Part 2. PUBLICATIONS

MARITIME IT & MODERN PIRACY APPLICATIONS IN THE ROLE OF ISC MARINE SIMULATOR

Ibrahim Ghazy,
Prof. Captain, Master Mariner F.G,
BSc (Maritime Transport), MSc (Advanced Navigation)
Head of Marine Simulator
Ahmed Abd Al Maksoud,
Captain, Master Mariner F.G, BSc (Maritime Transport)
Lecturer in the Marine Simulator
College of Maritime Transport and Technology
Arab Academy for Science and Technology and Maritime Transport
E-mail: capt.ahmad@hotmail.com

Abstract. In the past few years, acts of maritime piracy have been occurring with increasing frequency in many regions of the world. Adverse effects from these attacks are suffered not just by elements of the shipping industry but, by extension to many others field in our world economical system, from that base the needs to stop that act of piracy became very important & that leads us to understand the real effective elements that help the piracy to raise again to this level.
A good observing to the pirates attacks accidents natural show us that they have **totally different** style of attacking comparing to the past old accidents. It seems that new technology advantages did have much influence over the pirate's abilities. They didn't get lazy as usual people do when they start using high tech. products. We believe that Modern pirates use a great deal of technology & from that element we will break one and big link in a **criminal chain that caused Modern Piracy Raising.**

1. INTRODUCTION:

Modern pirates use a great deal of technology. It has been reported that crimes of piracy have involved the use of mobile phones, AIS, Sat. Phone, Decoding phones tracer modern speedboats, assault rifles, shotguns, pistols, mounted machine guns, and even RGPS and grenade launchers. The Technology was useful for both sides shipping industry from a side and pirates activity from the other side, which raised the need of good handling of this technology so it will reach the right hands always. Also, we have to, increase the teacher knowledge and skills to meet the stander of awareness need for crew training to achieve optimization of this technology to be always one step forward of the modern piracy.

1.1. What is Piracy?

According to the International Maritime Bureau (IMB) the definition is: Piracy is the act of boarding any vessel with intent to commit theft or any other crime, and with an intent or capacity to use force in furtherance of that act.

1.2. The Piracy Rising Once Again:

Surveying through different research and statistics concerning reasons of pirate's attacks, we find there are three main reasons:

a) Disrupted Governmental Administration:

Food, water, energy problem is a major problem for all government now which have simply encouraged pirate attacks.

b) Reduced Naval Presence:

The trend is for smaller world navies. Dramatically decreased international ocean patrols have left merchant vessels virtually unprotected on the sea frontier.

c) Technology:

Technical advances have been reduced crew size and vessel's ability to defend itself. On the other side of the coin, there has been a bumper crop of technological advances which improve the pirate chief's weapons of speed, shock, surprise.

1.3. Types of Pirates:

There are three main ***Types of Pirates:***

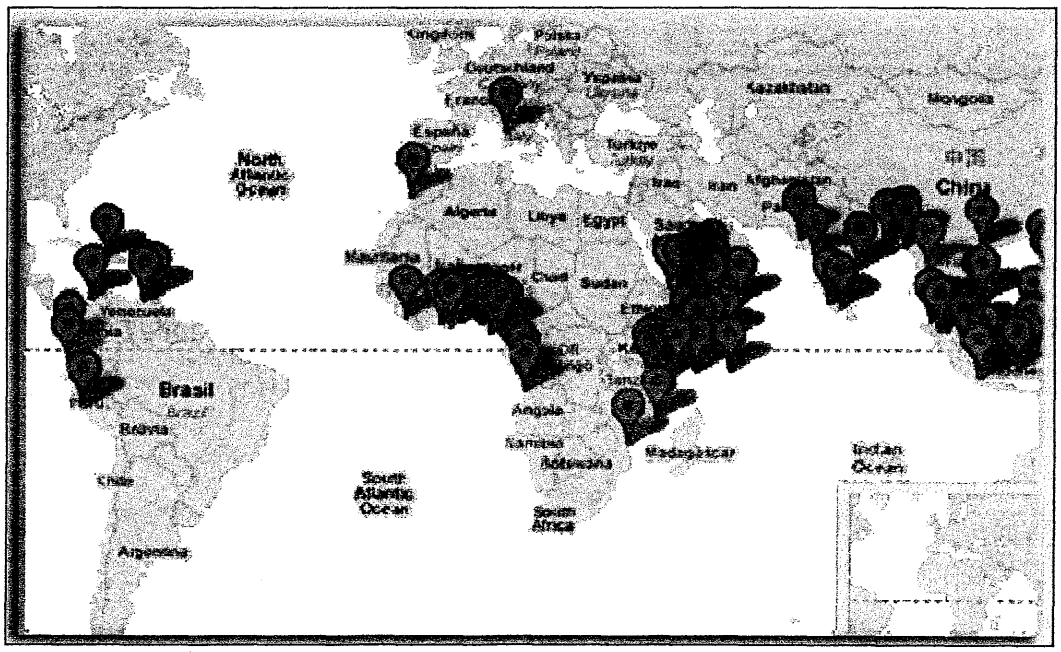
a) *The first* type of pirate is your standard issue low-life criminal. These are types who find it more expedient to just steal your finger, instead of taking the time to remove your ring.

