

Piracy off the Horn of Africa is a problem that appears to defy all efforts towards resolution. One can wonder why this is the case in light of modern technology to track vessels at sea and in view of all the tools at our disposal to counter armed attacks. In reality, the conditions that promote modern piracy and allow it to continue are not significantly different than those we have observed throughout history, as are the solutions.

Piracy is a product of three causative factors: motivation for gain, ability to project an armed force with the capability to seize vessels in shipping lanes, and safe havens pirates can use for home bases from which they can market their loot. Remove or interrupt any one of these factors and piracy is eliminated or reduced. Patrolling sea lanes with naval forces is useful but the size of the area that must be patrolled and the number of vessels operating in the shipping lanes make it nearly impossible to eliminate piracy through naval patrols of shipping lanes alone. The shipping companies must take some counter-measures of their own to discourage or delay pirates attempting to board their vessels.

Profit motive

Elimination of the profit motive is the simplest solution to stopping piracy yet it is the most difficult to realize. Payments made to pirates ensure that piracy will continue and expand, in that it provides funds to purchase better ships, weapons and to recruit new crews. The \$3 million ransom paid for the release of the Sirius Star makes perfect business sense when compared to the \$100 million value of the ship and its cargo. The logic of the exchange however may prove faulty over the longer term as ransom paid is translated into an improved capability for pirates to conduct attacks and may contribute to an increase in the number of pirates intent on seizing vessels.

Over one dozen ships and three hundred crew members are being held presently by pirates. With over one hundred attacks on vessels in the Horn of Africa last year, including one on the MV Faina a Ukrainian ship carrying tanks and other weapons (and later ransomed for \$3 million) the need for a more comprehensive solution to the problem is apparent. Recognizing that the payment of ransom is ultimately counter-productive, it follows that strategies should focus on either countering attacks at sea or on stopping pirates from boarding vessels altogether.

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Stopping men from boarding a vessel involves risk management decisions that vary from one type of vessel to the next. Cruise ships enjoy two inherent defenses against boarding: they tend to have a higher freeboard above the water line and are capable of higher speeds than fully loaded cargo vessels. The MS Nautica, an R class cruise ship was able to prevent being board by pirates on 30 November 2009. It was able to move at a flank speed of 23 knots which permitted them to outrun their pursuers. Noteworthy however was that the ship was struck eight times by rifle fire before it escaped. It was also inside a Maritime Protection Safe Area patrolled by an international security force. Neither speed nor the presence of naval security vessels in the area was sufficient to completely protect the vessel.

Fully loaded cargo vessels sit low in the water and cannot attain the speed needed to outrun pirate vessels. A fully loaded cargo vessel, such as the Sirius Star, may have as little as nine meters of freeboard and is easily boarded if the pirates are able to close in on the vessel. It must also be considered that a fully loaded vessel carrying volatile petroleum products may not be able to withstand even a limited fire fight between armed security forces and pirates attempting to board. As a result, most of the technology currently used for protection of ships against this type of threat relies on non lethal devices that attempt to keep the attackers at a distance, or at least prevent them from boarding, without invoking an armed response.

Anti-Pirate technologies

One promising technology that has been used with limited success is called the Long Range Acoustic Device or LRAD. This device is widely used by US Armed Forces for anti-ship boarding. The Seaborne Spirit and the Queen Mary 2 cruise ships employ this technology for their ship defense plans. A security team provided by Anti Piracy Maritime Security Solutions (APMSS) of Poole, Dorset, England employed this device successfully on November 14, 2008 to repel pirates attempting to attack a chemical tanker. However, on November 28, two weeks later, another APMSS security team used a LRAD to fend off three attempts but were ultimately unsuccessful in preventing pirates from boarding and taking over the vessel. The security team was forced to abandon the ship as they were fired upon by the pirates both while aboard the vessel and after leaping into the sea.

A more robust "stand-off" technology can be found in the "Vehicle-Mounted Active Denial System" or V-MADS. This device, currently under development by the Air Force Research Laboratory and the Department of Defense's Joint Non-Lethal Weapons Directorate, sends a narrow beam of 95 GHz millimeter waves towards an identified object out to 700 yards, which offers defense against most rocket propelled grenades (RPGs) and accurate small arms fire.

