and South Korea, which

more than compensated for the decrease Atalanta's and Ocean Shield's deployed forces. Second, Operation Ocean Shield and Operation Atalanta had their mandates extended two more years, until the end of 2014.[31] Third, EUNAVFOR's mission was extended to include Somali territorial and internal waters, which allowed the European force to conduct missions whose effects are felt on land. The first of these missions occurred on May 15 and was targeted at a pirate logistics base.[32] The attack was supported by the Somali TFG as well as a UN Security council resolution. EU NAVFOR did not set foot on Somali soil, and no Somalis were injured.[33] According to a Lloyd's List survey, 64% of shipping professionals favor these land based operations.[34]



For the purposes of this study, piracy-related military costs include the administrative budgets for the "big three" naval missions, the operating costs of surface vessels, their surveillance detachments, and UAVs, personnel costs associated with vessel protection detachments, and the cost of Shared Awareness and Deconfliction (SHADE) meetings. As will be shown below, the total military cost in 2012 was around $1.09 billion.

A. Administrative Budgets of Naval Operations

The first military cost studied is the administrative budgets of the "big three" naval operations – EUNAVFOR's Operation Atalanta, NATO's Operation Ocean Shield, and CTF-151. Each of these missions is chiefly comprised of national naval assets, but administering the joint operations has its own administrative costs. For example, Operation Atalanta is funded through the European Union External Commission's ATHENA financing mechanism.[35] This mechanism covers common costs such as the operational headquarters, the force headquarters onboard the flagships, miscellaneous services, and transport.[36] The table below summarizes each of the "big three" missions, their estimated administrative costs, and their primary funders in 2012:

Mission	Description	Costs and Contributing Nations
European Union Operation Atalanta	EU NAVFOR-Operation Atalanta was launched on December 2008, in accordance with an EU Council Joint Action. The mandate of the mission is to: • Deter, prevent and repress piracy and armed robbery off the coast of Somalia • Protect World Food Programme (WFP) vessels delivering aid to Somalia • Protect the vessels contributing to the African Union Mission on Somalia (AMISOM) • Protect vulnerable shipping off the Somali coast • Contribute to the monitoring of fishing activities around the Horn of Africa In 2012, Operation Atalanta's mission was extended through December, 2014.	Administrative Costs 2012: $11.4 million,[12] contributing nations include: Belgium • Croatia • France • Germany Greece • Italy • Montenegro Netherlands • Norway • Serbia • Spain Sweden • Ukraine • United Kingdom
NATO Operation Ocean Shield	NATO's Operation Ocean Shield has been patrolling the waters off the Horn of Africa since August 2009. The mission is to contribute to international efforts to counter maritime piracy while participating in capacity building efforts in the region. NATO Allies agreed on March 19, 2012 to extend Operation Ocean Shield for another two years until the end of 2014.	Administrative Costs 2012: ~5.7 million,[13] contributing nations include: Canada • Denmark • Greece • Italy Netherlands • Norway • Portugal Spain • Turkey • United Kingdom United States

Combined Task Force	CTF 151 is a multi-naval task force established in January 2009. It conducts operations under a mission-based mandate of the Combined Maritime Forces (CMF). Its goal is geared toward deterrence, disruption and suppression of piracy off of the coast of Somalia and the Gulf of Aden. The CTF headquarters is located in Bahrain.	Administrative Costs 2012: ~5.7 million,[14] contributing nations include: Australia • Bahrain • Pakistan Republic of Korea • Singapore • Turkey United Kingdom • United States

All told, the total administrative cost of the "big three" naval missions was around $22.8 million in 2012. Yet the administrative costs of these missions pale in comparison to their overall cost. For example, according to a senior military representative who wished to remain anonymous, the EU NAVFOR operation costs its member states close to $1.96 billion a year,[40] of which $11.4 million were common administrative costs.[41] The reason for this discrepancy is that the operational costs of these missions are allocated using the principle that "costs lie where they fall." For example, the fuel and personnel costs of a Danish warship operating as part of NATO Operation Ocean Shield would be borne by the government of Denmark alone, despite the fact that the Danish asset in question is being used as part of an international operation. Thus only the administrative costs described above are shared costs. For that reason, the vast majority of costs incurred by militaries are due to the deployment and operation of surface and support vessels.

B. Cost of Naval Vessel Deployment

In addition to the administrative costs described above, deployment of surface vessels and manned surveillance aircraft comes with significant costs. To determine the cost of naval vessel deployment, we considered vessel fuel costs and daily operating costs. We attempted to estimate these costs from publicly available information utilizing the most conservative numbers. For example, we counted the lowest possible number of vessels deployed on a daily basis, even though it is extremely likely that the actual average was considerably higher. Additionally, we do not consider additional costs associated with the transits from the Indian Ocean to the asset's country of origin and vice-versa.

To estimate the cost associated with fuel consumption, we converted fuel use into common units of measurement and simply multiplied daily fuel consumption by fuel price. We were unable to calculate each vessel's fuel consumption specifically because exact information was not available. Rather, we used publicly available information on certain classes of vehicles and used those statistics as proxies for all vehicles in a given class.[42]

Vessel Type	Average Number Deployed	Average Pre-Tax Fuel Price (per gallon)	Adjusted* Daily Fuel Consumption (gallons/day)	Total Annual Fuel Cost
Frigate	8	$3.97	21,641*	$206,191,189
Destroyer	7	$3.97	49,091*	$409,271,667
Auxilary	2	$3.97	12,360*	$29,441,520
Patrol/Reconnaissance Aircraft	6	$3.97	6,335**	$45,269,910
Helicopter	4	$3.97	190***	$905,160
TOTAL	27		89,617	$691,079,446
*24 hours/day, 300 days/year **5 hours/day, 300 days/year ***4 hours/day, 300 days/year				

To calculate daily operating costs, we began with an estimate – informed by discussions with individuals with intimate knowledge of naval operations – that the monthly operating cost of a frigate is $1,564,400 with an average of 230 sailors on board. From that calculation, we assumed that the operating cost of a vessel was roughly proportionate to the number of seafarers aboard and concluded that the total operating cost for all naval assets in 2012 was $335,865,600.[43]

Vessel Type	Average Number Deployed	Sailors Aboard	Frigate Monthly Cost	Cost Adjustment	Annual Operating Cost
Frigate	8	230	$1,564,000	1.0000	$150,144,000
Destroyer	7	280	$1,564,000	1.2174	$159,936,000
Auxilary	2	121	$1,564,000	0.5261	$119,747,200
Aircraft	6	11	$1,564,000	0.0478	$5,385,600
Helicopter	4	2	$1,564,000	0.0087	$652,800
TOTAL	27				$335,865,600

C. Cost of UAV Deployment

Another cost associated with military deployments is that related to unmanned aerial vehicles (UAVs). Though we are aware that several nations deploy UAVs in their counter-piracy efforts, it is difficult to know how many UAVs are being deployed for piracy, as opposed to terrorism-related purposes. It is also difficult to know the proportion of each UAV's time in flight that is dedicated to counter-piracy operations rather than another purpose.

To keep our calculations conservative, we assumed that only one of each known UAV model present in the region is used for piracy and that 50% of that UAV's flight hours were dedicated to monitoring piratical activity.

Country	Model	Number of Units	Hourly Cost	Duration of Mission per day	Total Operational Cost
US	Reaper	1	$1,456	12	$6,377,280
US	Robotic Helicopter	1	$1,804	4	$2,633,840
US	Global Hawk	1	$1,458	12	$6,386,040
South Korea	Hermes 450	1	$1,351	12	$5,917,380
				TOTAL	$21,314,540

The estimates used for this year were significantly more conservative than those used last year,[44] and have resulted in a total UAV-related cost of $21.31 million in 2012.

D. Cost of Vessel Protection Detachments

In addition to performing counter-piracy operations from aboard their own assets, militaries are deploying their personnel to guard WFP and AMISOM ships to protect those humanitarian missions from pirate attacks. Countries that have provided VPDs include, but are not limited to: Netherlands, Estonia, Germany and France.[45] Additionally, France and Ukraine provided vessel protection training to 12 troops from Uganda to serve as VPDs for AMISOM.[46] These VPDs protect an average of 40 WFP and 32 AMISOM ships transiting the HRA each year.[47]

Program	Ships per year	Cost per VPD team (of 10)	Cost per VPD team (of 18)	Total Cost VPD team (of 10)	Total Cost VPD team (of 18)
WFP	40	$151,667	$273,000	$6,066,680	$10,920,000
AMISOM	32	$151,667	$273,000	$4,853,344	$8,736,000
			TOTAL	$19,656,000	$19,656,000

To calculate the cost of a VPD, we use the reported cost figure of $273,000 for an 18-person VPD from the Netherlands and assume that to be the maximum size for a VPD, with the minimum team size being 10.[48]

Although this $273,000 figure may appear high when compared to the $34,500-$46,000 per-transit cost of PCASP, the per-guard costs are quite similar. By way of example, for an 11.5 day transit with four guards aboard, the cost per guard per day is around $1,000. By our calculations, that same transit would employ a VPD at a rate of $1,318.84 per guard per day. Thus the main difference in cost between PCASP and VPDs comes from the number of guards employed, not a difference in per-guard cost.

E. Cost of SHADE Meetings

To coordinate the various naval missions in the Indian Ocean and Arabian Sea, international navies rely on the Shared Awareness and Deconfliction (SHADE) mechanism. Established in 2008, SHADE is a mechanism aimed at improving cooperation and coordination among the maritime forces operating in the region while considering new initiatives designed to disrupt and prevent future pirate attacks. These meetings are hosted by the Combined Maritime Forces (CMF) and are held in Bahrain every three months.

SHADE Meeting	Meeting Date	Meeting Location	Attendees	Total
23rd Meeting	March 16, 2012	Bahrain	145	$171,290
24th Meeting	June 17, 2012	Bahrain	145	$171,290
25th Meeting	September 18, 2012	Bahrain	110	$136,940
			TOTAL	$479,520

For the purpose of this study we are only attempting to calculate the cost of the meetings themselves. We do not consider other costs associated with training, administration, headquarters, or personnel. In other words, we only consider the travel and accommodation costs associated with quarterly trips to Bahrain. During 2012, the 26th meeting scheduled for December was postponed until January of 2013. Therefore, there were only 3 meetings with 110-145 attendees in 2012, costing a total of $479,520.

F. Total Cost of Military Operations

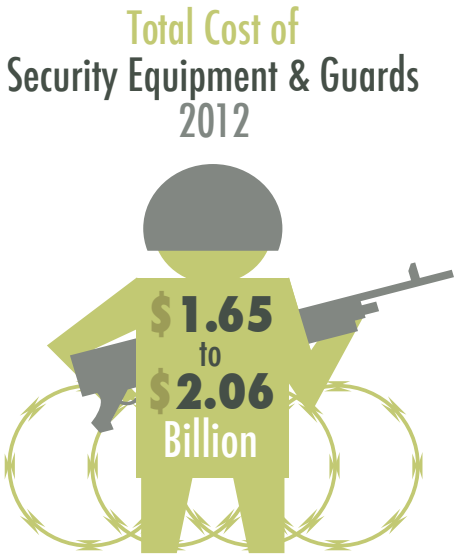
Total Cost of Counter-Piracy Military Efforts	
Total Administrative Budgets	$22,800,000
Total Cost Military Vessel	$1,026,945,046
Total Cost of UAVs	$21,314,540
Total VDP Costs	$19,656,000
Total Cost for SHADE Meetings	$479,520
TOTAL	$1,091,195,106

Taken together, the administrative budgets of the “big three” counter-piracy missions, the cost of surface vessels, reconnaissance aircraft, and UAV deployment, the cost of VPDs, and expenses related to the three SHADE meetings in 2012 amounted to $1.09 billion. Approximately 94.5% of the total cost was spent on surface vessel and reconnaissance aircraft deployment.

At $1.09 billion, the amount spent on military efforts appears to have decreased by around 14% from 2011. However, the reported decrease is the result of an extremely conservative approach to UAV use as well as our decision to hold the average number of vessels patrolling the Indian Ocean constant from 2011, despite reports that the number may have increased.[49]

Costs not included: *There are many costs associated with the deployment of surface naval vessels that could not be sufficiently isolated for this report. These costs include the cost of food, additional manning and supplemental training for the crew, port rights, logistics for supplies, intel support and additional maintenance and ship availability costs. Michael Frodl of C-Level Maritime Risks estimates that all of these costs together result in a cost of $200,000,000 per U.S. frigate per year. Thus if all incremental costs of a vessel deployment could be isolated and included in this calculation, the total military cost could be as much as $3 billion.*

3. The Cost of Security Equipment and Guards



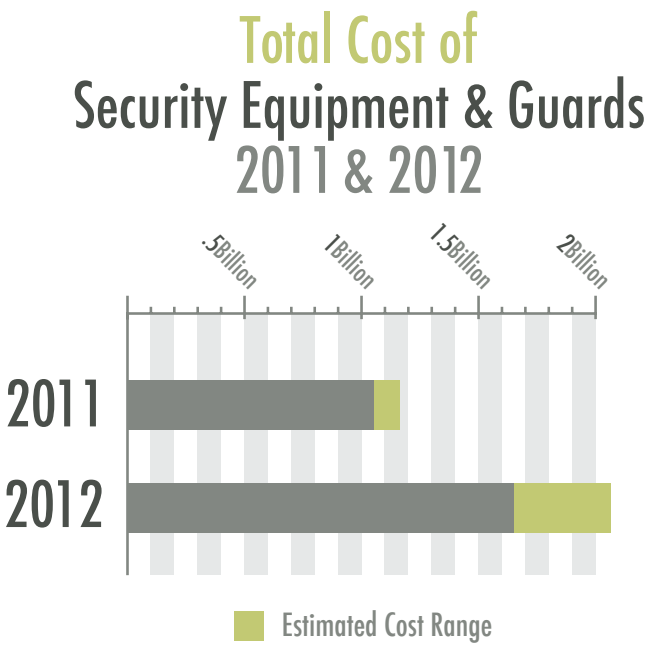
The sheer vastness of the HRA leaves ship owners largely to their own devices in protecting themselves from pirates. Such self-protection comes at a cost. In 2012, ship owners spent slightly more on security equipment than they did in 2011 and significantly more on armed guards.

A. Security Equipment

Best Management Practices for Protection against Somalia Based Piracy, Version 4 (BMP4) remains the industry standard for vessel self-protection.[50] With a compliance rate estimated at 80%,[51] these measures have played a sizeable role in the reduction of successful pirate attacks. BMP4 recommends the following self-protection measures that "are the most basic that are likely to be effective."[52] Examples of these self-protection measures include:

- Watchkeeping and Enhanced Vigilance
- Control of Access to Bridge, Accommodation and Machinery Spaces
- Water Spray and Foam Monitors
- Maneuvering Practice
- Upper Deck Lighting
- Safe Muster Points and Citadels
- Enhanced Bridge Protection
- Physical barriers (such as razor wire and electrified barriers)
- Alarms
- Closed Circuit Television
- Protection of Tools and Equipment
- Private Maritime Security Personnel

SECURITY EQUIPMENT						
Type of Equipment	Unit Cost per Ship	Units per Year	Rate of Use (Low)	Rate of Use (High)	Total Cost (Low)	Total Cost (High)
Razor Wire	$7,998.00	2.00	80%	80%	$447,888,000.00	$447,888,000.00
Water Cannons	$118,755.00	.20	.25%	.83%	$2,078,212.50	$6,927,375.00
Electrified Barriers	$39,585.00	.33	.75%	2.5%	$3,463,687.50	$11,545,625.00
Warning Signs	$4.50	1.00	80%	80%	$126,000.00	$126,000.00
Acoustic Devices	$21,000.00	.20	5%	15%	$7,350,000.00	$22,050,000.00
Sandbags	$1,424.16	1.00	80%	80%	$39,876,480.00	$39,876,480.00
				TOTAL	$500,782,380.00	$528,413,480.00



The methodology used to calculate security equipment costs in 2012 is substantially similar to that used in 2011. We considered the average per ship cost of each ship hardening measure, the rate at which each unit would have to be replaced, and the estimated percentage of ships employing each measure.

However, there were some changes that resulted in an overall increase in the amount spent on security equipment. Some of these changes were small, such as an increased unit price for razor wire[53] and an adjustment in the cost of acoustic devices. Other changes were larger. First, a conversation with a manufacturer of electrified barriers noted that the cost of these systems was significantly higher than estimated in 2011 ($39,585 as opposed to $1,529) and that the rate of use was significantly lower (0.75%-2.5% as opposed to 5%-15%). Also, the cost of water cannons was added to the cost matrix. These units, though expensive, are used by a small proportion of ships transiting the HRA and can be shared among ships. Finally, we made a fairly significant downward adjustment in the number of ships transiting the HRA each year, based on Catlin Group estimate that there are around 35,000 insurable ships in the Indian Ocean each year.[54]

In all, the estimated range of $500.7 million to $528.4 million represents a moderate 11% decrease from 2011's estimate of $530.8 million to $626.5 million.

B. Armed Guards

Among the most significant changes in 2012 was the increased use of armed guards aboard merchant vessels. This trend accounts for a large proportion of the reduction in reported pirate attacks, as no ship employing armed guards has been successfully attacked to date. Yet the increased benefits resulting from armed guards come at an increased cost.

Last year, we estimated that 25% of the ships transiting the HRA employed a team of armed guards at a rate of $50,000 per transit.[55] This resulted in a total cost of $530.6 million spent on armed security in 2011. Developments in 2012 have caused us to adjust our assumptions.

Regarding the rate of armed guard use, estimates range from 38% to 60%.[56] We feel that an estimated rate of PCASP use of 50% is the most appropriate for 2012. It represents the median of estimates surveyed and was specifically cited by a government survey and an industry representative.[57] Reports of the cost of a security team were similarly varied, with estimates ranging from $772.95 to $2,569.73 per guard per day.[58] Excluding these minimum and maximum estimates and averaging the rest yields a daily per-guard cost of $1,115.94.[59] This is the estimate used in our model.

Another consideration that came into play was the number of guards actually employed by ship owners per transit. BIMCO's GUARDCON suggests that a security team should consist of at least four guards.[60] Yet concerns have been raised that some ship owners have been employing smaller teams in hopes of achieving cost savings.[61] Because the degree to which such reductions are taking place is unclear, we provide a range for average team sizes between three and four guards per ship per transit.

Total Transits	Rate of PCASP	Ships w/ PCASP	Cost per Transit (3 guard average)	Cost per Transit (4 guard average)	TOTAL (low)	TOTAL (high)
66,612	50%	33306	$34,500.00	$46,000.00	$1,149,057,000.00	$1,532,076,000.00

Further adding to the cost of private security is the revised estimate of the number of transits through the Indian Ocean each year, which results in an estimate that between $1.15 and $1.53 billion was spent on armed guards in 2012. Controlling for that methodological change, the cost of PCASP aboard increased 79.7% from 2011.

C. Armed Guard Accreditation

The final aspect of security equipment related costs is that associated with armed guard accreditation. Our methodology remains virtually unchanged from last year's. We calculated the average cost of membership in the Security Association for the Maritime Industry (SAMI), the largest of such organizations, and multiply that by the number of members.[62]

SAMI Members	Cost/Member	TOTAL COST
186	$3,947.40	$734,216.40

The estimated cost of $734,216.40 represents a 152.6% increase from 2011, but that increase is almost entirely explained by the 144.7% increase in SAMI membership.

However, the cost of security guard accreditation is not included in the final cost estimate. The cost of accreditation, like other costs associated with running a PMSC, are passed on to the client and are therefore captured in the $38,500-$51,333 per-transit fee included above. Rather, SAMI membership is included as an example of the myriad industries that have emerged in response to the threat of maritime piracy.

In sum, the total cost for security equipment and guards in 2012 was between $1.65 and $2.06 billion.

Costs not included: *Costs associated with controlling access to the bridge, upper deck lighting, safe muster points and citadels, alarms, closed circuit television, and the protection of tools and equipment were not included in this section. This is because much, if not all, of the hardware necessary to engage in these types of vessel self-protection was likely present aboard most merchant vessels irrespective of maritime piracy.*

4. The Cost of Re-Routing

In addition to ship hardening measures, another tactic ship owners and operators use to avoid pirate attacks is the re-routing of ships through the HRA. BMP4 states that it is the shipping company's responsibility to provide guidance to the vessel Master on "the recommended routeing through the High Risk Area and details of the piracy threat."[63] This section considers the costs associated with vessel re-routing to avoid pirate attacks in the HRA.

In our 2010 report, we described what was then the relatively common practice of avoiding the HRA altogether by transiting around the Cape of Good

Hope rather than through the Suez Canal, into the Red Sea, and through to the Gulf of Aden and the HRA.[64] In 2011, however, we found that the increased presence of armed guards, pirates' expanded area of operation, and increased revenue from the Suez Canal all suggested that this type of extensive re-routing was no longer occurring.[65] The move away from routing around the Cape of Good Hope appears to have lasted through 2012, as the presence of armed guards has increased, pirate attacks remain spread throughout the Indian Ocean, and Suez Canal revenues remained virtually unchanged from 2011.[66]

This year's report, like last year's, is therefore limited to the more moderate form of re-routing whereby merchant vessels transit near the Arabian Peninsula and the Indian coastline, rather than taking the shortest possible route around the Horn of Africa and straight through the HRA.

Our methodology for calculating the cost of re-routing was substantially similar to that used in 2011. We only considered additional charter and fuel costs for tankers and bulk carriers, as containerships are capable of much faster speeds and re-route at a significantly lower rate than do tankers and bulk carriers. One significant difference in our methodology is that rather than using industry estimates to arrive at the percentage of ships re-routing along the Indian coast, we used AIS data provided by ExactEarth. By examining four separate regions along the direct route from the Horn of Africa to Sri Lanka and comparing those results to those from a 2008 study that modeled commercial shipping patterns in 2003 and 2004 (available in Appendix D), we found that 49.6% of merchant vessels engaged in re-routing practices. Notably, running the same calculation using AIS data from 2011 resulted in 60% of ships re-routing in that year, exactly midway between the upper and lower bound estimates in 2011 ECoP of 50% and 70%.

The following charts summarize our calculations:

Vessel Type	Vessel Class	Additional distance from re-routing (nm)	Additional time from re-routing (days)	Number of vessels through the Suez Canal	Proportion of vessels re-routing
Tanker	Handysize	760.045	2.64	1819.5	49.61%
Tanker	Aframax	760.045	2.64	1819.5	49.61%
Bulker	Handymax	760.045	2.64	1468	49.61%
Bulker	Panamax	760.045	2.64	1468	49.61%

Vessel Type	Vessel Class	Additional Charter Cost (per voyage)	Additional Fuel Cost (per voyage)	Total Annual Charter Cost	Total Annual Fuel Cost
Tanker	Handysize	$33,779.78	$46,651.56	$30,491,449.84	$42,110,216.80
Tanker	Aframax	$44,335.96	$79,200.00	$40,020,027.92	$71,490,192.84
Bulker	Handymax	$25,070.93	$44,000.91	$18,258,525.67	$32,044,750.41
Bulker	Panamax	$25,070.93	$51,952.88	$18,258,525.67	$37,835,970.36
					$290,509,659.51

Thus in 2012, approximately $290,509,659.51 was spent on re-routing. This sum represents a significant decrease from that reported in 2011, but only a small amount of that decrease was the result of a reduced proportion of ships re-routing. The rest was due to a revision to our methodology whereby only ships that passed through the Suez Canal – as opposed to all ships in the Indian Ocean – were considered candidates for re-routing. This is because only ships that enter the HRA through the Gulf of Aden are faced with the choice of whether to take a direct route through the HRA or re-route along the Indian coast.

***Costs not included**: OBP only considered re-routing options originating or terminating in the Gulf of Aden. Other potential re-routing options such as transits around the Cape of Good Hope, or other variations within the HRA could not be isolated to piracy causes, and therefore were not considered.*

5. The Cost of Increased Speeds

The current version of the industry-developed Best Management Practices (BMP4) describes the practice of increasing speed in the HRA as "one of the most effective ways to defeat a pirate attack."[67] In fact, BMP4 recommends that all ships travel at a speed of at least 18 knots when transiting the HRA. There is evidence to support this recommendation because, like the employment of armed guards, no ship making over 18 knots has ever been captured by pirates.[68] Yet this defensive measure, like all others, comes at a cost to ship owners and operators. This section considers the cost of increased speed through the HRA using satellite Automatic Information System (AIS) data obtained from the ExactEarth Corporation.

According to industry analysts, the cost of increased speed can be significant in the current era of high fuel prices. For example, it is estimated that one very large crude carrier (VLCC) that transited the HRA during October 2012 steaming at 17.9 knots, 5.1 knots above its ideal speed of 12.8 knots, incurs $88,681.74 in additional costs per day.[69]

Such specific data points are available as the result of satellite data obtained from ExactEarth. AIS is an automatic tracking system used for identifying and locating vessels using electronic signals that include information on ship type, speed, and position. All AIS messages sent from the HRA over a sixteen day period in both 2011 and 2012 were collected by ExactEarth's satellites and licensed to OBP for use in this report. The data set was collected to sample shipping traffic during the summer and winter monsoon seasons, as well as the interim periods between those two seasons.

Though a full explanation of the methodology used to calculate the cost of increased speed to the shipping community is available in Appendix E, a brief account of the way we reached our conclusion is in order. First, we separated those AIS messages containing ship type and dimensions from those containing speed over ground and position. Then, using statistical software, we cross-referenced the two sets of messages by MMSI number, a common identifier used in AIS transmissions, so that we had ship type, speed over ground, and ship dimensions for each commercial transit of the HRA on the sixteen days in question. To monetize the data, we considered ship type, ship weight, and speed over ground using a set of fifteen cost curves provided by analysts at BIMCO. These curves related ship speed to hourly fuel consumption for each of the fifteen ship categories in question.

To determine the fuel cost specifically attributable to piracy, the optimal cruising speed had to be ascertained. To do this, we used the results from a 2012 quarterly speed survey conducted by RS Platou Markets finding that VLCC tankers were cruising at an average rate of 12.8 knots and that containerships were travelling at an average of 15.1 knots.[70] Because bulkers and tankers steam at similiar speeds, 12.8 knots was used for the optimal speed for bulk carriers. For each ship where data was available, we took the difference between the reported speed and the optimal speed, and calculated the cost of that difference using the cost curves provided by BIMCO. The preliminary results are as follows:

	Tankers	Containers	Bulkers
Raw Number	909	1719	1719
Raw Number (Fast)	520	720	1106
% Above Optimal	57.21%	41.88%	64.34%
Cost per Fast Ship	$25,895.92	$29,750.05	$63,247.25
Aggregate cost	$13,465,880.34	$21,420,035.38	$69,951,457.59

Because our data only consisted of 16 days out of the year, the data had to be annualized to account for all commercial transits within the HRA, which results in the following estimates:

	Tankers	Containers	Bulkers
Number	20736.5625	39214.6875	39214.6875
# Above Optimal	11862.5	16425	25230.625
% Fast	57.21%	41.88%	64.34%
Cost per Fast Ship	$25,895.92	$29,750.05	$63,247.25
Aggregate cost	$307,190,395.33	$488,644,557.20	$1,595,767,626.22

It may have become apparent that the number of reported bulk carriers is identical to the number of reported containerships. This is due to the fact that the AIS messages did not distinguish between these two types of ships, yet engineering differences between the two classes result in vastly different fuel costs. To compensate for this deficiency, we calculated all "cargo ships" as if they were containerships and performed the same calculation a second time as if they were all bulk carriers. Then, using information from the Suez Transit Authority,[71] we assigned proportions of 27.59%, 34.66%, and 37.76% to tankers, bulkers, and containerships, respectively. This resulted in the following cost estimate:

Ship Type	Proportion in Suez	Number of Transits in HRA	Proportion Steaming Faster than Optimal	Number Steaming Faster than Optimal	Average Cost per Fast-Steaming Ship	Subtotal
Tanker	27.59%	16539.6	57.21%	9461.64837	$25,895.92	$245,018,124.62
Container	37.76%	22635.4	41.88%	9480.80252	$29,750.05	$282,054,340.94
Bulker	34.66%	20776.1	64.34%	13367.316	$63,247.25	$845,445,964.25
TOTALS		59951.25		32309.7669		$1,372,518,429.81

Thus if 100% of ships transited the HRA with their AIS transponders running, the 59,951 observed transits would have resulted in $1.37 billion in costs due to increased speeds in 2012. However, though BMP4 states that "it is recommended that AIS is left on throughout the High Risk Area," it adds that "the Master has the discretion to switch off the AIS if he believes that its use increases the ship's vulnerability."[72] Conversations with those familiar with ship tracking and reporting practices has led us to believe that approximately 75% of ships operate in the HRA with their AIS transponders switched on, but that a certain proportion – around 10% – scramble their MMSI numbers, sending multiple numbers per ship per transit. After making those adjustments, we conclude that 66,612 transits through the HRA have resulted in $1,525,020,477.56 in fuel costs from faster than optimal steaming in 2012.

Despite these seemingly exact conclusions, the AIS data remains an imperfect measure of industry steaming practices in the HRA. This is true for several reasons. First, AIS operators sometimes enter intentionally false inputs into their transponder, including false or multiple MMSI numbers and randomly scrambled entries.

Second, basic user error sometimes results in faulty information. Finally, some users simply choose not to steam through the HRA with their AIS transponders switched on. Moreover, there are variables such as current, wind, and hull condition that affect a ship's fuel consumption rate that are not captured in our data.

Nonetheless, our results are in line with our previous estimate that $2.7 billion was spent on increased speeds in 2011, especially when held up against our finding that both the proportion of ships speeding and the amount by which they speed dropped from 2011 to 2012. Moreover, our finding that there are over 65,000 annual transits through the Indian Ocean each year (as opposed to the 42,450 estimated in 2011) is in line with estimates given by those familiar with vessel tracking and reporting practices. Thus despite the shortcomings inherent in our methodology, our result falls well within reasonably acceptable estimates that have been endorsed by experts in the field.

In addition to providing information on the cost of increased speed, the satellite AIS data used in this section sheds some light on different ships' abilities to comply with BMP4's recommendation that ships transiting the HRA should travel at a speed of at least 18 knots, as well as the effects of the summer and winter monsoon seasons on steaming practices.

The chart below makes two separate but related points about BMP compliance. The first is that not all ships are equally able to steam at 18 knots. In 2011 and 2012, the proportion of tankers steaming at or above 18 knots was between 5% and 6%, while the proportion of other cargo ships travelling at the BMP recommended speed was above 20%. Second, the decrease in the proportion of ships that reduced their speed in 2012 was much more pronounced in other cargo ships than tankers, with the former seeing a 24.3% reduction and the latter seeing a 6.3% reduction.

Proportion Steaming at or Above 18 knots by Year			
	Tankers	Other Cargo Ships	All Ships
2011	5.75%	27.21%	20.02%
2012	5.39%	20.59%	15.33%

Additionally, much has been made about the impact of monsoon seasons on maritime piracy.[73] However the following chart suggests that these seasonal variations have minimal impact on steaming practices:

Proportion Steaming at or Above 18 knots, Monsoons Versus Interim Periods			
	Tankers	Other Cargo Ships	All Ships
2011 Monsoons	4.64%	26.77%	19.19%
2011 Interims	6.65%	27.56%	20.67%
2012 Monsoons	5.01%	21.01%	15.41%
2012 Interims	5.78%	20.18%	15.26%

Throughout 2011 and 2012, the proportion of ships steaming at or above 18 knots changed very little in response to differences between the summer and winter monsoon seasons and the interim periods between those seasons. In the past two years, the most pronounced effect that the monsoon seasons had on steaming was a 2% increase in tankers steaming at or above 18 knots during 2011. The average observed change between monsoon seasons and interim periods was under 1%, and fewer ships travelled at or above 18 knots during interim periods than monsoon seasons in 2012. This is not to say that the summer and winter monsoon seasons have no impact on maritime piracy; it is only to say that they appear to have little to no impact on commercial steaming practices.

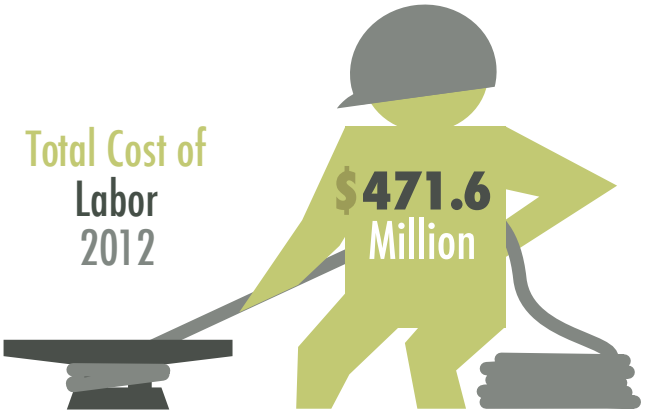
In sum, the satellite AIS data used in this section suggest that ship owners and operators spent $1.53 billion on increased speeds in 2012, confirm that tankers are less able to steam at or above 18 knots than other classes of ships, and lead to the conclusion that the coming and going of monsoon seasons has little impact on commercial steaming practices.

***Costs not included**: According to the Cyprus Shipping Chamber, merchant vessels undergoing a pirate attack incur between $3,000 and $6,000 in additional fuel costs per attack[74]. These costs stem from the increased fuel required to engage in evasive maneuvers. Using the Cyprus Shipping Chamber estimation, these evasive measures cost between $246,000 and $492,000 in 2012.*

6. The Cost of Labor

- 6 seafarers killed
- 383 seafarers held hostage

Another welcome change that has come as a result of decreased pirate activity off the Horn of Africa is the reduction in the number of hostages held and killed by pirates. While one seafarer's life cut short by a pirate is one too many, the 82% reduction in pirate-related hostage fatalities – down from 34 in 2011 to 6 in 2012[75] – is a sign that a reduction in violence at sea is indeed occurring. Additionally, the number of hostages held by pirates dropped from 1,118 to 383 between 2011 and 2012, a much welcomed 66% reduction.[76]



Though the human cost of piracy to seafarers cannot and should not be ignored,[77] this section focuses only on the economic costs associated with seafarer labor, namely hazard pay and wages paid during capture.

A. Hazard Pay

There are various contractual schemes that have been developed to compensate seafarers for the additional risk of transiting the east African HRA. The first of these is a framework agreed upon between the International Transport Workers' Federation (ITF) and ship owners through the International Bargaining Forum (IBF).[78] The latest sample international agreement under the ITF/IBF framework states that "[t]he Seafarer shall…be paid a bonus equal to 100% of the basic wage for the durations of the ship's stay in a Warlike Operations area – subject to a minimum of 5 days' pay."[79] The ITF is comprised of 600,000 seafarers worldwide, many of whom transit the Indian Ocean and Arabian Sea.[80]

Second, the government of the Philippines requires that all contracts with Filipino seafarers provide for hazard pay of 200% of wages and benefits when transiting the HRA.[81] The compensation scheme was created by the Philippine Overseas Employment Administration in 2009,[82] revised in 2011,[83] and clarified in 2012.[84] Between 160,000 and 250,000 of the world's approximately 1.37 million seafarers are from the Philippines.[85]

In addition to the two larger scale schemes described above, many other seafaring contracts contain a hazard pay provision. According to a leading chartering firm, almost all seafarers are unionized and come under a collective bargaining agreement (CBA). Moreover, almost all of these CBAs follow the ITF's lead in providing for 100% additional hazard pay.

Last year's report only considered the hazard pay coming from Filipino government and ITF arrangements known to be operable in the HRA, concluding that 30% of seafarers received hazard pay.[86] However, conversations with Anuj Chopra and others at Anglo-Eastern Ship Management have led us to revise that estimate significantly upwards. Through the course of our investigation, we gained a deeper understanding of the degree to which seafarers are entitled to hazard pay. In fact, 90% of Indian seafarers, 95% of Filipino seafarers, 90% of Sri Lankan seafarers, 80% of Ukrainian seafarers, 60% of Pakistani seafarers, 95% of Malaysian seafarers, and 95% of Indonesian seafarers receive hazard pay.[87] The only crewmembers not likely to receive hazard pay are those from China, Russia, Myanmar and the African continent. From these figures, we conclude that at least 70% of seafarers transiting the east African HRA are entitled to receive hazard pay.[88]

Hazard Pay in 2012	
Hazard pay per transit through the HRA	$10,000
Transits per year through the HRA	66,612
Percentage of vessels disbursing hazard pay	70%
Hazard pay in 2012 due to E. African HRA	$466,284,000

The other revision made to last year's methodology concerns the cost per transit attributable to hazard pay. Last year, we took an average daily per-ship wage of $2,100 and multiplied it by the 7 days that it takes on average to transit the HRA. From those assumptions, we concluded that hazard pay amounted to $14,700 per transit.[89] However, further discussions with Anglo-Eastern have resulted in a reduction in that per-transit estimate. There is significant variation in both crew size and transit duration that results in a hazard pay costs ranging from $3,000 to $19,000 per transit, with an average cost of around $10,000.[90] This $10,000 figure will be used for 2012's calculation. Again, our revised estimate of the number of annual transits in the Indian Ocean further drove the estimated cost of hazard pay upwards.

All told, at $10,000 per transit and with 70% of vessels incurring hazard pay costs, the total cost of east African piracy-related hazard pay in 2012 was $466,284,000.

B. Captivity Pay

The nature of piracy-related labor costs incurred by the shipping industry changes in the event of a successful hijacking. Absent a successful pirate attack, only the wages above normal levels are properly considered costs of piracy. However, in the event of a successful hijacking, seafarer labor stops being put to productive use altogether.

For example, if the average labor cost per transit is $10,000 for ships who do not disburse hazard pay and $20,000 for the ships that do, only the additional $10,000 per transit in hazard pay is a "cost of piracy" absent a hijacking. Once a ship is taken, however, 100% of the labor cost is attributable to piracy for the duration of the hostage situation. Companies must pay the seafarers' wages without receiving any of the benefit of their labor.

Merchant Vessel	# of Hostages	Days in 2012	Months in 2012	Monthly Labor Rate	Subtotal
MV Free Goddess	21	247	8.10	$84,000.00	$680,262.30
MT Liquid Velvet	22	157	5.15	$88,000.00	$452,983.61
MV Obib G	18	8	0.26	$72,000.00	$18,885.25
MT Fairchem Bogey	21	12	0.39	$84,000.00	$33,049.18
MT Enricco Livoli	18	114	3.74	$72,000.00	$269,114.75
MV Leila	15	56	1.84	$60,000.00	$110,163.93

MV Albedo	23	213	6.98	$92,000.00	$642,491.80
MV Orna	10	293	9.61	$40,000.00	$384,262.30
MT Royal Grace	22	304	9.97	$88,000.00	$877,114.75
MT Smyrni	26	235	7.70	$104,000.00	$801,311.48
				Base Wages	$4,269,639.34
				Hazard Pay (35%)	$1,046,061.64
				TOTAL	$5,315,700.98

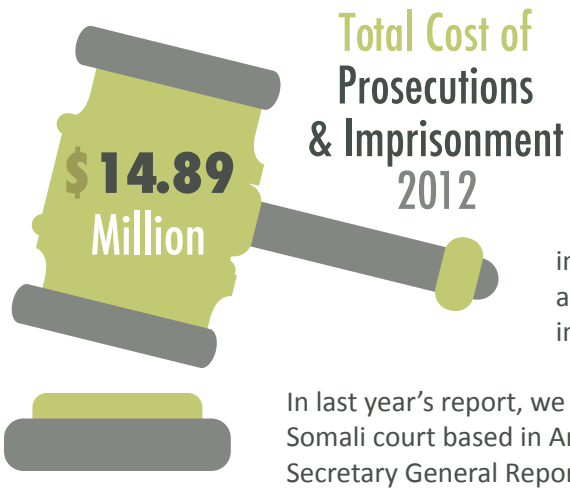
Rather than using the simple calculation just described to calculate captivity cost, we decided to use a different, more accurate formulation. As stated in the preceding subsection, hazard pay only doubles "base wages," or the wages paid to the lowest paid crewmember. Thus the pre-hazard pay labor cost is actually more than twice the hazard pay, as pre-hazard pay labor costs include the larger salaries of higher ranked crewmembers aboard the vessel. Nonetheless, labor cost is correlated to the size of the crew. We therefore took an average monthly pre-hazard pay labor cost of $80,000 for 20 crew, adjusted the monthly labor cost to account for changes in crew size, and calculated subtotals based on crew size and duration of capture. We then multiplied the total labor cost by 35% to calculate additional hazard pay.[91]

This section assumes that only large-scale merchant vessels (as opposed to fishing vessels and local dhows) continue to pay seafarer wages in the event of a hostage situation.[92] It further assumes that, in accordance with the preceding section on hazard pay, that 70% of merchant vessels disburse hazard pay to seafarers transiting the HRA. Using that calculation, the total cost of captivity pay was $5,315,701 in 2012.