Maritime Security & Counter-Piracy: Strategic Adaptations and Technological Options

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The beam penetrates less than 1/64th of an inch of the subject's skin and produces an intense burning sensation that stops when the subject moves out of the beam or the beam is blocked. Unfortunately the beam can be absorbed by fog or sea spray, and a wood or metal screen would be all that is required to block the beam entirely. Still, it could be highly effective against attackers in small craft not prepared for this specific device.

Laser and LED devices that temporarily blind the subject provide standoff, and there are any number of available models used by the military and law enforcement that can temporarily blind a subject or induce disorientation and nausea. However most of the devices currently available operate at relatively short ranges normally within small arms range. More powerful lasers can cause the same effect at greater ranges, but at close range would cause permanent blindness. This limitation implies that the user is willing to accept risk to his own life by using a less powerful device against an armed attacker at close range, or one that causes permanent damage to his attacker. Also to be considered is the fact that there is no guarantee this type of device would succeed in blinding all members of the attacker's party and thus stop an attack. If one or more members of the attackers group is permanently crippled in this manner but the attack ultimately succeeds the crew could suffer serious reprisals. It is likely that the next group of attackers would employ counter measures and be inclined to exact revenge for any past injuries suffered as a result of using this device.

When considering use of force that is likely to cause death or crippling injuries half measures simply will not do. Security teams providing protection to the ship and its crew must be prepared to use lethal force as their first or final option if an active resistance to boarding is contemplated. The example provided by the APMSS team in their efforts to defend their vessel using the LRAD should not be forgotten.

It can be concluded that shipping companies and owners of the cargo desire to protect their vessels, cargo and crews and are willing to take active counter measures if they demonstrated utility and have a reasonable chance of success. It must also be assumed that owners are intent on ensuring that no action is taken that results in the destruction of their vessels and the loss of crew and cargo.

Anyone trained in military defensive operations will acknowledge that a credible defense is built upon the principle of layers of defense which are mutually supporting. A determined attacker will overcome initial defenses, or find counter measures learned from experience that will allow them to succeed in subsequent attacks. If an active defense is employed, security teams must have the tools required to do the job. In short most, if not all resources available in a layered defense that engages the threat at the furthest possible range, and continues to apply pressure

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all the way up to the ship using multiple means of defense must be considered. Ultimately this means that if all else fails, the option to use lethal force to counter lethal force must be considered.

There are of course two major impediments to employing lethal force in defense of ships at sea: those associated with employing weapons from the deck of large vessels carrying volatile cargo, and the risk of fire and explosion. Second, there are political issues involved in cargo vessels entering foreign ports carrying lethal weapons. Some nations simply will not permit civilians with weapons to enter their ports. There are also inherent issues associated with rules of engagement and legal jurisdictions when lethal force is employed by civilian security forces. All of these issues make the use of lethal force problematic for routine defense of vessels, and should only be used as a last resort.

Strategies

A possible solution to these issues involves moving the defensive platform off the deck of the ship being defended and taking the fight to the pirates while they are still some distance from the ship. By placing a significant portion of a ship's defenses on board a smaller vessel that can be launched from the mother ship, any counter fire from the pirates will be directed at that smaller vessel, and not at the initially targeted vessel. Assuming a ship has opted to include lethal force in its list of options, this also allows the mother ship to release an armed security vessel before entering a port-of-call that would not permit entry of armed vessels into their port. The security vessel could be moved from one ship leaving a hazardous sea lane and passed onto another entering, or it could be picked up by a tender that shuttles the security vessels between ships needing protection.

There are some commercial security companies attempting to conduct mother ship operations in the Horn of Africa now using small craft with armed security contractors. This can be highly expensive, and there are limits to the numbers of such ships and trained operators available to man the details. Another option is to employ Unmanned Surface Vessels (USV) equipped with an array of defensive and offensive devices. The US Navy has tested two small, armed USV's designed to patrol harbors and defend vessels. One such vessel, the Protector, is a 30 foot USV originally built by BAE systems, Lockheed Martin and the Israeli Defense firm RAFAEL, now marketed by Rafael Advanced Defense Systems Ltd. The Protector can be remote controlled from approximately ten miles away allowing it to provide a wide perimeter defense for the ships it protects. With new satellite based, broadband technology being developed by Tantara Communications LLC to track shipping containers, it is possible that small USV's of this type could be controlled from port and be limited only by their fuel range and sea conditions.