Between hazard pay and captivity pay, the total cost to labor in 2012 was $471,599,701. Although this figure represents a significant increase from that reported in 2011, the increase was due entirely to improved methodology as opposed to real cost increases. Controlling for these methodological changes, labor costs remained virtually unchanged between 2011 and 2012.

***Costs not included**: Administrative costs associated with negotiating and administering hazard pay and captivity pay are not included in this section.*

7. The Cost of Prosecution and Imprisonment



Piracy is the oldest crime of universal jurisdiction under international law, its perpetrators dubbed *communis hostis omnium* ("the common enemy of all") by Cicero in the first century B.C.[93] True to its international character, at least 40 countries were involved in capturing, investigating, trying, and imprisoning pirates in 2012.[94] The cost of trying pirates may have dropped this past year, but the cost attributed to imprisonment increased. Before delving into 2012's cost factors, a number of developments in the area of prosecution and imprisonment are worth mentioning for context.

In last year's report, we discussed Jack Lang's proposal for a specialized extraterritorial Somali court based in Arusha, Tanzania to try suspected pirates.[95] According to a new Secretary General Report published in 2012, that strategy has been supplanted by one involving internationally assisted domestic anti-piracy courts in Somalia, Seychelles,

Kenya, Mauritius and Tanzania.[96] International assistance comes from the United Nations and its Member States, which support various elements of domestic prosecutions from training personnel to constructing prisons, with local officials conducting the actual judicial processes.[97] The project is expected to cost $30.49 million between early 2012 and mid-2014, of which $9.38 million has already been contributed.[98]

The UNODC has taken the lead in the capacity-building efforts needed to operationalize this regional trial strategy.[99] To that end, the UNODC has been working with Kenya, Seychelles, Mauritius and Tanzania to "address the particular problems of conducting fair and efficient piracy trials and ensuring safe and secure imprisonment of piracy prisoners," while providing a more basic level of assistance in Somaliland and Puntland.[100] These widespread efforts will work towards increasing the capacity to prosecute pirates within the region, as opposed to transferring them to the United States or the European Union for costlier prosecution.

Country	Pirates Held	Completed Trials	# of Suspects	Region
Comoros	6	0	0	Africa
Kenya	164	2	11	Africa
Madagascar	12	1	14	Africa
Maldives	41	0	0	Africa
Oman	32	2	20	Africa
Seychelles	124	4	37	Africa
Somalia & Puntland	308	unknown	unknown	Africa
Somaliland	94	unknown	unknown	Africa
Tanzania	12	0	0	Africa
UAE	10	1	10	Africa
Yemen	129	1	4	Africa
India	119	unknown	unknown	Asia
Korea	5	0	0	Asia
Malaysia	7	1	7	Asia
Belgium	2	2	2	Europe & Japan
France	22	1	6	Europe & Japan
Germany	10	1	10	Europe & Japan
Italy	20	2	20	Europe & Japan
Japan	4	0	0	Europe & Japan
Netherlands	33	1	9	Europe & Japan
Spain	8	0	0	Europe & Japan
USA	28	2	2	North America
TOTAL	1190	21	152	

In 2012, the cost related to prosecutions was $8.84 million, down 24% from the $11.66 million reported in 2011.[101] Almost all of 2012's reported prosecution costs were spent in Europe, which held 7 piracy trials at an average cost of $1,174,484.86 each.[102] It should be noted, however, that Kenyan and Seychellois prosecutions are not included in this estimate, as those costs are borne by the UNODC and captured in the section concerning counter-piracy organizations.[103] Similarly, Somali and Indian prosecution costs are un-accounted for due to the unavailability of relevant data.

Region	Pirate Trials	Average Cost per Trial	Total Trial Cost	Pirates Imprisoned	Cost per year of imprisonment	Total Imprisonment Cost	Total Regional Cost in 2012
Africa	5	$227.97	$1,139.86	644	$730.00	$470,120.00	$471,259.86
Asia	1	$7,313.96	$7,313.96	131	$375.51	$49,191.81	$56,505.77
Europe	7	$1,174,484.86	$8,221,394.00	99	$47,793.60	$4,731,566.40	$12,952,960.40
N. America	2	$307,355.00	$614,710.00	28	$28,284.00	$791,952.00	$1,406,662.00
TOTAL	16		$8,844,557.82	902		$6,042,830.21	$14,887,388.03

Overall, the reduction in prosecution costs appears to be due simply to a decrease in the number of suspects prosecuted. Excluding those prosecuted by Somalia and India, 232 pirates were prosecuted in 2011, and 152 were prosecuted in 2012.

Where imprisonment costs are concerned, our methodology remains unchanged from 2011. We began with the number of pirates held as reported by the UNODC.[104] We then subtracted those held by Kenya and Seychelles, separated detainees by region, and multiplied each region's detainees by the estimated average imprisonment cost for that region. From that calculation, we conclude that $6.04 million was spent on incarceration in 2012. This figure, up 26.67% from 2011, is mostly due to an increase in the number of pirates detained in Europe. In 2011, 72 pirates were serving sentences in Europe at a cost of $3.47 million; in 2012, there were 99 pirates serving sentences at a cost of $4.73 million.

This reduction in prosecution costs occurring alongside an increase in imprisonment costs highlights an important policy consideration. While pirate prosecution is a relatively short-term proposition, imprisonment is a rather long term one. In 2012, sentences ranged from 2 years to life, with an average sentence of 8.66 years.[105] Absent a post-trial transfer agreement, a commitment to prosecute a suspected pirate could potentially become a costly, long-term commitment to imprison that pirate. Signing and acting upon agreements to imprison convicted pirates in the region is therefore paramount. Seychelles, Somalia, Kenya, and Mauritius have already signed such agreements.[106]

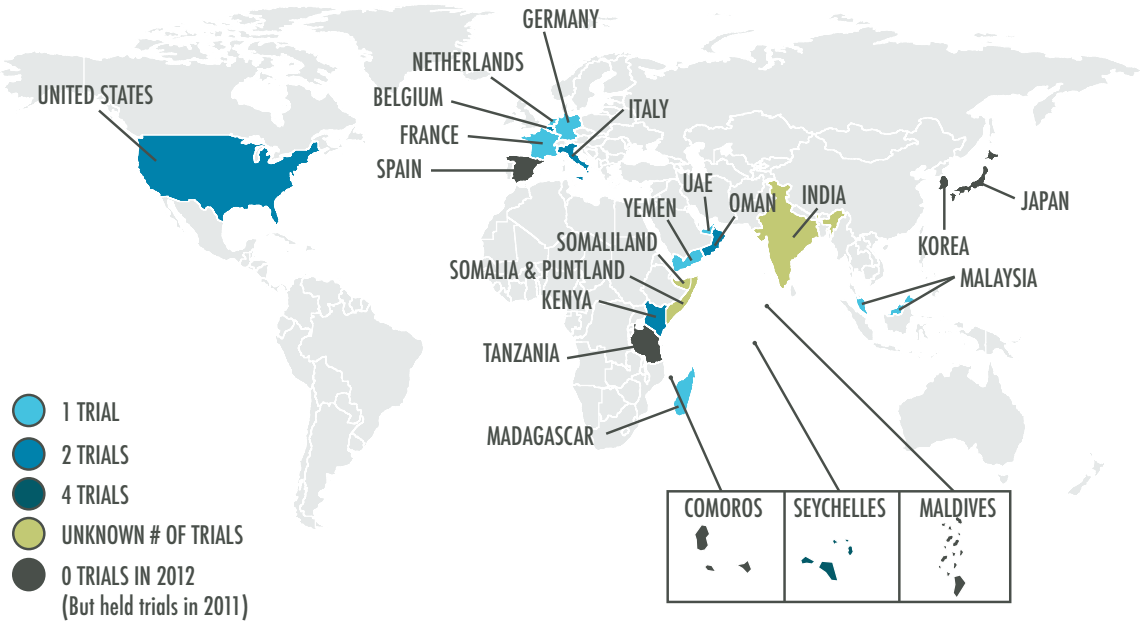
There is another issue related to sentencing that does not affect cost per se, but is nonetheless worth mentioning, as it likely has implications on the retributive and deterrent effects of piracy trials. The issue is a lack of consistency in sentencing that, according to a 2012 paper written by Eugene Kontorovich on behalf of OBP, is due to variances in statutes and sentencing norms between countries and appears unrelated to the severity of the pirates' individual actions.[107] In addition to important questions of equity among defendants accused of the same crime, the observed variance in sentencing may be detrimental to the deterrent effect of piracy prosecutions overall. [108]

It is difficult to predict the future of prosecution and imprisonment costs because there are emerging forces that could drive future costs both upwards and downwards. One factor driving up future costs is the improved judicial standards being marshaled in by regional states like Seychelles, Kenya, Mauritius, and Tanzania with the help of the UNODC. Generally speaking, improved quality comes at an increased price, and prosecutions are no exception. Another more speculative factor driving prosecution and imprisonment costs upwards would

be a reduction in the catch and release rate, a stated goal of those combatting east African piracy.[109] Reducing the catch and release rate would necessarily result in an increased rate of prosecution, with a corresponding increase in cost. Increasing the number of piracy prosecutions and the quality of those prosecutions would be two welcome developments, but they would come at a cost.

There are also several factors that could drive future costs downward. First, a shift away from North American and European prosecutions and towards regional tribunals would lower costs. Even assuming that improved judicial standards would increase the per-prosecution cost in regional states, those rates would still be significantly lower than their American and European counterparts. Second, the UNODC and the U.S. State Department have invested in video conferencing equipment that could drastically lower the cost of witness appearances in the region.[110] These sorts of technological efficiencies should be sought at every turn. Finally, the collection and sharing of evidence is becoming more streamlined through the ongoing efforts of INTERPOL and the forthcoming work of RAPPICC.[111] Together, these efficiencies should serve to lower the cost of a piracy prosecution moving forward.

PIRACY PROSECUTIONS IN 2012



TOTAL COST OF TRIAL & IMPRISONMENT

AFRICA	$471,259.86
ASIA	$56,505.77
EUROPE	$12,952,960.40
N. AMERICA	$1,406,662.00

$ 14.89 Million

In the end, the effectiveness of the judicial aspect of the global fight against maritime piracy should be measured by the per-prosecution cost, the naval catch and release rate, and the deterrent effect that results from prosecutorial efforts. Steps are currently underway to improve these metrics.

Costs not included: *The cost of prosecutions and imprisonment paid for by the United Nations is not included in this section. This is because those costs are captured in the section covering counter-piracy organizations.*

8. The Cost of Piracy-Related Insurance

Total Cost of War Risk and K&R Insurance 2012

$550.7 Million

Piracy off the coast of Somalia continues to pose a risk to ships transiting the High Risk Area (HRA), and ship-owners continue to insure themselves against that risk. Like all companies seeking to mitigate risk, ship owners pay premiums to insurance companies to cover financial losses in the case of an accident. The rise in maritime piracy has led to an increase in insurance costs reflecting the increased risk due to a possible hijacking. This section seeks to calculate insurance costs that can be attributed to maritime piracy.

Calculating the cost of piracy-related insurance remains as difficult and contentious a task as it was in 2011. Though the input received by the insurance industry last year has proven durable, the debate as to the profitability of pirate-related insurance continues unabated. Demonstrating the split in perception was a 2012 Lloyd's List market survey finding that 53% of respondents believed that the insurance industry was "profiteering" from piracy, with 24% disagreeing with that statement and the remaining 23% unsure.[112] This discrepancy is undoubtedly related to the private and individualized nature of insurance contracts, and there is little that can be done to affect those informational limitations.

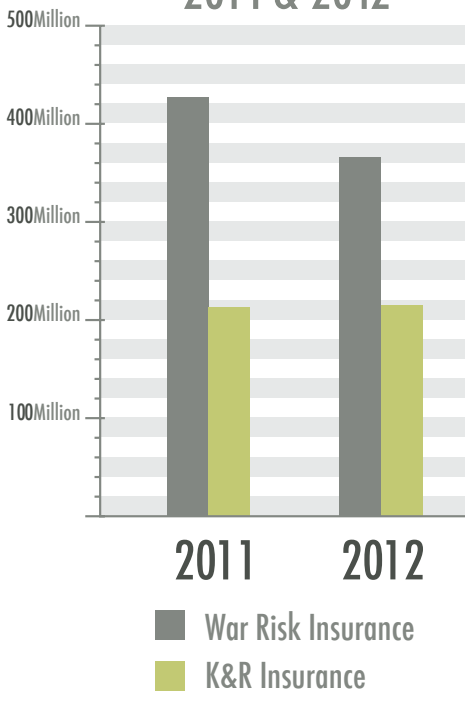
The two primary forms of piracy-related insurance are War Risk and Kidnap and Ransom (K&R) insurance. Although it is possible that the threat of piracy has resulted in increased hull and cargo premiums, such a cost increase – if it exists – would be a second order cost of piracy outside the scope of this study.[113]

- **War Risk Insurance**: this form of insurance primarily covers the cost of injury to the crew and damage to the vessel while traveling inside the war risk area.[114] In addition to these costs, some war risk plans also cover the payment of ransom.[115]

All ships transiting the war risk area must purchase war risk insurance. The war risk area is determined by the Lloyds Market Association (LMA) Joint War Committee in London.[116] With the minor exception of the deletion of Djibouti excluding transit, the piracy-related war risk area remained unchanged in 2012.[117]

There are three ways for the insured to reduce their war risk premium. The first is through a no claims bonus available to ship-owners who do not file a piracy related claim. The second is an additional discount for the purchase of K&R insurance. The third is a discount available to those who employ armed guards in defense of their vessel. In addition, compliance with the latest industry best management practices (BMP4), which has been an important too used by industry to deter pirates, is frequently a requirement for underwriting.[118]

Total Cost of War Risk and K&R Insurance 2011 & 2012



- **Kidnap and Ransom Insurance:** K&R policies are separate from war risk policies and cover the ransom payment along with additional costs associated with hostage negotiations, including consultants' fees, legal expenses, and other related costs.[119]

In determining each ship's K&R premium, insurers consider factors such as its speed, freeboard height (including whether it is laden or in ballast during voyage), and whether there are armed guards present on board.[120]

Broadly speaking, the news on premium rate changes has been mixed. The insurance industry is not a monolith, and rates are individually negotiated. As a result, some analysts and commentators have reported rate decreases resulting from the decrease in reported attacks, while others have predicted across-the-board rate increases due to the continued risk and questions about underreporting.[121] Thus our baseline estimates of 0.10% of the hull value for war risk insurance, and the $12,500 and $7,500 baselines for K&R cover applied to "low and slow" and "high and fast" ships remains unchanged. Also unchanged are our assumptions regarding war risk insurance that 100% of insured ship-owners receive a 50% no claims bonus and that 50% of insured ship-owners receive a 50% discount for purchasing K&R cover.

One thing that has certainly changed, however, is the increased presence of PCASP on board merchant vessels. This has resulted in a larger discount available to ships employing armed guards, as well as an increase in the proportion of ships qualified to receive such a discount.[122] Last year, we estimated that approximately 25% of the ships transiting the HRA received a 30% war risk discount for the use of armed guards.[123] This year we estimate that 50% of ships receive a 40% discount for the use of armed guards. Our estimate of 50% is at the low end of industry estimates that between 50% and 60% of all ships transiting the east African HRA employ armed guards.[124]

In short, the methodology based on discussions with industry representatives and utilized in the 2011 report remains largely unchanged, yet the increased presence of armed guards has made a measurable difference in the overall cost of insurance.

In 2012, our calculations suggest that the shipping industry spent around $550.7 million on war risk and K&R insurance, down 13.26% from the $634.9 million reported in 2011.[125] Although we use a revised estimate of 66,612 for the number of vessels transiting the Indian Ocean throughout the rest of this report, we continue to use the estimate from ECoP 2011 that around 42,450 vessels transit the Indian Ocean for the purposes of insurance. This is because most, though not all, commercial vessels transiting the HRA purchase piracy-related insurance. The following tables summarize our findings:

WAR RISK INSURANCE		
Ship Type	# in HRA	Hull Value
Tanker	9,171	$41,000,000.00
LNG	2,016	$26,000,000.00
Carrier	7,442	$30,333,333.33
General Cargo	3,397	$23,666,666.67
Container Ships	15,310	$23,666,666.67
RO/RO Ships	688	$23,666,666.67
Car Carriers	2,525	$23,666,666.67
Passenger Ships	217	$23,666,666.67
Other	1,701	$23,666,666.67

	Group 1 (No Claims Only) 25% of Ships		Group 2 (No Claims/K&R) 25% of Ships		Group 3 (No Claims/PCASP) 25% of Ships		Group 4 (No Claims/K&R/PCASP) 25% of Ships	
Ship Type	# of Ships	Rate per Ship	# of Ships	Rate per Ship	# of Ships	Rate per Ship	# of Ships	Rate per Ship
Tanker	2293	$20,500.00	2293	$10,250.00	2293	$12,300.00	2293	$6,150.00
LNG	504	$13,000.00	504	$6,500.00	504	$7,800.00	504	$3,900.00
Carrier	1860	$15,166.67	1860	$7,583.33	1860	$9,100.00	1860	$4,550.00
General Cargo	849	$11,833.33	849	$5,916.67	849	$7,100.00	849	$3,550.00
Container Ships	3827	$11,833.33	3827	$5,916.67	3827	$7,100.00	3827	$3,550.00
RO/RO Ships	172	$11,833.33	172	$5,916.67	172	$7,100.00	172	$3,550.00
Car Carriers	631	$11,833.33	631	$5,916.67	631	$7,100.00	631	$3,550.00
Passenger Ships	54	$11,833.33	54	$5,916.67	54	$7,100.00	54	$3,550.00
Other	425	$11,833.33	425	$5,916.67	425	$7,100.00	425	$3,550.00

TOTAL COST OF WAR RISK INSURANCE: $365,499,212.53

K&R INSURANCE				
Ship Type	# in HRA	K&R Rate	% w/K&R	Subtotal
Tanker	9,171	$12,500.00	50%	$57,317,597.25
LNG	2,016	$12,500.00	50%	$12,600,735.86
Carrier	7,442	$12,500.00	50%	$46,512,466.25
General Cargo	3,397	$12,500.00	50%	$21,232,239.93
Container Ships	15,310	$7,500.00	50%	$57,412,102.77
RO/RO Ships	688	$7,500.00	50%	$2,580,000.67
Car Carriers	2,525	$7,500.00	50%	$9,469,453.00
Passenger Ships	217	$12,500.00	50%	$1,354,579.11
Other	1,701	$10,000.00	50%	$8,505,496.71
			TOTAL	$216,984,671.53

The per-transit decline in the cost of piracy-related insurance is even more striking in light of two changes in the makeup of ships transiting the HRA between 2011 and 2012 that serve to drive up the cost of insurance. According to UNCTAD's 2011 *Review of Maritime Transport*, the average hull value of a ship transiting the Suez Canal (our proxy for the profile of the estimated 42,467[126] transits through the HRA each year) was $24.0 million.[127] Yet in UNCTAD's 2012 *Review of Maritime Transport*, the average hull value was estimated at $26.6 million, representing a 10.8% increase.[128]

In addition to this general increase in hull values, the proportion of more expensive ships to less expensive ones was significantly higher in 2012 than 2011. For example, tankers, which are the most expensive of all the ships transiting the Suez, represented 19.7% of total traffic in 2011 and 21.6% of the total traffic in 2012. Similarly, bulk and combined carriers, the next most expensive class of ships, constituted 15.6% of total traffic in 2011 and 17.52% in 2012. Contrast this with the rates of the less expensive ships – such as general cargo ships, container ships, passenger ships and "other" ships – which saw respective proportional decreases of 11.04%, 5.33%,

8.17%, and 22.91% between 2011 and 2012. Both of these factors put upward pressure on the cost of piracy-related insurance. This upward pressure was more than offset by discounts related to the increased use of PCASP.

In fact, after controlling for the changes in the composition of merchant vessels in the HRA, the decrease in insurance costs between 2011 and 2012 would be a full 14.9%, as opposed to the 13.3% reduction observed.[129]

The cost of piracy-related insurance represents a welcome decrease from 2011. This is despite an increase in the estimated value of the insured property in the HRA. The overall decline is due primarily in the increased use of PCASP aboard merchant vessels. If the downward trend in reported attempts and hijackings continues, we should expect the piracy-related insurance costs to continue decreasing in the future.[130]

Costs not included: *The cost of hull insurance is not included in the section on piracy-related insurance because hull insurance is considered to be a normal cost of the shipping industry. Depending on the specific policy in question, piracy may have a direct effect on hull insurance premiums. However, OBP was not able to conclusively discern what proportion of any given hull insurance premium is directly attributable to piracy risk.*

9. The Cost of Counter-Piracy Organizations

In addition to the funds contributed directly by governments and industry, several counter-piracy organizations devote some or all of their budgets to the fight against maritime piracy. Some of these organizations are IGOs performing their official duties and others are NGOs playing a more informal role, but all of them provide valuable input to the global effort against piracy, and all of them incur costs while doing so. This section describes the missions of each counter-piracy organization, notes relevant developments in 2012, and estimates the annual total spent on each organization.

A. Trust Fund to Support Initiatives of States to Counter Piracy off the Coast of Somalia ("Trust Fund")

Total Contribution to the Trust Fund, 2012: $5.83 million	
Germany Italy Qatar Spain	$2.5 million
Japan	$2 million
UAE	$1 million
Norway	~$333,333

With a mandate from the forty-six member states comprising the Contact Group on Piracy off the Coast of Somalia (CGPCS), the Trust Fund was established on January 27, 2010 by the United Nations Secretary General, Ban Ki Moon. The Trust Fund has supported the initiatives of three United Nations entities, namely the United Nations Development Programme (UNDP), United Nations Office on Drugs and Crime (UNODC) and the United Nations Political Office for Somalia (UNPOS). The objective of the Fund is to "help defray the expenses associated with prosecution of suspected pirates, as well as other activities related to implementing the Contact Group's objectives regarding combating piracy in all its aspects."[131] At the CGPCS 13th Plenary Session, participants noted that while there has been a reduction in the number of attacks and hijackings in 2012, the underlying causes of piracy remain in place. Because the gains made are both fragile and reversible, CGPCS stakeholders noted, ongoing funding and operational support will be necessary.[132]

The Trust Fund has approved twenty-seven projects at a value of $11.95 million, including initiatives aimed at strengthening regional criminal justice and law enforcement systems to fight piracy in Somalia, Kenya and the Seychelles.[133] At its 10th meeting on March 28, 2012, the Trust Fund's Board approved two new projects valued at $1.37 million. The newest projects will support the trials of pirates in Kenya, Mauritius, Seychelles and the United Republic of Tanzania and provide further assistance to the UNODC Piracy Prisoner Transfer Programme.[134] As of December 2012, $16.5 million has been contributed to the Trust Fund, of which $12.12 million has been disbursed.[135]

However, the cost attributed to the Trust Fund in this study is not based on the expenditures made in a given year. Rather, it is based on the donations received in a given year.[136] In 2012, Germany, Italy, and Qatar donated a combined $2.5 million,[137] Japan donated $2 million,[138] the United Arab Emirates donated $1 million,[139] and Norway donated approximately $333,333.[140] This brings the total cost attributed to the Trust Fund to $5.83 million in 2012.

B. UNODC
United Nations Office on Drugs and Crime

Of all the United Nations agencies combatting piracy, the UNODC spends the most, both in time and resources, on the issue. In fact, the UNODC Counter Piracy Programme (CPP) received 67% of the Trust Fund's total allocation.[141] Though the UNODC's initial mandate was to aid Kenya in prosecuting and imprisoning pirates, it has been extended to cover five additional regional nations: Seychelles, Mauritius, Tanzania, Maldives and Somalia.[142]

Total Financial Contribution to UNODC, 2012: $6.74 million	
Australia	$2 million
Denmark	~$4.62 million
Germany	$120,000

The CPP supports the regional effort to detain and prosecute piracy suspects in accordance with international standards of justice, the rule of law, and respect for human rights. To achieve these goals, the UNODC CPP focuses on the following areas:

- Assisting fair and efficient trials in regional centers while building a sustainable criminal justice capacity to address piracy and other serious crimes
- Providing humane and secure imprisonment in Somalia by updating Somali prisons and facilitating post-trial transfers
- Supporting police, officials and prison guard training as well as providing necessary equipment and logistical assistance to all stages of the progress to ensure ability to meet the standards of fairness and efficiency[143]

The overall budget of the UNODC CPP is $55 million.[144] However, this section only considers new contributions made in 2012, which amounted to $6.74 million, with $2 million coming from Australia,[145] approximately $4.62 million from Denmark,[146] and $120,000 from Germany.[147]

C. CONTACT GROUP ON PIRACY OFF THE COAST OF SOMALIA (CGPCS)

Total Cost of Contact Group Meetings, 2012: $765,242
15 total meetings: $765,242 (12 working group meetings and 3 CGPCS plenary meetings were held during 2012)

The CGPCS was established on January 14, 2009 following UN Security Council Resolution 1851. Its goal is to "facilitate the discussion and coordination of actions among states and organizations to suppress piracy off the coast of Somalia."[148] This international forum works towards the prevention of piracy off the Somali coast through a multi-stakeholder process including representatives from industry, government, international organizations, and civil society. The CGPCS has five Working Groups dedicated to specific issues of piracy deterrence:

Working Group 1: chaired by the United Kingdom, WG1 is responsible for effectively operating naval coordination and building judicial, penal and maritime capacity in regional states. WG1 meets three times per year at the IMO headquarters in London.

Working Group 2: chaired by Denmark, WG2 provides legal and judicial guidance to the CGPCS, States and organizations on all aspects related to counter-piracy. WG2 normally meets three times per year in Copenhagen.

Working Group 3: currently chaired by the Republic of Korea, WG3 focuses on industry-specific issues such as vessel self-protection. The group meets twice per year; Washington DC and London were the host cities of 2012.

Working Group 4: chaired by Egypt, WG4 concentrates on public diplomacy, promoting awareness of the problem of piracy off the Somali coast. The group met twice in 2012, first meeting in NY and the second meeting in the UAE.

Working Group 5: chaired by Italy, WG5 works toward identifying and disrupting the financial network utilized by pirates. The group met three times during 2012, twice in London and once in Rome.

The bulk of piracy related funding attributable to the CGPCS is distributed by the Trust Fund and captured above. However, there are additional costs associated with attending the 15 CGPCS meetings held in 2012. Travel and accommodation costs are the only ones included in this estimate, but these per meeting costs vary depending on meeting duration, size, and international travel required. The table below summarizes our findings:

Category	Meeting Date	Meeting Location	Duration	Attendees	% Intl Travel	Meeting Total
WG 1	3/21/2012	London	1	150	25	$34,848
	7/12/2012	London	1	150	25	$34,848
	11/14/2012	London	1	150	25	$34,848
WG 2	3/5/2012	Copenhagen	1	100	95	$76,986
	9/17-18/2012	Copenhagen	2	100	95	$101,686
WG 3	2/28/2012	Washington, DC	1	100	35	$51,290
	9/25/2012	London	1	150	25	$34,848
WG 4	3/28/2012	New York	1	150	25	$42,908
	6/26/2012	Dubai	1	50	95	$42,458
WG 5	3/5/2012	London	1	150	25	$34,848
	7/9/2012	London	1	150	25	$34,848
	11/9/2012	Rome	1	50	95	$41,296
11th Plenary	3/29/2012	New York	1	250	25	$66,510
12th Plenary	7/25/2012	New York	1	250	25	$66,510
13th Plenary	12/11/2012	New York	1	250	25	$66,510
					TOTAL	$765,242

There are other costs associated with CGPCS meetings, like the direct cost of planning the meeting and the opportunity cost of attending the meeting, which if included, would drive the total cost figure upwards, if only slightly. In the end, we estimate that $765,242 was spent on travel to and accommodation for CGPCS meetings.[149]

D. The Djibouti Code of Conduct

Total Financial Contribution to the Djibouti Code, 2012: $312,800	
Netherlands	$22,300
Norway	$40,600
Republic of Korea	$150,000
France	$49,900
ASRY	$50,000

The Djibouti Code of Conduct became effective on January 29, 2009 and is managed by a multi-national Project Implementation Unit (PIU) within the IMO. The implementation of the Code is meant to help improve communication and information sharing among states on piracy incidents in the Indian Ocean and Gulf of Aden. In addition, the Djibouti Code works toward enhancing regional states' capabilities to deter, arrest, and prosecute pirates. During 2012, South Africa and Mozambique became the newest Djibouti Code signatories, which now has 20 of the 21 eligible countries signed on.[150]

PIU, Annual Budget: $13.8 million

The PIU has a budget of US$ 13.8 million held in the IMO Trust Fund[151]; 87% of these funds have been allocated for use by 2013.[152] The primary donor continues to be Japan, but additional contributions have been made by states, organizations, institutions, and private individuals to support counter-piracy capacity building. During 2012, the governments of the Netherlands, Norway, the Republic of Korea, and France each made contributions.[153] In addition, the Arab Shipbuilding and Repair Yard (ASRY), based in Bahrain, donated $50,000 to the Djibouti Code, [154] bringing the total contribution to $312,800 in 2012.

E. Somalia

Total Financial Contribution to UNDP Somalia (piracy related) 2012: $4.96 million	
Norway	~$333,333
Denmark	~$4,625,000

The United Nations Development Programme (UNDP)-Somalia is dedicated to mobilizing resources for recovery and development in Somalia. In 2011 UNDP- Somalia launched a new 5 year program whose focus is on peace-building, conflict management, governance and law. The goal is to build the capacity for people and local institutions to prevent, manage and resolve conflict.[155] Additionally, UNDP-Somalia has also developed a training program for judicial personnel, including judges and prosecutors. This program will strengthen judicial capacity in Somalia to ensure an efficient response to organized crime, specifically piracy. So far, the UNDP has provided free legal counsel and representation to 8,778 persons, including 30 court cases involving 138 suspected pirates in Somalia.[156]

The Trust Fund currently allocates 26% of its funds to UNDP – Somalia.[157] Though this funding represents the majority of UNDP-Somalia's budget, other donations were made to the program specifically earmarked for piracy. Specifically, the government of Norway donated approximately $333,333[158] and Denmark donated approximately $4.62 million.[159]

F. EUCAP NESTOR

EUCAP NESTOR 2012 Budget (est.): $2,982,012

EUCAP NESTOR is an initiative of the European Union's Common Security and Defence Policy. The initiative was launched on July 16, 2012 and is "aimed at enhancing the maritime capacities" of initially Djibouti, Kenya, Seychelles, Somalia and Tanzania.[160] The project has an initial mandate of two years, with a strategic assessment to come after one year in operation. The two-year budget of EUCAP NESTOR is $29,820,120.[161] However, the bulk of that budget is likely to be spent in 2013 and the first half of 2014 once the program becomes more fully operational. Accordingly, this report estimates that only 10% of EUCAP NESTOR's total budget was spent in the first quarter of its operation. This results in an estimated $2,982,012 being spent in 2012.

G. Regional Anti-Piracy Prosecutions Intelligence Co-operation Centre (RAPPICC)[162]

RAPPICC is a center which aims to be a "one stop shop" for intelligence gathering, investigation and prosecution of pirates.[163] It will facilitate, coordinate and analyze intelligence to inform "*tactical law enforcement options, including the turning of intelligence into useable evidence for prosecutions both in the region and further afield.*"[164] Operations started in a temporary office in June of 2012,[165] but RAPPICC officially held its inaugural ceremony on February 2013.[166]

RAPPICC Total: $1,273,000	
UK	$873,000
Netherlands	$400,000

The UK and Dutch government agreed to jointly fund this new piracy intelligence unit which is located in the Seychelles. The UK donated £550,000 ($873,000), while the Netherlands gave €300,000 ($400,000).[167]

H. PiraT Project

PiraT Project, Annual Budget: ~$445,899[168]

The PiraT Project is a non-profit organization funded by the German Federal Ministry of Research and Education (BMBF).[169] The mission of the PitaT Project is "develop a comprehensive concept for maritime security in which political risk analyses and technological security solutions are linked with legal and economic approaches."[170] The BMBF granted approximately one million euros toward this initiative in March of 2010.[171] The funding was meant to last until December 2012, but was prolonged until March 2013.[172] Spreading the one million euro donation evenly over the 36 months of the funding's duration results in an estimated $445,899 spent in 2012.[173]

I. OCEANS BEYOND PIRACY

Total Budget of Oceans Beyond Piracy in 2012: $775,000

Founded in 2010, OBP is the flagship project of the One Earth Future Foundation in Broomfield, Colorado. OBP "seeks to develop a global response to maritime piracy that deals comprehensively with deterrence, suppression, and prosecution of piracy while building the foundation for a longer-term solution."[174] A key component of the project is increasing cooperation by engaging and mobilizing a wide range of maritime community stakeholders including ship owners, seafarers, governments, international organizations, and the insurance industry. In 2012, OBP spent $775,000 on staff salaries, meeting costs, and other expenses related to furthering its mission.

Organization	2012 Donations
Trust Fund	$ 5,830,000.00
UNODC	$ 6,740,000.00
CGPCS	$ 765,242.00
DCoC	$ 312,800.00
UNDP	$ 4,960,000.00
EUCAP NESTOR	$ 2,982,012.00
RAPPICC	$ 1,273,000
PiraT	$ 445,899.00
OBP	$ 775,000.00
TOTAL	$ 24,083,953.00

In 2012, our calculations suggest that counter-piracy organizations received $24,083,953 million for capacity building projects. The following table summarizes our findings:

Costs not included: *There were several organizations that could not be included in this section for various reasons. Among them were INTERPOL, UNOPS, MPHRP, EU MASE, EU PMAR, and EU Critical Maritime Routes/Marsic. Though all of these organizations play a role in the international fight against maritime piracy, specific cost information was not available.*

Piracy Trends and Takeaways

Creating this report required scouring hundreds if not thousands of news reports, press releases, and government documents in addition to engaging in dozens of email exchanges and phone calls with stakeholders from industry, government, and civil society. Several takeaways emerged from this investigation, suggesting trends to watch for in 2013 and beyond. This section touches briefly on each of these major developments.

A. Observed reduction in East African piracy

The clearest takeaway from 2012 is that east African hijackings are down significantly from years past. In 2011, 31 ransoms were paid to Somali pirates at a total cost of $160 million.[175] In 2012, the number of ransoms dropped to 8 and the total value of those ransoms dropped to $31.75 million.[176] This represents a 74.2% reduction in the number of ransoms and an 80.2% reduction in their value. The observed reduction in hijackings could be the result of a number of factors including improved international cooperation, sustained military operations, continued adherence to industry best management practices, and the presence of armed guards aboard merchant vessels.

While the significant reduction in the number of hijackings from 2011 and 2012 is relatively straightforward, less clear is the observed reduction in attempted attacks and suspicious activity. According to the IMB, reported piratical events short of hijacking fell from 209 in 2011 to 61 in 2012,[177] representing a 71% reduction year to year. The process of reporting pirate activity appears to be complicated by the multiple reporting centers, the difficulty of distinguishing pirates from bona fide fishermen,[178] and an alleged tendency by some private security companies to underreport pirate activity. [179] Nonetheless, it seems clear that one of two things is happening with regards to attempted attacks. Either they did in fact fall proportionately to successful hijackings, or, in the event that they did not, the pirates' success rate fell dramatically.

Whether this extremely positive takeaway from 2012 will continue to be a trend for 2013 and beyond is an open question. As noted during the Security Council debate on maritime piracy[180] and repeated many times thereafter,[181] the gains made in 2012 are both fragile and reversible. Though significant progress is being made in Somalia, a lack of economic opportunities combines with continuing governance challenges, leaving a powerful incentive to resort to piracy absent sustained efforts at deterrence.

B. Increased cost of prevention as a proportion of the cost of piracy

The incidence of piracy may have fallen by around 70% between 2011 and 2012, but the cost of combatting piracy only fell 8.15% during that same time period. This has resulted in a dramatic increase in the "per incident" cost of piracy. Whether the change is conceptualized in terms of hijackings, attempts, total attacks, or dollars paid in ransom, the cost of prevention is increasing rapidly relative to the cost of the problem itself:

- **Cost per hijacking**: In 2011, $250.0 million was spent per hijacking. In 2012, $421.4 million was spent per hijacking, a 68.6% increase in the cost per hijacking.
- **Cost per attempt**: In 2011, $32.30 million was spent per attempted attack. In 2012, $96.7 million was spent per attempt, a 199.5% increase in the cost per attempted attack. However, this figure is complicated by possible underreporting of attempted pirate attacks.
- **Cost per attack (including all hijackings and attempts)**: In 2011, $28.60 million was spent per pirate attack. In 2012, $78.66 million was spent per attack, a 175.0% increase.
- **Cost per dollar spent on ransoms**: In 2011, the international community spent around $42 for every dollar spent on ransoms. In 2012, around $186 was spent for every dollar spent on ransoms.

The dramatic increase in the cost of prevention as a proportion of the cost of piracy suggests that continuing with short term solutions to maritime piracy may not be an economically efficient course of action. A shift towards long-term solutions could be considered now that the number of pirate attacks has fallen to pre-crisis levels.

C. Slight shift towards long-term solutions

In last year's report, it was estimated that 99.5% of the money spent on maritime piracy went towards short-term, stopgap measures aimed at suppressing symptoms of piracy rather than addressing the root causes. Only 0.5% was spent on these longer term investments.

Lamentably, the ratio of dollars spent on recurring costs to dollars spent on long-term investment barely changed in 2012, with 99.36% spent on short-term mitigation and only 0.64% spent on long term solutions. This virtually imperceptible change from 2011 to 2012 suggests that the international community has yet to move from treating the symptoms of piracy to treating its causes.

Concluding Remarks

With hijackings and reported attempts down to levels that more closely resemble those observed in 2005 than those observed in 2010, it can be said with some confidence that the crisis which made Somali piracy infamous the world over has finally subsided. This is welcome news for the seafarers transiting the HRA, the companies that employ them, and the consumers who rely on maritime commerce for low cost goods available all over the world. Nonetheless, the gains made are fragile and reversible, and if counter-piracy efforts are abandoned, there is the risk that maritime piracy might return to the crisis levels of 2010 and 2011.