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Another option is the smaller, jet ski sized Sentry manufactured by the British Defense firm Qinetiq. The Sentry has a limited fuel load and operating time, roughly six hours. Its small size makes it practical to quickly launch from cargo vessels to encounter hostile small craft at sea. These small craft could be fitted with an array of devices, to include acoustic, microwave, laser technologies and water cannons that would move the active defense well away from the mother ship, delaying or driving off the pirate vessels while the mother ship escapes. The longer range Protector could operate independently at sea to help patrol shipping lanes, with multiple USV's being tended by one mother ship or a control station at a friendly port in the region.

There are two other maritime security technologies both designed for close-in defense. The first is a unique application of nets and booms, developed by the UK based Anti-Piracy Maritime Security Solutions. This technology is designed to be deployed when a threat appears, and can be easily recovered and re-stowed by hand while underway. The intent is to foul the prop of the pirate's small boat engine, causing the small craft to capsize or swamp in the wake created by the larger ship's forward motion.

Assuming the pirate vessel does not swamp or capsize, or even if it does, the potential is there for the pirates to still employ their boarding ladders or even use the nets themselves to board. Another product on the market that can help prevent this is a new anti-traction system developed at Southwest Research Institute. "The Mobility Denial System" (MDS) is a non-hazardous chemical spray system that spreads a highly slippery, viscous gel to inhibit the movement of individuals or vehicles on treated surfaces such as asphalt, concrete, grass, and wood. This technology was developed for the US Marine Corps for use in crowd control. It's effective on vertical or horizontal surfaces, at temperatures ranging from 32 to 125 degrees Fahrenheit. It is a water based system that last for six to twelve hours under normal conditions. A series of containers with this substance and remote controlled spray devices pre-positioned at points where a pirate would likely attempt to board could be all that is needed to deny them access to the vessel. There are any number of remote controlled spray devices with CCTV aiming and control systems that would permit accurate application of the substance from a safe location.

This article has addressed three factors that influence piracy: motivation for financial profit, ability to project an armed force into shipping lanes with the capability to seize vessels, and safe havens they can use for home bases and from which they can market their loot. History has demonstrated time and again that it is the third factor that is the most critical.

Piracy is caused by a desire to profit. Greed is not the only motivating factor. Piracy is a risky business that often ends in death or imprisonment. In truth the vast majority of pirates and their

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crews would seek other means of employment if it were available to them. Piracy off the Somali coast began as a result of illegal fishing and toxic waste dumping from international cargo vessels that further reduced the yield of fish and seafood. "Before we started the piracy, we appealed to the world to do something about the illegal fishing in our territorial waters," said Farah Ismail, a convicted pirate serving 15 years in a Somali prison. "They didn't listen, so we turned to piracy." Ismail, 38, is from Puntland, a Somali territory on the tip of the Horn of Africa. Most of the piracy takes place there and in southern Somalia. Pirates have largely avoided the north-western Somali territory of Somaliland, which has a functioning government and security forces. Even so, the Somali government has just three patrol boats to patrol the entire 860 kilometer coastline.

The US Department of State Office of Anti-Terrorism Assistance (ATA), the US Coast Guard, the Department of Defense and other government agencies from the US, the UK and other foreign nations are providing assistance to Kenya and other surrounding nations to enhance their coastal defense capabilities and improve control of coastal waters in the entire region. These programs are coordinated through the US Department of State Office of the Coordinator for Counterterrorism (S/CT), the United Kingdom Foreign and Commonwealth Office, Counterterrorism Department and similar government offices from other foreign nations whose primary mission is to forge relationships with government, non-state and multilateral organizations to advance counterterrorism objectives.

Ultimately, the only real solution is to re-establish a credible law enforcement capability within the Somali government that can enforce rule of law in the ports and villages along the coast, as well as on the high seas. This will require the coordinated efforts of government assistance programs, both military and civilian, to restore rule of law on shore as well as the seas, and responsible, innovative and effective security programs provided by commercial organizations to protect their vessels and crews in a manner that does not result in the enrichment and empowerment of the criminal organizations that prey upon them.

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