Appendix A:
Methodology for Calculating Ransoms Paid

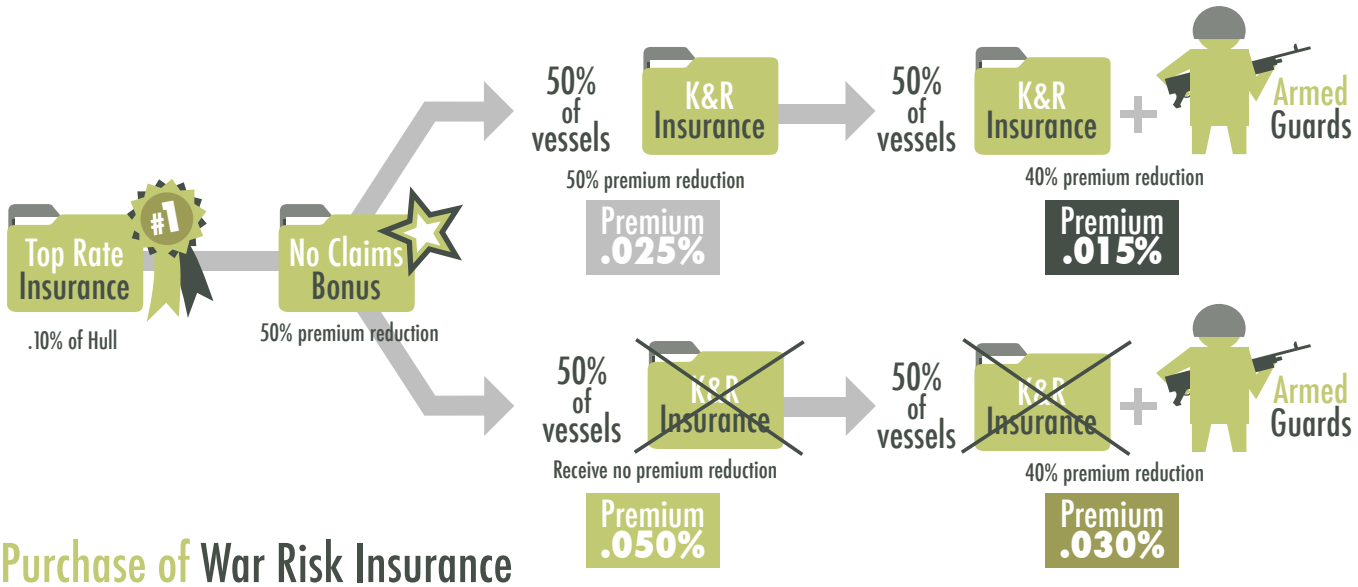
Total ransoms paid for 2012 were compiled from various sources. The table below lists vessel name, vessel type, ransom amount, and the sources where the respective amounts were found:

Vessel Name	Vessel Type	Ransom Paid	Sources
Free Goddess	Bulk Carrier	$5,700,000.00	1. Somali Pirates Free Greek-owned Ship, Say Ransom Was $5.7 Mln. (2012, October 12). Reuters. Retrieved from http://www.reuters.com/article/2012/10/12/somalia-piracy-idUSL5E8LC23020121012 2. Somali Pirates Release M/V Free Goddess - REPORT (2012, October 11). gCaptain. Retrieved from http://gcaptain.com/pirates-release-mv-free-goddess/ 3. Report on Somalia (2012, October 14). MS Risk. Retrieved from http://www.jltgroup.com/content/UK/risk_and_insurance/ms_risk_weekly/Report_on_Somalia_(October_8_-_14_2012).pdf
M/T Liquid Velvet	Chemical Tanker	$4,000,000.00	1. Somali Pirates Release M/V Free Goddess - REPORT (2012, October 11). gCaptain. Retrieved from http://gcaptain.com/pirates-release-mv-free-goddess/ 2. Piracy Report 12th-20th September 2012 (2012, September 20). Maritime Asset Security & Training. http://xa.yimg.com/kq/groups/2322095/124319294/name/Piracy_Report_12th-20th_September.pdf
MV Olib G	Chemical Tanker	$3,000,000.00	1. Archer, V. (2012, February 3). Piracy Report: February 3, 2012- Pirate Attacks Down Due to Tough Weather Conditions. Somalia Report. Retrieved from http://www.somaliareport.com/index.php/post/2689/Piracy_Report_February_3_2012 2. Piracy Report 12th-20th September 2012 (2012, September 20). Maritime Asset Security & Training. http://xa.yimg.com/kq/groups/2322095/124319294/name/Piracy_Report_12th-20th_September.pdf
MT Fairchem Bogey	Oil/Chemical Tanker	$8,000,000.00	1. Archer, V. (2012, February 3). Piracy Report: February 3, 2012- Pirate Attacks Down Due to Tough Weather Conditions. Somalia Report. Retrieved from http://www.somaliareport.com/index.php/post/2689/Piracy_Report_February_3_2012 2. Piracy Report 12th-20th September 2012 (2012, September 20). Maritime Asset Security & Training. http://xa.yimg.com/kq/groups/2322095/124319294/name/Piracy_Report_12th-20th_September.pdf 3. Seafarers' Fund Needed to Release Ships Held by Somali Pirates (2012, January 24). Safety4Sea. Retrieved from http://www.safety4sea.com/page/9133/2/seafarers--fund-needed-to-release-ships-held-by-somali-pirates

MT Enrico levoli	Oil/Chemical Tanker	$9,000,000.00	1. Mwangura, A. (2012, April 23). Pirates Release Italian Oil Tanker. Somalia Report. Retrieved from http://www.somaliareport.com/index.php/post/3265/Pirates_Release_Italian_Oil_Tanker 2. Piracy Report 12th-20th September 2012 (2012, September 20). Maritime Asset Security & Training. http://xa.yimg.com/kq/groups/2322095/124319294/name/Piracy_Report_12th-20th_September.pdf
Leila	Roll on, Roll off (RO/RO)	$250,000.00	1. Pirates Release MV Leila (2012, April 12). Somalia Report. Retrieved from http://www.somaliareport.com/index.php/post/3233/Pirates_Release_MV_LEILA 2. Obulutsa, G. (2012, April 12). Somali Pirates Release Panama-flagged Ship Amid Ransom Reports. Reuters. Retrieved from http://www.reuters.com/article/2012/04/12/us-somalia-piracy-idUSBRE83B0PT20120412 3. Piracy Report 12th-20th September 2012 (2012, September 20). Maritime Asset Security & Training. http://xa.yimg.com/kq/groups/2322095/124319294/name/Piracy_Report_12th-20th_September.pdf 4. Somalia: MV Leila Released, Pirate Source Confirms Ransom Payment (2012, April 12). RBC Radio. Retrieved from http://www.raxanreeb.com/2012/04/somalia-mv-leila-released-pirate-source-confirms-ransom-payment/
Albedo	Container Ship	$1,200,000.00	1. McMahon, L. (2012, August 2). Pirates Free Seven Albedo Crew for $1.2m Pay-out. Lloyd's List. Retrieved from http://www.lloydslist.com/ll/sector/ship-operations/article404357.ece 2. McMahon, L. (2012, August 8). Relatives of Albedo 15 Plead for Help to Raise Money for Ransom. Lloyd's List. Retrieved from http://www.lloydslist.com/ll/sector/regulation/article404788.ece 3. Pirates Release 7 Pakistani Crew of MV Albedo (2012, July 31). Somalia Report. Retrieved from http://www.somaliareport.com/index.php/post/3555/Pirates_Release_7_Pakistani_Crew_of_MV_Albedo_
Orna	Bulk Carrier	$600,000.00	1. Somali Pirates Free Ship After Nearly 2 Years (2012, October 20). Associated Press. Retrieved from http://bigstory.ap.org/article/somali-pirates-free-ship-after-nearly-2-years 2. Report on Somalia (2012, October 14). MS Risk. Retrieved from http://www.jltgroup.com/content/UK/risk_and_insurance/ms_risk_weekly/Report_on_Somalia_(October_8_-_14_2012).pdf

Appendix B:
Methodology for Calculating Piracy Insurance Premiums

To calculate the different war risk premiums paid by ships, we estimated the different proportions of ships which might be purchasing war risk premiums at different rates, as shown below:



Purchase of War Risk Insurance % of ships

Hull value:

We do not include VLCC Tankers (300,000 DWT) since they are not able to transit the Suez. LNG Tankers use the value of LPG carriers. All other ship values are calculated by the average value of container ships.

2011: Review of Maritime Transport pp. 65 (2011). United Nations Conference on Trade and Development. UNCTAD. Retrieved from http://unctad.org/en/docs/rmt2011_en.pdf

Vessel	Ship type	Years old	UNCTAD 2011	Average per vessel type	Total average for 2011
Tankers	Handy 45,000 DWT	5	$26,000,000	$ 44,000,000.00	$30,250,000.00
	Suezmax 150,000 DWT	5	$62,000,000		
LNG Tankers	LPG carriers	10	$25,000,000	$ 25,000,000.00	
Containers	500 TEUs	10	$6,000,000	$ 19,000,000.00	
	2,500 TEUs	10	$23,000,000		
	12,000 TEU's	10	$28,000,000		
Bulk Carriers	Handysize 28,000 DWT	10	$20,000,000	$ 33,000,000.00	
	Panamax 75,000 DWT	5	$25,000,000		
	Capesize, 150,000 DWT	5	$54,000,000		
General Cargo	average of containers			$19,000,000	$24,625,000.00
Car Carriers				$19,000,000	
Passenger Ships				$19,000,000	
Other				$19,000,000	

2012: Review of Maritime Transport pp. 72 (2012). United Nations Conference on Trade and Development. UNCTAD. Retrieved from http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf

Vessel	Ship type	Years old	UNCTAD 2012	Average per vessel	Total average for 2012
Tankers	Handy 45,000 DWT	5	$28,000,000	$ 41,000,000.00	$30,250,000.00
	Suezmax 150,000 DWT	5	$54,000,000		
LNG Tankers	LPG carriers	10	$26,000,000	$ 26,000,000.00	
Containers	500 TEUs	10	$7,000,000	$ 23,666,666.67	
	2,500 TEUs	10	$30,000,000		
	3,500 TEU's	10	$34,000,000		
Bulk Carriers	Handysize 28,000 DWT	10	$17,000,000	$ 30,333,333.33	
	Panamax 75,000 DWT	5	$31,000,000		
	Capesize, 150,000 DWT	5	$43,000,000		
General Cargo	average of containers			$23,666,667	$26,958,333.33
Car Carriers				$23,666,667	
Passenger Ships				$23,666,667	
Other				$23,666,667	

Appendix C:
Methodology for Calculating Cost of Security Equipment & Guards

Security Equipment:

Security Equipment	Pricing Sources
Razor Wire	http://www.fencegateandbeyond.com/18-concertina-razor-wire-galvanized-steel-1-box-5-rolls-cwgg18r5.html
Water Cannon	Conversation with Raphael Kahn, CEO of Secure Globe
Electrified Barrier	
Warning Signs	2011 ECOP
Acoustic Devices	
Sandbags	

Security Equipment	Unit Price	Unit Length	Units/Ship	Replacement Rate	Ships in HRA	Compliance Rate (Low)	Compliance Rate (High)	Ships w/ Product (Low)	Ships w/ Product (High)	Total Cost (Low)	Total Cost (Low)	Total Cost (High)
Razor Wire	$199.95	75	1500	40	2	42450	80%	80%	33960	33960	$543,224,160.00	$543,224,160.00
Water Cannon	$118,755.00			1	.20	42450	0.25%	0.8%	106	354	$2,520,574.88	$8,401,916.25
Electrified Barrier	$39,585.00	1500	1500	1	0.33	42450	0.75%	2.5%	318	1061	$4,200,958.13	$14,003,193.75
Warning Signs	$3.00			1.5	1	42450	80%	80%	33960	33960	$152,820.00	$152,820.00
Acoustic Devices	$21,000.00			1	0.20	42450	5%	15%	2122.5	6367.5	$8,914,500.00	$26,743,500.00
Sandbags	$0.92			1548	1	42450	80%	80%	33960	33960	$48,364,473.60	$48,364,473.60
									TOTALS		$607,377,486.60	$640,890,063.60

Calculations:

- Total Cost: unit price*units*replacement rate*ships with product
- Unit Cost per Ship: unit price*units

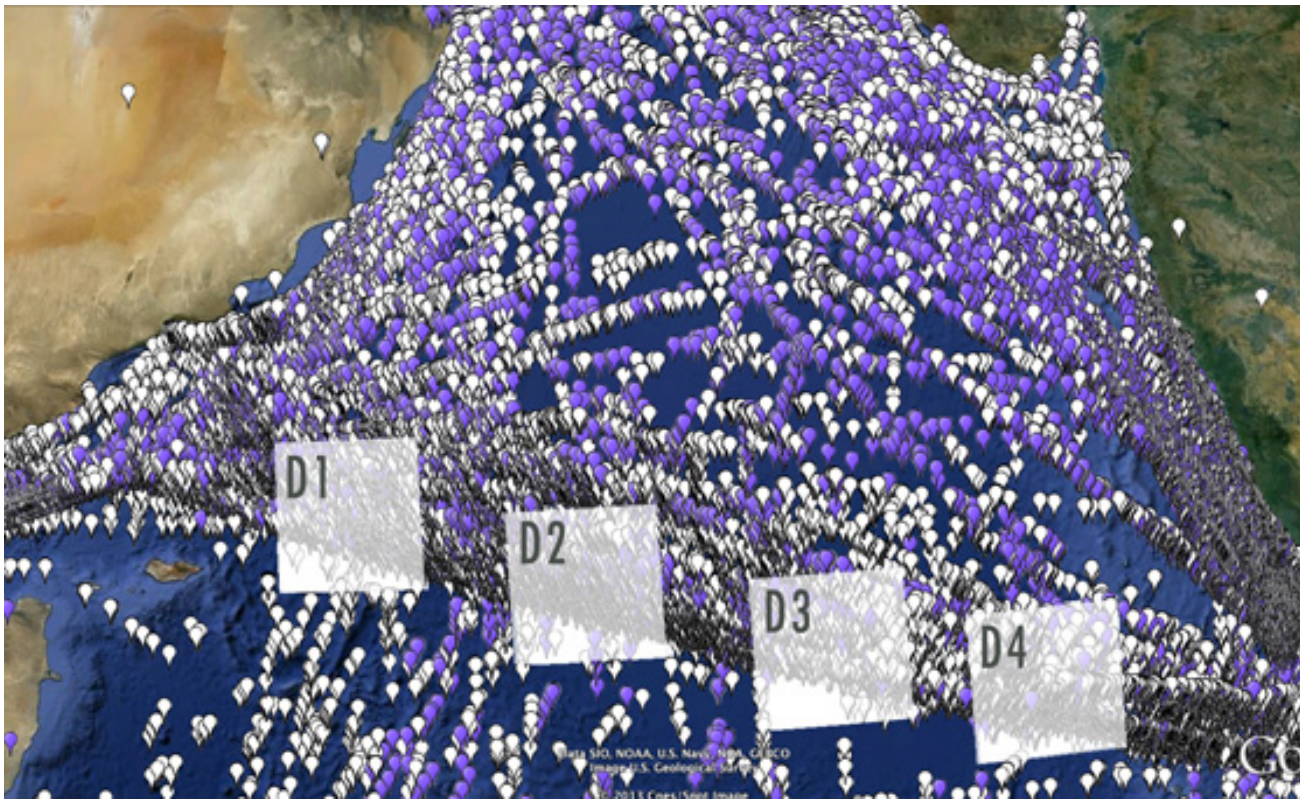
Armed Guards:

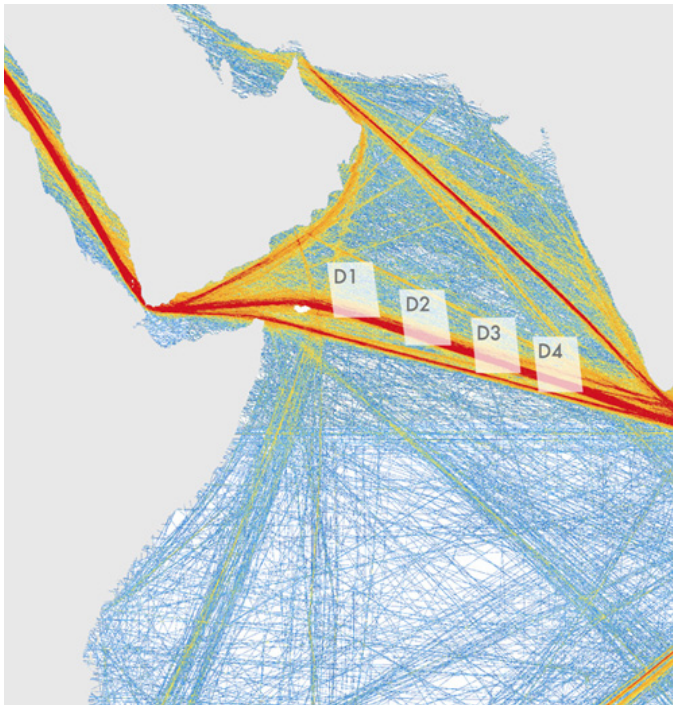
Calculation:

- Ships with PCASP*cost per transit

Appendix D:
Methodology for Calculating Cost of Re-Routing

Determining the percentage of ships re-routing





This data can be accessed at http://globalmarine.nceas.ucsb.edu

Calculation:

- For 2003-2004 Data: [Number of ships in D1-D4]/[Total Ships in the HRA] = R_{Old}
- For 2012 Data: [Number of ships in D1-D4]/[Total Ships in the HRA] = R_{New}
- % Re-Routing = $(R_{Old} - R_{New})/ R_{Old}$

Determining the cost of re-routing

To determine the number of ships that might re-route, we took the total number of tankers and bulk carriers that transited the Suez Canal, which was 3,639 and 2,936, respectively

To determine the additional distance resulting from re-routing, we used a distance calculator available at http://www.daftlogic.com/projects-google-maps-distance-calculator.htm to generate the following maps:

Direct Route: 1,516.8 nm (5.27 days at 12 knots)

Indian Coast Route: 2,276.8 nm (7.91 days at 12 knots)

This data resulted in the following calculation:

Vessel Class	Bunker Rate	Charter Rate/Day	Speed (kts)	Daily Fuel Consumption	Applicable Transits	Add'l Distance (nm)	Add'l Days	% Re-routing
Handysize Tanker	$837	$12,800	12	21.12	1819.5	760	2.6	49.61%
Aframax Tanker	$837	$16,800	12	27.12	1819.5	760	2.6	49.61%
Handymax Bulker	$837	$17,500	12	19.92	1468	760	2.6	49.61%
Panamax Bulker	$837	$17,500	12	23.52	1468	760	2.6	49.61%

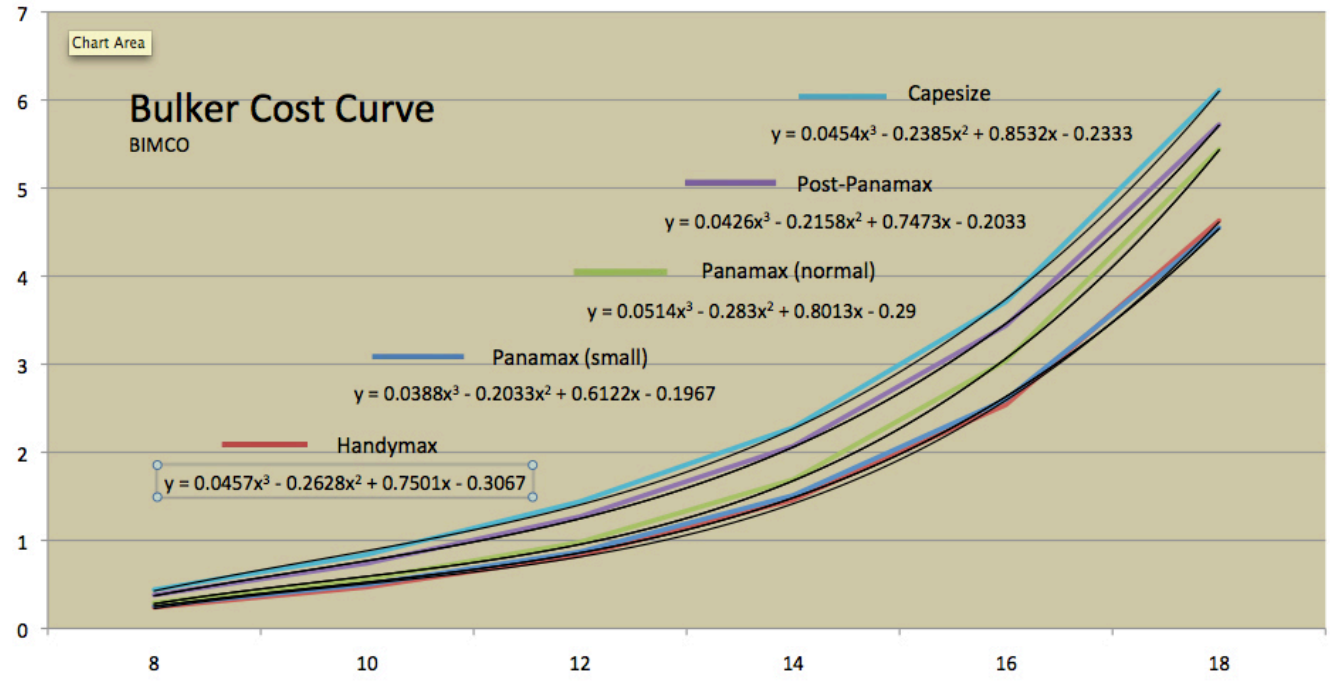
To monetize this data, we performed the following calculations for each ship type:

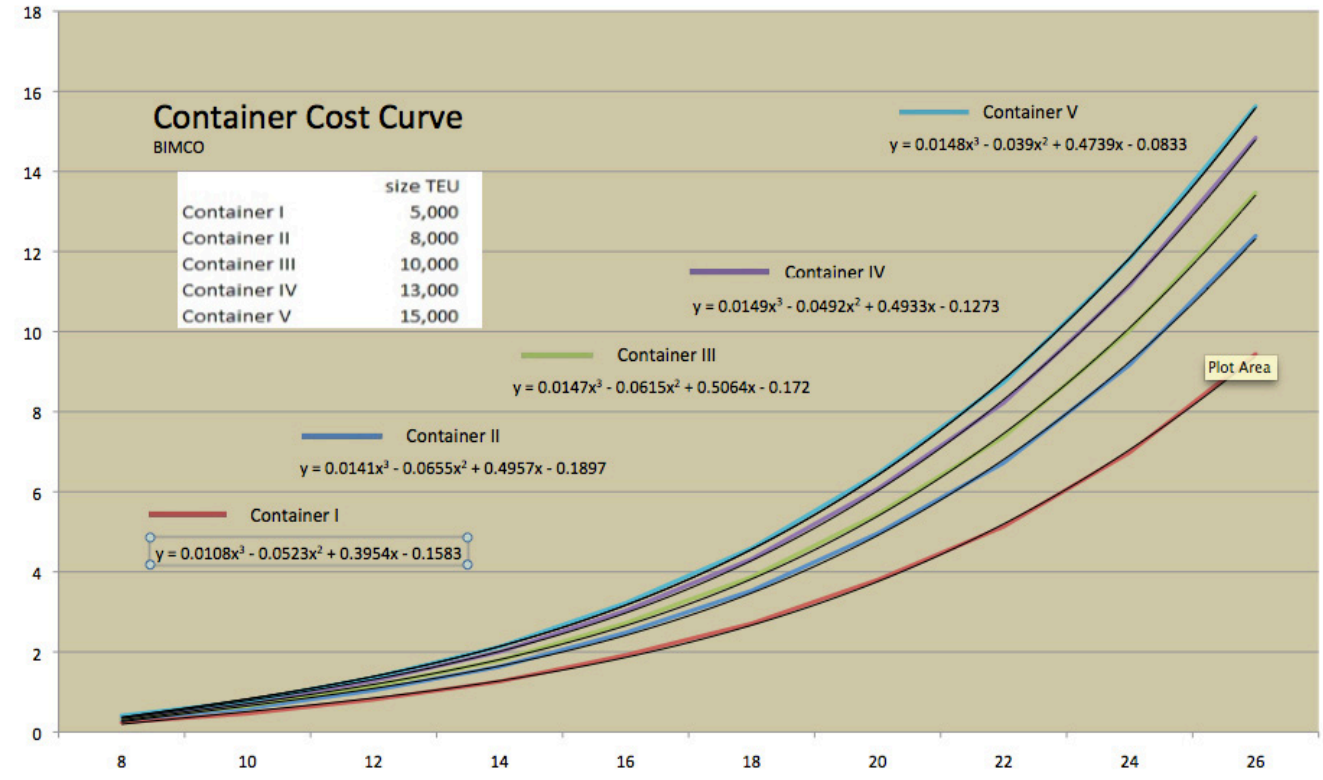
- Additional charter cost = [Charter Rate]*[Add'l Days]*[Applicable Transits]
- Additional fuel cost = [Daily fuel consumption]* [Add'l Days] *[Applicable Transits]

Appendix E:
Methodology for Calculating Cost of Increased Speed

Data Type and Sources used to monetize cost of piracy to shipping use (AIS) Exact Earth ™ data to calculate Fuel Consumption against a cost curve provided by BIMCO.

<table>
<tr><th>Data Type</th><th colspan="5">Data Sources</th></tr>
<tr><td>Maritime (AIS) Automatic Information System</td><td colspan="5">ExactEarth Ltd., a company jointly owned by COM DEV International Ltd and HISDESAT Servicios Estratégicos S.A., is a data services company that leverages advanced microsatellite technology to deliver monitoring solutions characterized by high performance, reliability, security, and simplicity.
The exactAIS® service is a global vessel tracking and maritime domain monitoring system based on a world leading space-based AIS (Automatic Identification System) detection technology. http://www.exactearth.com 1-519-622-4445</td></tr>
<tr><td rowspan="6">Length to Weight Conversion</td><td colspan="5">Equations– NOTE: METRIC UNITS ARE USED IN ALL EQUATIONS
Conversion Factors: 1m = 39.37 inches = 3.281 feet</td></tr>
<tr><td>Type of Vessel</td><td>Equation</td><td>Inches</td><td>R^2</td><td>Standard Error</td></tr>
<tr><td>Tankers</td><td>(m) LOA = 8.49089 * DWT^0.291101</td><td>*39.37</td><td>0.97</td><td>0.06020</td></tr>
<tr><td>Bulkers</td><td>(m) LOA = 7.945414 * DWT^0.300942</td><td>*39.37</td><td>0.95</td><td>0.08869</td></tr>
<tr><td>Containerships</td><td>(m) LOA = 4.089324 * DWT^0.380157</td><td>*39.37</td><td>0.95</td><td>0.08208</td></tr>
<tr><td colspan="5">Source: Knight, Kevin; Mathis, Ian, “National Economic Development (NED) Manual for Deep Draft Navigation, Appendix H.</td></tr>
<tr><td>Cost Curves Tankers, Bulkers and Containers</td><td colspan="5">*See Curves Below</td></tr>
</table>




Container Cost Curve
BIMCO
size TEU
Container I 5,000
Container II 8,000
Container III 10,000
Container IV 13,000
Container V 15,000
Container V
y = 0.0148x³ - 0.039x² + 0.4739x - 0.0833
Container IV
y = 0.0149x³ - 0.0492x² + 0.4933x - 0.1273
Container III
y = 0.0147x³ - 0.0615x² + 0.5064x - 0.172
Container II
y = 0.0141x³ - 0.0655x² + 0.4957x - 0.1897
Container I
y = 0.0108x³ - 0.0523x² + 0.3954x - 0.1583
Plot Area
0 2 4 6 8 10 12 14 16 18
8 10 12 14 16 18 20 22 24 26

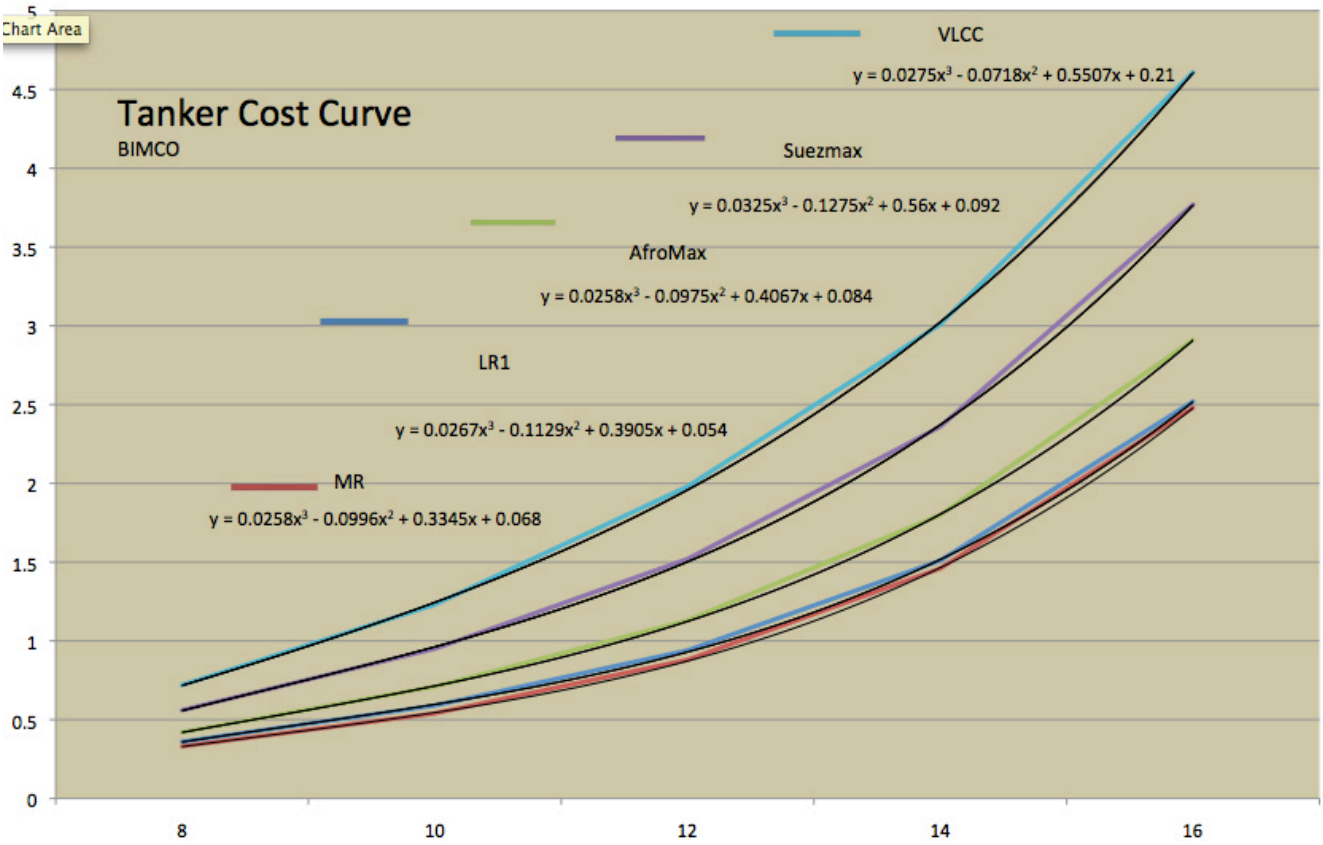


Chart Area
Tanker Cost Curve
BIMCO
VLCC
y = 0.0275x³ - 0.0718x² + 0.5507x + 0.21
Suezmax
y = 0.0325x³ - 0.1275x² + 0.56x + 0.092
AfroMax
y = 0.0258x³ - 0.0975x² + 0.4067x + 0.084
LR1
y = 0.0267x³ - 0.1129x² + 0.3905x + 0.054
MR
y = 0.0258x³ - 0.0996x² + 0.3345x + 0.068
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
8 10 12 14 16

Appendix F:
Methodology for Calculating Cost of Labor

Vessel Name	Hijack Date	Release Date	Total Duration	Days held in 2012	Total number of Hostages Held in 2012	Still in Captivity
MV Olib G	September 8, 2010	January 8, 2012	487	8	18	
MV Albedo	November 25, 2010	July 31, 2012	614	213	23	
MV Orna	December 15, 2010	October 19, 2012	674	293	19	
FV Alfardous	February 13, 2011	Captive		365	8	8
FV Abdi Khan	April 16, 2011	Captive		365	6	3
Al Ain	August 27, 2011	Captive		365	13	13
MT Fairchem Bogey	September 20, 2011	January 12, 2012	114	12	21	
FV Nimesha Duwa	October 10, 2011	Captive		365	6	6
MT Liquid Velvet	October 31, 2011	June 5, 2012	218	157	22	
FV Aride	October 31, 2011	February 3, 2012	95	34	2	
FV Al Mulahi	November 23, 2011	January 7, 2012	45	7	13	
MT Enrico Ievoli	December 27, 2011	April 23, 2012	118	114	18	
Safina Al Salam	January 2, 2012	January 5, 2012	3	3	16	
Al Wasil	January 14, 2012	Captive		352	3	3
MV Free Goddess	February 7, 2012	October 11, 2012	247	247	21	
MV Leila	February 15, 2012	April 11, 2012	56	56	15	
Al Assma	February 28, 2012	March 7, 2012	8	8	17	
Ghazal Howlf	March 2, 2012	Captive		304	6	6
MT Royal Grace	March 2, 2012	Captive		304	22	22
Al-Sharqia	March 6, 2012	March 9, 2012	3	3	7	
Ramban	March 10, 2012	Captive		296	15	15
Eglantine	March 26, 2012	April 2, 2012	7	7	23	
FV Naham 3	March 26, 2012	Captive		281	15	15
Al Amood	April 13, 2012	Captive		262	9	9
Al Fahad	April 14, 2012	Captive		261	8	8
Alabass	April 21, 2012	May 19, 2012	28	28	4	
MT Smyrni	May 10, 2012	Captive		235	26	26
Shamsi	June 20, 2012	June 29, 2012	9	9	7	
TOTAL				4954	383	134

Ransoms Paid 2012 (See Appendix A for more details)

Appendix G:
Methodology for Calculating Cost of Prosecutions & Imprisonment

Pirates held source: UNODC December 2012 Brochure- Issue 10, pp. 8-9
For the complete document please visit:
http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf

Trials Held in 2012:

Country	Completed Trials	# of Suspects	Sources
Kenya	2	11	1. Muyanga, P. (2012, August 8). Somali pirates get 20-year jail term. Bussiness Daily-Africa. Retrieved from http://www.businessdailyafrica.com/Somali+pirates+get+20+year+jail+term/-/539546/1474126/-/k0hs6a/-/index.html; UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10 (pp.2). Retrieved from http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf 2. Denmark hands suspected pirates to Kenya for trial (2012, February 18). Capital FM News. Retrieved from http://www.capitalfm.co.ke/news/2012/02/denmark-hands-suspected-pirates-to-kenya-for-trial/
Madagascar	1	14	Somali pirates sentenced to five years hard labour (2012, November 19). Oceanus Live. Retrived from http://www.oceanuslive.org/main/viewnews.aspx?uid=00000566
Oman	2	20	(UNODC reported 32 held pirates December 2012 - 12 pirates trailed in 2011 (ECOP 2011)= 20 pirates trialed in 2012. 2 trial assumption due to number prosecuted) UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10 (pp.2). Retrieved from http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf
Seychelles	4	37	1. Nuland, V. (2012, November 7). Republic of Seychelles Conviction of Pirates. U.S. Department of State. Retrived from http://www.state.gov/r/pa/prs/ps/2012/11/200232.htm; UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10 (pp.2). Retrieved from http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf 2. Seychelles Court Sentenced 3 Pirates to 21 Years in Prison (2012, November 29). Oceanus Live. Retrieved from http://www.oceanuslive.org/main/viewnews.aspx?uid=00000567 UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10 (pp.2). Retrieved from http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf 3. UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10 (pp.2). Retrieved from http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf 4. Six Suspect Pirates To Go On Trial In Seychelles Court (2012, September 3, 2012). Oceanus Live. Retrieved from http://www.oceanuslive.org/main/viewnews.aspx?uid=00000513

UAE	1	10	Cosgrove, M. (2012, May 24). Somali pirates sentenced to life in UAE. Jurist. Retrieved from http://jurist.org/paperchase/2012/05/somali-pirates-sentenced-to-life-in-uae.php; 10 Somali pirates sentenced to life in Abu Dhabi jail (2012. May 22). Gulf News. Retrieved from http://gulfnews.com/news/gulf/uae/crime/10-somali-pirates-sentenced-to-life-in-abu-dhabi-jail-1.1026208
Yemen	1	4	Yemen Hands down Jail Sentences to Somali Pirates (2012, July 19). RBC Radio. Retrieved from http://www.raxanreeb.com/2012/07/yemen-hands-down-jail-sentences-to-somali-pirates/
Malaysia	1	7	Gomez, J. (2012, September 2012). Court has jurisdiction to hear case of seven Somali pirates. New Straits Times. Retrieved from http://www.nst.com.my/latest/court-has-jurisdiction-to-hear-case-of-seven-somali-pirates-1.147793#; Malaysia offers pirates suspects no excuse plea bargain (2012, September 26). Google news. Retrieved from http://www.google.com/hostednews/afp/article/ALeqM5jzPeXNCjBSwXOaD82DiftcPri3dQ?docId=CNG.92f8e882d0cac04a70810207085ab1e2.591
Belgium	2	2	Belgian Warship Arrests Five Suspect Pirates Off Somali Coast (2012, December 16). Oceanus Live. Retrieved from http://www.oceanuslive.org/main/viewnews.aspx?uid=00000579
France	1	6	Crippa, M. (2012, June 21). Somali Pirates on Trial in France: 4 year long pre-trial detention creates evidentiary hurdles. Piracy-Law: Communis Hostis Omnium. Retrieved from http://piracy-law.com/2012/06/21/somalis-pirates-on-trial-in-france-4-year-long-pre-trial-detention-creates-evidentiary-hurdles/
Germany	1	10	Phillips, R. (2012, October 21). Long road to justice- The German piracy trial. Piracy-Law: Communis Hostis Omnium. Retrieved from http://piracy-law.com/2012/10/21/long-road-to-justice-the-german-piracy-trial/
Italy	2	20	1. Crippa, M. (2012, March 27). Historic Piracy Trial Opens in Italy. Piracy-Law: Communis Hostis Omnium. Retrieved from http://piracy-law.com/2012/03/27/historic-piracy-trial-opens-in-italy/ 2. Somali pirates jailed for attack on Italian oil tanker (2012, December 4). Reuters. Retrieved from http://uk.reuters.com/article/2012/12/04/uk-italy-pirates-idUKBRE8B30KZ20121204
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Average cost per trial:

Europe	
Country	Cost
Belgium 1	$633,800.00
Belgium 2	$633,800.00
France	$633,800.00
Germany	$4,856,145.00
Italy 1	$633,800.00
Italy 2	$46,249.00
Netherlands	$633,800.00
Average Cost	$1,174,484.86

Source:
http://www.spiegel.de/international/germany/german-trial-of-somali-pirates-turns-into-pointless-and-expensive-farce-a-855252.html

Cost of trial per day € 35,000= $46,249
(currency conversion January 16, 2013)
Germany: 46,249*105 day trial duration= 4,856,145
Italy: 46,249*1 day trial duration= 46,249

Other Costs found here: http://www.spiegel.de/international/world/torture-execution-german-justice-through-the-eyes-of-a-somali-pirate-a-755340.html

Approximate trial cost: €500,000= $663,800
(currency conversion January 16, 2013)

Region	Average Cost	Source
Africa	$227.97	ECOP 2011 (pp.22-24). Same methodology used, but with January 16, 2013 conversion rates. Retrieved from http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf
Asia	$7,313.96	
N. America	$307,355.00	DeLisi, M., et al. (2010). Murder by numbers: monetary costs imposed by a sample of homicide offenders. Journal of Forensic Psychiatry & Psychology, Vol. 21(4), 501-513.

Cost per year of imprisonment: source ECOP 2011 (pp.22-24)
Retrieved from http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf

Total Imprisonment Cost: pirates imprisoned*cost per year of imprisonment

Total Regional Cost: total trial cost + total imprisonment cost

Appendix H:
Methodology for Calculating Cost of Military Operations

A. Cost of Naval Vessel Deployment:

1. Average diesel fuel price during 2012: $3.97 per gallon.
   Retrieved from the Energy Information Administration website.
   (Average Diesel fuel cost for 2012 available at: http://www.eia.gov/forecasts/steo/ and http://www.eia.gov/todayinenergy/detail.ctm?id=7630)

2. Methodology for adjusted daily fuel consumption:
   Calculation of daily fuel consumption:
   - Divide the listed range by the listed fuel capacity (in some cases converted from tons to liters) to calculate the 'gas mileage' for each craft.
   - Divide the 'gas mileage' by the listed cruising speed to calculate 'gallons burned per hour'.
   - Multiply 'gallons burned per hour' by 24 to get daily fuel consumption.

3. Adjustment: as per discussions with a navy representative, ships are assumed to be operating 25 days per month, aircrafts fly 5 hours per day and helicopter 4 hours per day.

4. # deployed units*300*(diesel fuel cost*adjusted daily fuel consumption)+daily operating cost

5. Model ships used for classification: Frigate: Oliver Hazard Perry Class (U.S.); Destroyer: Arleigh Burke Class (U.S.); Auxiliary: average of Quinghaihu Supply Ship (China), INS Sukanya Patrol Ship (India), and Galicia Class Amphibious Ship (Spain); Aircraft: P-3C Orion (multiple countries); Helicopter: SA341J Gazelle.

6. Methodology for cost per sailor per day:
   - Daily cost assumption for a frigate: $ 52,146.67
   - $52,146.67/300= $173.82
   - # deployed units*sailors aboard*cost per sailor per day*300

B. Cost of UAV Deployment:

1. Hourly Cost:
   - **Reaper:** http://www.elpasotimes.com/news/ci_19628409
   - **Robotic Helicopter:** http://www.unmanned.co.uk/unmanned-vehicles-news/unmanned-aerial-vehicles-uav-news/dsei-northrop-grumman-and-qinetiq-offer-uk-gazelle-conversion/
     Total cost for demonstration program for a year in the UK=$15.8m/365/24= $1,804
   - **Global Hawk:** http://www.dailytech.com/USAF+Hopes+U2+to+Global+Hawk+Transition+Done+in++2015/article22425.htm
     Total flight cost given= $35,000/24 hours (usual flying time) = $1,458
   - **Hermes 450:** http://abcnews.go.com/Politics/story?id=1413025#.TwSEfiNr9w0

2. Mission duration per day: some UAVs can remain in flight up to 30 hours, but we averaged endurance as 24 hours and 8 hours for the Robotic Helicopter; figuring that only 50% of the time, is devoted toward counter-piracy efforts.

3. Total Operation cost: hourly cost*duration of the mission*365

C. Cost of Vessel Protection Detachments:

1. Ships per year: total ships escorted since Atalanta's initiation of 159 WFP and 126 AMISOM. 159/4= 39.75; 126/4=31.5
2. VPD cost: $273,000 for a team of 18 per transit

D. Cost of SHADE Meetings:

	23rd Meeting - March 16, 2012	
	Number of Attendees: 145	% of International Travel: 75%=108.75
Europe	51	$766
North America	23	$1,402
Asia	14	$406
Africa	20	$3,212
Accomodation Per Day		$272
Total		$171,290

	24th Meeting - June 17, 2012	
	Number of Attendees: 145	% of International Travel: 75%=108.75
Europe	51	$766
North America	23	$1,402
Asia	14	$406
Africa	20	$3,212
Accomodation Per Day		$272
Total		$171,290

	25th Meeting - Sept 18, 2012	
	Number of Attendees: 110	% of International Travel: 75%=82.5
Europe	39	$766
North America	19	$1,402
Asia	8	$406
Africa	17	$3,212
Accomodation Per Day		$272
Total		$136,520

Total Cost of SHADE Meetings in 2012	$479,520

1. Airports used:
   - Europe: Copenhagen, Denmark- Copenhagen Airport (CPH)
   - North America: New York, US- John F. Kennedy Airport (JFK)
   - Asia: New Delhi, India- Indira Gandhi International Airport (DEL)
   - Africa: Mombasa, Kenya- Moi International Airport (MBA)
2. Airfares based from the website www.kayak.com searched on January 30th, 2013. The travel dates searched were March 6-8 of 2013. The cheapest airfare was selected, even though most of the attendees travel in business class
3. Accommodation price for Bahrain: http://aoprals.state.gov/web920/per_diem.asp
4. Airfare*number of travelers+ accommodation*number of travelers

Appendix I:
Methodology for Calculating Cost of Counter-Piracy Organizations

A. Trust Fund to Support Initiatives of States to Counter Piracy off the Coast of Somalia ("Trust Fund"): $5.83 million.

1. **Plenary Sessions:** Germany, Italy, Qatar and Spain: $2.5 million

   Communique of the 12th Plenary Session held in July 2012: total contribution US$14 million
   For the complete communique please visit:
   http:/www.thecgpcs.org/plenary.do;jsessionid=1BfGizZKODRzszrXQ4TtTROBPZatKuaFnZOPQLDsaZOIAySHsai6lnNBDcTKVuvg?action=plenarySub&seq=21

   Communique of the 13th Plenary Session held in December 2012: contribution from Germany, Italy, Qatar and Spain. Total contribution US$ 16.5 million
   For the complete communique please visit:
   http://www.thecgpcs.org/plenary.do?action=plenarySub&seq=22

   Calculation: $14m - $16.5m= $2.5m given be the countries stated above

2. News Article and Press Release:

Country	Amount	Source	Link
Japan	$2 Million	UNODC Website	http://www.unodc.org/unodc/en/press/releases/2012/March/japan-makes-impressive-contribution-of-around-23-million-to-unodc-projects-in-afghanistan-and-region.html
UAE	$1 Million	Business Intelligence Middle East	http://www.bi-me.com/main.php?c=3&cg=2&t=1&id=58350

3. **UN Security Council Report S/2012/177**
   Available at: http://oceansbeyondpiracy.org/sites/default/files/un_sec-gen_report_re_criminalization_of_piracy_s-2012-177.pdf

   Norway: contributed USD $1 million between INTERPOL, UNDP and the Trust Fund (pg. 70)

   Calculation: $1m / 3 organizations = ~ $333,333

B. The United Nations Office of Drugs and Crime (UNODC): $6.74 million

1. News Article:

Country	Amount	Source	Link
Australia	$2 Million	The Austalian	http://www.theaustralian.com.au/news/breaking-news/australia-provides-2m-to-fight-piracy/story-fn3dxiwe-1226447255441

2. **Security Council Report S/2012/177**
   Available at: http://oceansbeyondpiracy.org/sites/default/files/un_sec-gen_report_re_criminalization_of_piracy_s-2012-177.pdf

   Denmark: Denmark approved a new regional stabilization program for the Horn of Africa in the amount of DKK 215 million for the period from 2011 to 2014, between UNDP and UNODC (pg. 14) DKK 225 = ~USD $37m (currency conversion calculated on December 10, 2012)

   Calculation: $37m / 4 years / 2 programs = ~ $4.62 million

   Germany: contributed UNODC USD $120,000 (pg. 33)

C. The Contact Group on Piracy off the Coast of Somalia (CGPCS): $765,242

Meeting	Date	Location	Duration (Days)	Attendees	% Intl Travel	Europe	N. America	Asia	Africa	Europe Travel Per Person	N. America Travel Per Person	Asis Travel Per Person	Africa Travel Per Person	Accomodation Per Day	Total
WG1	3/21	London, UK	1	150	25	16	10	8	4	$181	$983	$822	$856	$319	$34,848
	7/12	London, UK	1	150	25	16	10	8	4	$181	$983	$822	$856	$319	$34,848
	11/14	Copenhagen, Denmark	1	150	25	16	10	8	4	$181	$983	$822	$856	$319	$34,848
WG2	3/5	Copenhagen, Denmark	1	100	95	47	30	10	8	$260	$808	$741	$1,052	$260	$76,986
	9/17 & 9/18	Copenhagen, Denmark	2	100	95	47	30	10	8	$260	$808	$741	$1,052	$260	$101,686
WG3	2/28	Washington D.C., US	1	100	35	15	10	5	5	$1,635	$240	$1,417	$1,356	$300	$51,290
	9/25	London, UK	1	150	25	16	10	8	4	$181	$983	$822	$856	$319	$34,848
WG4	3/28	New York, US	1	150	25	16	10	8	4	$797	$301	$1,071	$1,709	$309	$42,908
	6/26	Dubai, UAE	1	50	95	30	10	6	2	$546	$1,052	$254	$345	$278	$42,458
WG5	3/5	London, UK	1	150	25	16	10	8	4	$181	$983	$822	$856	$319	$34,848
	7/9	London, UK	1	150	25	16	10	8	4	$181	$983	$822	$856	$319	$34,848
	11/9	Rome Italy	1	50	95	30	10	6	2	$222	$854	$742	$838	$416	$41,296
11th Plenary Meeting	3/29	New York, US	1	250	25	30	20	8	5	$797	$301	$1,071	$1,709	$309	$66,510
12th Plenary Meeting	7/25	New York, US	1	250	25	30	20	8	5	$797	$301	$1,071	$1,709	$309	$66,510
13th Plenary Meeting	12/11	New York, US	1	250	25	30	20	8	5	$797	$301	$1,071	$1,709	$309	$66,510
														TOTAL	$765,242

1. Airports used:
   - Europe: Copenhagen, Denmark- Copenhagen Airport (CPH)
   - North America:
     ~ If meetings were held in the US: Toronto, Canada- Toronto Pearson International Airport (YYZ)
     ~ If meetings were held in another location: New York, US- John F. Kennedy Airport (JFK)
   - Asia: New Delhi, India- Indira Gandhi International Airport (DEL)
   - Africa: Mombasa, Kenya- Moi International Airport (MBA)

2. Airfares based from the website www.kayak.com searched on January 21th, 2013. The travel dates searched were March 6-8 of 2013. The cheapest airfare was selected, even though most of the attendees travel in business class

3. Accommodation price for each city hosting the meetings retrieved from the website http://aoprals.state.gov/web920/per_diem.asp for all non-US destinations; while www.priceline.com for US destinations(Washington DC and NYC).

Calculation: airfare*number of travelers + accommodation*number of travelers
For further details on the meetings please visit: http://www.thecgpcs.org/meetschd.do?action=meeting

D. The Djibouti Code of Conduct: $312,800

1. Subtraction of available data: based on the table used in ECOP 2011 (pg. 29) subtracted from the table published on the PIU Brochure (February- August 2012). Japan was not included since it made a contribution of $13.6 when the Code was first introduced. For the complete PIU Brochure please visit: http://www.imo.org/OurWork/Security/PIU/Documents/PIU_Brochure_2nd_Edition.pdf

	PIU Brochure		ECOP 2011		2012
Country	Contribution		Contribution		Contribution
Japan	$14.6 Million		$1 Million		None
Saudi Arabia	$100,000		$100,000		None
Marshall Islands	$100,000	-	$100,000	=	None
Netherlands	$72,300		$50,000		$22,300
Norway	$40,600		-		$40,600
Republic of Korea	$150,000		-		$150,000
France	$49,900		-		$49,000

2. News article

Company	Amount	Source	Link
ASRY (Arab Shipbuilding and Repair Yard Company	$50,000	Maritime Reporter and Marine News Magazine online	http://www.marinelink.com/news/receives-donation-bahrain348672.aspx

E. The United Nations Development Programme (UNDP) – Somalia: $4.92 million

1. **UN Security Council Report S/2012/177**

   Calculated the same way as above:
   Norway- Trust Fund section 3. and Denmark- UNODC section 2.

F. EUCAP NESTOR: $2,982,012

1. Total Budget: €22.8 million= $29,820,120 (foreign currency exchange made on February 28, 2013)

   Calculation: 10% of $29,820,120 = $2,982,012

G. RAPPICC: $1,273,000

1. From websites http://www.tradewindsnews.com/firstpage/article664400.ece and http://www.gov.uk/government/news/anti-piracy-centre-open-for-business

Calculation: UK (873,000) + Netherlands ($400,000) = $1,273,000

H. PiraT Project: $445,899

1. From their website: http://www.maritimesecurity.eu/ : The BMBF €1m million Euros March 2010. Project extended until March 2013.From their website: http://www.maritimesecurity.eu/
   The BMBF €1m million Euros March 2010. Project extended until March 2013.

   Calculation: € 1million / 36 months = 27,777 * 12= ~ € 330,000 = USD $445,899
   Currency conversion calculated on January 24, 2012

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12 Liz McMahon, *Lull in piracy sparks concern that countries will cut naval forces*, LLOYD'S LIST (Oct. 26, 2012), Retrieved from: http://www.lloydslist.com/ll/sector/regulation/article410356.ece (quoting Lieutenant Commander Andres Loevik of NATO as saying that, ""Pirates are merging in with legal fishing vessels and this is a concern to take into account.").

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are not reporting the attempted attacks that other vessels were reporting before. There could be many reasons for this, it could be that they fear liability or simply the owners themselves have got clauses in their contracts which prevent any reporting of attempted attacks. This is very sad… Until recently there were a lot more free reports coming out and at the moment we feel that the reports are being suppressed. We need to find a way if people are afraid of liability or other such factors, for that information to be made available."); Liz McMahon, *PMSCs criticize navies for not sharing information on piracy*, Lloyd's List (Oct. 25, 2012), Retrieved from: http://www.lloydslist.com/ll/sector /regulation/article410283.ece (noting that the chief executive of Gulf of Aden Group Transit and Lieutenant Commander Andres Loevik of NATO, and Giles Nokes of BIMCO all acknowledged a problem with incident reporting).

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38 Since data was not available for the administrative costs of NATO's Operation Ocean Shield or CTF 151, we have estimated that their administrative budgets are approximately half that of EU Operation Atalanta.

39 Since data was not available for the administrative costs of NATO's Operation Ocean Shield or CTF 151, we have estimated that their administrative budgets are approximately half that of EU Operation Atalanta.

40 OBP's figure of $1.09 billion is the result of conservative assumptions built into the methodology.

41 Holzer, G-S. and Jurgenliemk, H. (2012). The Somali crisis and the EU: Moving onshore and committing to Somalia, GGI Analysis Paper 5/2012. Global Governance Institute

42 See Appendix H for a full explanation.

43 Our cost calculation for deployment cost is well in line with that of well-regarded Naval Affairs Specialist, Ronald O'Rourke. According to Mr. O'Rourke, the Operation & Support cost for a Littoral Combat Ship (LCS) is $36.7 million per ship per year. (O'Rourke, R. (2012, August 10). Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress (pp. 7). Retrieved from: http://www.fas.org/sgp/crs/weapons/RL33741.pdf - "Department of Defense, Selected Acquisition Report (SAR), LCS, as of December 31, 2010, p. 37) If we multiply $36.7 million by the 17 ships deployed on average, the total operation cost would be $612,000,000 per year. While our calculation of $950.6 million is significantly higher than Mr. O'Rourke's, there are several explanations for this discrepancy. First, LCSs are smaller than the frigates and destroyers used in counter-piracy operations. This results in lower fuel and operational costs. Second, Mr. O'Rourke's calculation only considers surface vessels, while ours takes into account costs associated with reconnaissance aircraft and helicopters. Finally, Mr. O'Rourke's analysis is on a per-ship basis, which includes approximately 50% of a ship's time being spent in port (Willard, R. F. (2007). Personnel Tempo of Operation Program. Department of the Navy. Retrieved from: http://www.public.navy.mil/bupers-npc/support/itempo/Documents/OPNAV300013CPERSTEMPO.pdf; Congressional budget Office (2011). An Analysis of the Navy's Amphibious Warfare Ships for Deploying Marines Overseas. Retrieved from: http://www.cbo.gov/publication/42716). Because our calculation uses average multi-national deployments and accounts for ships going to port and being replaced in theater, we assume that each ship spends 82.2% of the year at sea.

44 For last year's calculations please visit: Bowden, A. and Basnet, S. (2012). Economic Cost of Somali Piracy 2011. Oceans Beyond Piracy. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf; Since specific numbers of UAVs used for counter-piracy operations was not available, we assumed that only 1 of each known model deployed in the area was used for counter piracy efforts 50% of the time. For South Korea we used Hermes 450 since it is cheaper than the other UAVs and for ECoP 2011 consistency. Sources for assumptions: Ackerman, Spencer (2012, August 02). US Navy robot helicopter chases African pirates. Retrieved from: http://www.wired.co.uk/news/archive/2012-08/02/robot-chases-pirates; Axe, David (2012, August 13). Hidden History: America's Secret Drone War in Africa. Retrieved from: http://www.wired.com/dangerroom/2012/08/somalia-drones/all/; Eun-jung, Kim (2012, November 9). (LEAD) Assembly panel okays extension of troop deployment in UAE. Retrieved from: http://english.yonhapnews.co.kr/national/2012/11/09/72/0301000000AEN20121109004451315F.HTML; Gambino, Lauren (2012, April 5). US drone crashes at Seychelles airport. Retrieved from: http://www.telegraph.co.uk/news/worldnews/africaandindianocean/seychelles/9188548/US-drone-crashes-at-Seychelles-airport.html; Lawrence, Chris (2012, June 11). Navy drone crashes in Maryland. Retrieved from: http://edition.cnn.com/2012/06/11/us/maryland-drone-crash/index.html; UAV Operations over Somalia are a Danger to Air Traffic (2012, July 25). Retrieved from: http://www.unmanned.co.uk/unmanned-vehicles-news/unmanned-aerial-vehicles-uav-news/uav-operations-over-somalia-are-a-danger-to-air-traffic/; For further information on calculations please visit Appendix H.

45 EU Nafvor news: French Naval Ship Embarks an Estonian Vessel Protection Detachment (2011, May 10). Retrieved from: http://eunavfor.eu/french-naval-ship-embarks-an-estonian-vessel-protection-detachment/; EU Naval Force Warship HNLMS Van Amstel Delivers Supplies to World Food Programme Protection Team (2012, May 29). Retrieved from: http://eunavfor.eu/eu-naval-force-warship-hnlms-van-amstel-delivers-supplies-to-world-food-programme-protection-team/; EU NAVFOR warship escorts WFP-vessel (2012, October 18). Retrieved from: http://eunavfor.eu/eu-navfor-warship-escorts-wfp-vessel/ and Permanent Representation of Estonia to the UN (2012, November 19). Retrieved from: http://www.un.estemb.org/est/esileht/koned/newwin-middle50/aid-852

46 EU Nafvor trains AMISOM Vessel Protection Detachment troops (2012, February 9). Retrieved from: http://eunavfor.eu/eu-navfor-trains-amisom-vessel-protection-detachment-troops-2/

47 Osler, D. (2012, June 21). Atalanta has been a success, Foreign Office maintains. Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/sector/ship-operations/article401255.ece. Using the given numbers of the total ships escorted since Atalanta's initiation of 159 WFP and 126 AMISOM. We then divided these numbers by 4, calculating it as 4 years starting beginning of 2009 to end of 2012.

48 Hailey, R. (2011, November 3). Government urged to be flexible over use of armed guards. Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/sector/ports-and-logistics/article383352.ece

49 Kelly, T. (2012, October 23-25). Combatting Piracy Week- Plenary Session: Assessing International Counter-Piracy Efforts and Initiatives (pp. 14). Retrieved from: http://piracy-europe.com/uploads/ffiles/2012/12/628564.pdf ("This was the broadest naval coalition ever with some 30 vessels from 22 nations operating in the Internationally Recognised Transit

Corridor (IRTC) on any given day"); McMahon, L. (2011, October10). Naval Support for anti-piracy fight set to decrease. Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/sector/regulation/article381695.ece ("A spokesman for Nato said that were 18 vessels from Combined Maritime Forces, Nato and EU Navfor on duty on October 10, 2010, and 18 units on October 10, 2011")

Security Equipment and Guards

50 Shipping Warned to Be Vigilant After Pirate Attack (2012, December 20). Shipping Times. Retrieved from: http://www.shippingtimes.co.uk/item_10423.html ("NATO and her maritime partners are still patrolling and disrupting pirate activity, however, the merchant community have their role to play and should continue to ensure that vessels implement Best Management Practices (BMPs) and are prepared to repel pirate attacks.").

51 Bowden, A. and Basnet, S. (2012). Economic Cost of Somali Piracy 2011. Oceans Beyond Piracy. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf; Shapiro, A. J. (2012, March 27). Piracy Off the Horn of Africa. Remarks to the Center for American Progress, US Department of State. Retrieved from: http://www.state.gov/t/pm/rls/rm/186987.htm ("Approximately 20 percent of all ships off the Horn of Africa are not taking proper security precautions. Unsurprisingly, these account for the overwhelming number of successfully pirated ships.").

52 BMP4 (2011). Best Management Practices for Protection against Somalia Based Piracy, Version 4. Retrieved from: http://www.shipping.nato.int/SiteCollectionDocuments/BMP4_web.pdf

53 Fence Gate and Beyond, price list for 18" Concertina Razor Wire Galvanized Steel 1 box (5 Rolls). Retrieved from: http://www.fencegateandbeyond.com/18-concertina-razor-wire-galvanized-steel-1-box-5-rolls-cwgg18r5.html

54 Last year, we used 42,450 as the number of ships transiting the HRA each year. This year, we use an estimate of 35,000, which is the number reported to Lloyd's List by Peter Dobbs, Catlin head of asset protection. Retrieved from: http://www.lloydslist.com/ll/sector/regulation/article412337.ece

55 Bowden, A. and Basnet, S. (2012). Economic Cost of Somali Piracy 2011. Oceans Beyond Piracy. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf

56 Northam, G. (2013, January 21). Security at sea: changing risk horizons. Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/sector/Insurance/article415358.ece; Lloyd's List Maritime Security Survey (2012). Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/incoming /article411572.ece/BINARY/Piracy+survey+big.pdf (reporting that 38% of respondents reported that their company had not used armed guards); Piracy: A Threat to Maritime Security and the Global Economy (2012, November 14). Diirad.com. Retrieved from: http://www.diirad.com/news-in-english/4298-piracy-a-threat-to-maritime-security-and-the-global-economy-.html

57 McMahon, L. (2012, November 23). Will regulation make armed guards a permanent fixture on vessels? Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/sector/regulation/article412337.ece (citing Catlin head of asset protection Peter Dobbs that around 50% of ships employ armed guards); Nightingale, A. and Wiese Bockmann, M. (2012, October 22). Somalia Piracy Falls to Six-Year Low as Guards Defend Ships. Bloomberg. Retrieved from: http://www.bloomberg.com/news/print/2012-10-22/somalia-piracy-attacks-plunge-as-navies-secure-trade-route-1-.html ("Fourteen out of 28 ships briefed by the U.K.'s Royal Navy in the week to Oct. 19 were carrying or recently carried armed guards, U.K. Maritime Trade Operations said in an e-mailed report Oct. 20.").

58 Using last year's estimate that the average HRA transit lasts 11.5 days. Hired Guns Tame The Somali Coast (2012, October 6). Strategy Page. Retrieved from: http://www.strategypage.com/htmw/htseamo/articles/20121006.aspx ("Most of these ships are now using a detachment of 4-5 armed guards, which cost them about $40,000 for the short trip through pirate infested waters."); Armed guards protect Swiss ships from pirates (2012, August 19). Swiss Info. Retrieved from: http://www.swissinfo.ch/eng/swiss_news/Armed_guards_protect_Swiss_ships_from _pirates.html?cid=33343846 ("Another restriction is the high cost of such security, with a four person team costing SFr40,000 per week."); see also Kazakos, Thomas A., "Piracy: Impact and Challenge on Maritime Trade," (2012).

59 Brown, J. (2012) Pirates and Privateers: Managing the Indian Ocean's Private Security Boom. Lowy Institute. Retrieved from: http://lowyinstitute.cachefly.net/files/brown_pirates_and_privateers_web.pdf (citing an conversation with an industry representative that the cost per day per guard is $1000); German shipping firm spends $126,000 on security for each Gulf of Aden round trip (2012, September 6). Platts. Retrieved from: http://www.platts.com/RSSFeedDetailedNews/RSSFeed/Shipping/8700313; Laws and Guns (2012, April 14). The Economist. Retrieved from: http://www.economist.com/node/21552553 (reporting that the cost of a 4-man team is $45,000 per transit).

60 GUARDCON (2012). BIMCO (pp. 3). Retrieved from: https://www.bimco.org/Chartering/Documents/Security/~/media/Chartering/Document_Samples/Sundry_Other_Forms/Sample_Copy_GUARDCON__04_01_2013.ashx

61 McMahon, L. (2012, September 12). Sami founder warns against pressure to shrink armed security teams. Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/sector/regulation/article407233.ece (quoting SAMI founder Peter Cook at the ICS conference that, "The worst enemy is complacency. Some shipowners have been reducing their best management practices and putting pressure on teams to cut numbers," he said. "Armed guards have experienced a 100% success rate but I want to put a caveat on this.").

62 SAMI Members (2012). Security Association for the Maritime Industry. Retrieved from: http://www.seasecurity.org/directory/; SAMI Grades & Fees (2012). Security Association for the Maritime Industry. Retrieved from: http://www.seasecurity.org/membership/grades-fees/

Re-Routing

63 BMP4. Retrieved from: https://www.bimco.org/News/2011/08/18_BMP4.aspx

64 ECoP 2010. Retrieved from: http://oceansbeyondpiracy.org/cost-of-piracy/economic

65 ECoP 2011 (page 18). Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf

66 Egypt Suez Canal official sees stable revenue in 2012 (2012) Retrieved from: http://www.reuters.com/article/2012/09/13/ozabs-egypt-suez-canal-idAFJOE88C02220120913

Increased Speeds

67 BMP4. Retrieved from: https://www.bimco.org/News/2011/08/~/media/Products/Publications/Pamphlets/BMP/BMP4_Low_Res_05-09.ashx

68 Pirates: The economic costs of maritime crime (2012). Retrieved from: http://www.globalpost.com/dispatch/news/regions/africa/kenya/120306/pirates-economic-cost-somalia; This Tech Entrepreneur Is About to Launch the Blackwater of the High Seas (2012). Retrieved from: http://www.wired.com/dangerroom/2013/01/private-navy/all/

69 Due to Oceans Beyond Piracy's licensing agreement with ExactEarth, none of the AIS data will be available to those outside OBP. A detailed description of our methodology is included in Appendix E for those who wish to obtain their own license and re-create our calculations.

70 Have falling bunker prices halted further slow steaming? (2012) Retrieved from: http://www.lloydslist.com/ll/sector/ship-operations/article399609.ece

71 Data available from: http://suezcanal.gov.eg.

72 BMP4. Retrieved from: https://www.bimco.org/News/2011/08/~/media/Products/Publications/Pamphlets/BMP/BMP4_Low_Res_05-09.ashx

73 Somali Piracy and the Monsoon Seasons (2010). Retrieved from: http://www.bergenrisksolutions.com/index.php?dokument=759; Increased Threat of Piracy After the Monsoon (2009). Retrieved from: End of Monsoon Bring Piracy

Warning (Schechter McElwee Shaffer and Harris (2009) http://www.idaratmaritime.com/wordpress/?p=92; Ibid Retrieved from: http://www.maintenanceandcure.com/maritime-piracy-warning.html

74 Kazakos, Thomas A., "Piracy: Impact and Challenge on Maritime Trade," (2012).

Labor

75 Edwards, L. and Lee, J. (2012). Total Reported crew fatalities. Retrieved from http://www.compass-rm.com/piracystatistics/Somali_Piracy_Fatalities_Graphic_as_at_31.07.12.pdf

76 See Appendix F for a full list.

77 For a full accounting of the human cost of piracy, see HCOP. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/hcop_2011.pdf

78 International Bargain Forum (2010). Retrieved from: http://www.imec.org.uk/ibf.html

79 2012-2014 IMEC/ITF IBF International Agreement (2012). (pp. 8). Retrieved from http://www.imec.org.uk/~imec/images/stories/Agreements/International%20Agreement.pdf

80 International Transport Workers' Federation (2012). Retrieved from http://www.itfglobal.org/seafarers/index.cfm

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82 Philippine Overseas Employment Administration (2009). Computation and Payment of the Double Wage and Benefits Due to Seafarers on Board Vessels Transiting the Gulf of Aden. Retrieved from http://www.poea.gov.ph/MCs/MC%202009/mc14.pdf

83 Philippine Overseas Employment Administration (2011). Governing Board Resolution No. 09. Retrieved from: http://www.poea.gov.ph/gbr/2011/gb_9_2011.pdf

84 Philippine Overseas Employment Administration (2012). Governing Board Resolution No. 12. Retrieved from http://www.poea.gov.ph/gbr/2012/GBR-12-2012.pdf

85 Hellenic Shipping News (2011, November 18). Seafarers call on Aquino government to ratify ILO Maritime Labor Convention. Retrieved from: http://www.seafarersrights.org/tag/filipino-seafarers/; BIMCO/ISF Manpower Study 2010 Update.

86 Bowden, A. and Dr. Basnet, S. (2012). Economic Cost of Somali Piracy 2011. Oceans Beyond Piracy. Retrieved from http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf

87 Conversations with informed members of the chartering industry.

88 There have been reports that seafarers who are entitled to receive hazard pay do not actually receive it. This claim is too speculative to be included in our methodology, but it is worth noting nonetheless.

89 Bowden, A. and Dr. Basnet, S. (2012). Economic Cost of Somali Piracy 2011. Oceans Beyond Piracy. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf

90 These figures came from discussions with Anglo-Eastern, and are based on the contracts seen by individuals inside that company as well as their understanding of the broader labor market.

91 In reality, monthly labor wages for tankers is around $96,000 and hazard pay is between 35% and 40% of the base labor cost. We chose the lower base labor cost and the lower hazard pay in accordance with OBP's policy of reporting conservative cost estimates. All numbers came from discussions with Anuj Chopra of Anglo-Eastern.

92 The MV Iceberg was not included in this table, as it has been widely reported that the owner of the Iceberg did not continue to pay wages to seafarers while in captivity.

Prosecution and Imprisonment

93 MARCUS TULLIUS CICERO, ON DUTIES (WALTER MILLER (TRANS.)) 385 (1913).

94 These countries include Germany, United Kingdom, Sweden, Spain, France, Belgium, Netherlands, Italy, Norway, Serbia, Montenegro, Croatia, Ukraine Portugal, Turkey, United States, Canada, Denmark, Greece, Netherlands, Australia, Bahrain, Pakistan, Singapore, Russia, Japan, South Korea, Iran, Comoros, Kenya, Madagascar, Maldives, Oman, Seychelles, Somalia, Tanzania, UAE, Yemen, India, and Malaysia.

95 Lang, J. (2011). Report of the Special Adviser to the Secretary-General on Legal Issues Related to Piracy off the Coast of Somalia. U.N. Document S/2011/30. Retrieved from: http://cil.nus.edu.sg/wp/wp-content/uploads/2010/10/Lang_report_S-2011-301.pdf; Bowden, A. and Basnet, S. (2012). Economic Cost of Somali Piracy 2011 (pp. 23). Oceans Beyond Piracy. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf

96 UN Report S/2012/50 (2012, January 20). Report of the Secretary-General on specialized anti-piracy courts in Somalia and other States in the region. United Nations Security Council. Retrieved from: http: //www.un.org/ga/search/view_doc.asp?symbol=S/2012/50

97 UN Report S/2012/50 (2012, January 20). Report of the Secretary-General on specialized anti-piracy courts in Somalia and other States in the region. United Nations Security Council. Retrieved from: http://www.un.org/ga/search/view_doc.asp?symbol=S/2012/50

98 UN Report S/2012/50 (2012, January 20). Report of the Secretary-General on specialized anti-piracy courts in Somalia and other States in the region. United Nations Security Council. Retrieved from: http://www.un.org/ga/search/view_doc.asp?symbol=S/2012/50. (contributors include the UNDP, UNODC, INTERPOL, the EU, and the governments of Norway, the United States, and the United Kingdom).

99 Other contributors include UNDP, UNPOS, INTERPOL, the EU, and the governments of Norway, the United States, and the United Kingdom.

100 UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10 (pp.2). Retrieved from: http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf

101 There was a misunderstanding built into 2011's methodology that mistakenly conflated suspects prosecuted with trials held, resulting in an underestimation of 2011's total cost.

102 Lakotta, B. (2011, April 7). Torture? Execution?: German Justice Through the Eyes of a Somali Pirate. Der Spiegel. Retrieved from: http://www.spiegel.de/international/world/torture-execution-german-justice-through-the-eyes-of-a-somali-pirate-a-755340.html (calculating the average cost of a European piracy trial at 500,000 Euros, which is equal to $663,800 using January 16's conversion rate); Lakotta, B. (2012, September 12). An Expensive Farce: Germany's Somali Pirate Trial Is Pointless. Der Spiegel. Retrieved from: http://www.spiegel.de/international/germany/german-trial-of-somali-pirates-turns-into-pointless-and-expensive-farce-a-855252.html (reporting that the cost of a particularly lengthy German trial was 3,675,000 Euros, or $4,856,145 for a 105 day trial. Lakotta's figure of 35,000 Euros per day was used as a proxy for a 1 day long Italian trial where the suspect pled guilty).

103 See Cost of Counter-Piracy Organizations, *infra* at Section 9

104 UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10. Retrieved from: http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf

105 Phillips, R. L. (2012, October 21). Long road to justice – The German piracy trial. Communi Hostis Omnium, Retrieved from: http://piracy-law.com/2012/10/21/long-road-to-justice-the-german-piracy-trial/; Bacher, K. (2012, August 22). Somali pirate sentenced to life in prison. Jurist. Retrieved from: http://jurist.org/thisday/2012/08/somali-pirate-sentenced-to-life-in-prison.php

106 UNODC Brochure (2011). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 7. Retrieved from: http://www.unodc.org/documents/Piracy/UNODC_Brochure_Issue_7_WV.pdf; GIS Newsletter (2012, May). Maritime Piracy- Agreement Signed with Somali Authorities (pp.5). Retrieved from: http://gis.gov.mu/English/Documents/GIS%20Publication/News%20May%202012%20Update.pdf

107 Kontorovich, Eugene (2012). The Penalties for Piracy. Oceans Beyond Piracy. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/obp_penalties_for_piracy_final.pdf

108 Ibid

109 Limitations of Regional Pirate Prosecutions Provoke Concern Once Again; Seychelles Stepts Up (2012 February 6). Contact Group on Piracy off the Coast of Somalia. Retrieved from: http://www.thecgpcs.org/about.do?action=news_sub&seq=92

110 UNODC Brochure (2012). Counter Piracy Programme- Support to the Trial and Related Treatment of Piracy Suspects, Issue 10. Retrieved from: http://www.unodc.org/documents/easternafrica//piracy/CPP_brochure_December_2012.pdf. ("UNODC is currently supporting the use of video conferencing in Kenyan and Mauritian courtrooms to enable witnesses to provide testimony in piracy trials from their respective countries."); Shapiro, A. J. (2012, October 26). Turning the Tide on Somali Piracy. Remarks to the Atlantic Council. US Department of State. Retrieved from: http://www.state.gov/t/pm/rls/rm/199927.htm. ("[T]he State Department and the United Nations Office on Drugs and Crime have worked together to support prosecutions. Together we recently provided funding and technical support for Kenyan judicial officials to hear testimony from crew members by video teleconference from their home countries for hearings held in Mombasa, Kenya.").

111 *See*, *e.g.*, Greece to prosecute first maritime piracy case with evidence gathered by Interpol team (2012, December 13). The Sofia Globe. Retrieved from: http://sofiaglobe.com/2012/12/13/greece-to-prosecute-first-maritime-piracy-case-with-evidence-gathered-by-interpol-team/; Hague, H. W. (2012, February 21). International community targets pirate kingpins. Gov.UK. Retrieved from: https://www.gov.uk/government/news/international-community-targets-pirate-kingpins. ("The RAPPICC will coordinate and analyse intelligence to inform tactical law enforcement options, including the turning of intelligence into useable evidence for prosecutions both in the region and further afield.").

Insurance

112 Piracy & Security: A Special Report from Lloyd's List (2012, April 5). Lloyd's List. Retrieved from: http://www.lloydslist.com/ll/incoming/article395619.ece/BINARY/LL_Piracy+%26+Security.pdf; *see also*, Bowden, A. and Basnet, S. (2012). Economic Cost of Somali Piracy 2011. Oceans Beyond Piracy. Retrieved from: http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf ("On the one hand, some insurance brokers, such as Willis Group Holdings (the world's third largest), have stated that piracy is among its 'fastest-growing' businesses. On the other hand, Andrew Voke, Chairman of the LMA Marine Committee has stated that piracy claims have overtaken the income gained from premiums, and that some underwriters would like to withdraw from the market. Neil Roberts, Senior Executive for Underwriting at LMA, has estimated that piracy costs ship owners an additional $160 million a year in premiums.") (internal citations omitted).

113 See "Scope and Methodology."

114 Gerlach, J. and Irwin J. (2005). War Risk Insurance for Non-Governmental Organizations. Retrieved from: http://www.spibrokers.com/NGO/War_Risk_Insurance_for_Non-Governmental_Organizations.pdf ("Quite simply, war risk insurance provides benefits for injury resulting from an act of war.")

115 Piracy - The Insurance Implications (2011). Marsh Inc. (pp. 4). Retrieved from: http://usa.marsh.com/LinkClick.

aspx?fileticket=mlpXR_Q17ss%3d&tabid=1985&mid=10432 ("The insurance industry debate as to whether loss of or damage to a ship as a result of an act of piracy should be covered under the ship's H&M marine risks or war risks policy has been largely resolved. Today the great majority of ships are insured against piracy under their war risks insurance."); *Id*. ("Both H&M marine risks insurers and war risks insurers have reimbursed ransom payments on policies that include the risk of piracy.").

116 Joint War Committee (2012). Lloyd's Market Association. Retrieved from: http://www.lmalloyds.com/Web/market_places/marine/JWC/Joint_War.aspx/; Baldwin, D. (2011, August 28). Piracy Wave Set to Hit Households in the Gulf Cooperation Council (GCC). Gulf News. Retrieved from: http://gulfnews.com/business/features/piracy-wave-set-to-hit-households-in-the-gcc-1.857936

117 Joint War Committee (2012). Lloyd's Market Association. Retrieved from: http://www.lmalloyds.com/Web/market_places/marine/JWC/Joint_War.aspx/

118 Piracy - The Insurance Implications (2011). Marsh Inc. Retrieved from: http://usa.marsh.com/LinkClick.aspx?fileticket=mlpXR_Q17ss%3d&tabid=1985&mid=10432. ("Compliance with Best Management Practices 3 (BMP3) will normally be expected as standard and may be an underwriting requirement."); for the latest version of the Best Management Practices (version 4), please visit: https://www.bimco.org/News/2011/08/~/media/Products/Publications/Pamphlets/BMP/BMP4_Low_Res_05-09.ashx.

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125 In the 2011 report, a rounding error led us to overstate the cost of insurance by around $31.5 million. That figure should be revised down to $603.4 million, producing no change in the report's final estimate that piracy cost the global economy between $6.6 and $6.9 billion in 2011.

126 Calculated from the following estimated figures: (Number of registered ships with MSCHOA: January: 1,800, February: 1,800, March: 2,500, April: 2,750, May: 3,250, June: 3,300, July: 3,550, August: 3,700). Therefore totaling 22,650 for eight months, an average of 2,831 per month. (2,831*4) + 22,650= 33,974 which is the 80% BMP compliance then total= 42,467. See Blount, K. (2011, October 18). Combating Piracy: Current Situation and Trends. EUNAVFOR Presentation at the Hanson Wade Combating Piracy Conference (slide 6). Retrieved from: http://piracy-europe.com/uploads/files/1169/Keith_Blount.pdf

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128 Please visit Appendix B for details on calculation

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130 There have been reports that the cost structure of piracy-related insurance and armed guards is beginning to shift. Historically, private armed guards and piracy-related insurance were treated as separate measures, each costing around $40,000 per transit. Recently, ship owners and operators have been pointing to the success of armed guards and successfully arguing that the cost of insurance and armed guards should be no more than $40,000 total. If this practice becomes more widespread, it would result in a drastic reduction in the cost of these two piracy prevention measures. It also may result in a change in the makeup of security teams seeking to reduce labor cost. Retrieved from: http://www.thecgpcs.org/trustfund.do?action=trustFund

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