b) *The second* pirate type is a more sophisticated organized crime group such as the five gangs thought to control a significant percentage of piracy Area.

c) *The third* and perhaps the most troubling type is the "**Semi-Official Military Pirate**", which is the actual pirates who have merely painted their vessel to look like one of the real Coastguards also they have connections with the ports authority, ships agents, ships chartering companies to access any feedback about your ship.

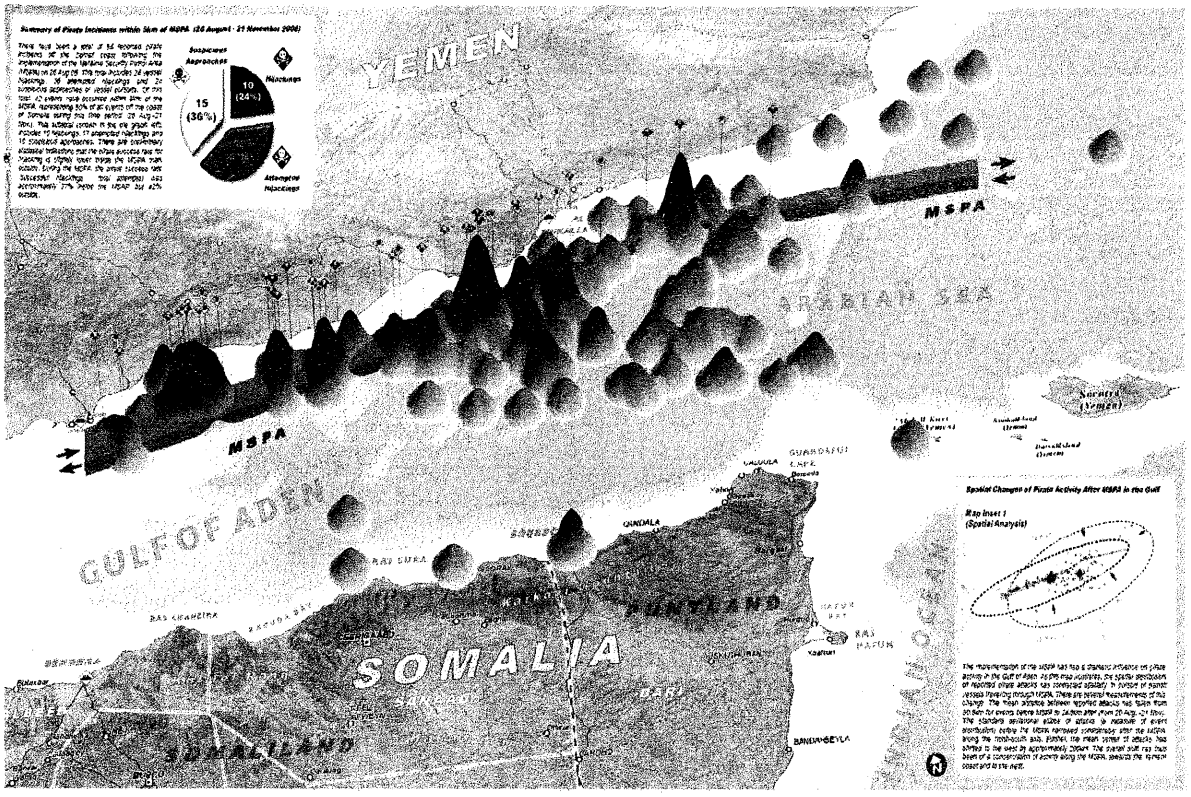
2. AN OVERVIEW FOCUSING ON PIRATES ATTACKS DENSITY

Actual pirates who have merely painted their vessel to look like one of the real Coastguards also they have connections with the ports authority, ships agents, ships chartering companies to access any feedback about your ship. Fig. 1 is a map shows all the piracy and armed robbery incidents reported to the Piracy Reporting Centre during 2008 and fig. 2.1 is a 3D perspective map illustrates the relative spatial density of reported pirate incidents in the Gulf of Aden for 2008 (current as of Nov. 21, 2008) and some Incidents that have occurred within 5km of the Maritime Security Patrol. Fig. 2.2 is a map illustrates the relative spatial density of reported pirate Incidents in the Gulf of Aden for 2008 and fig. 2.3 is a Keywords of Route.



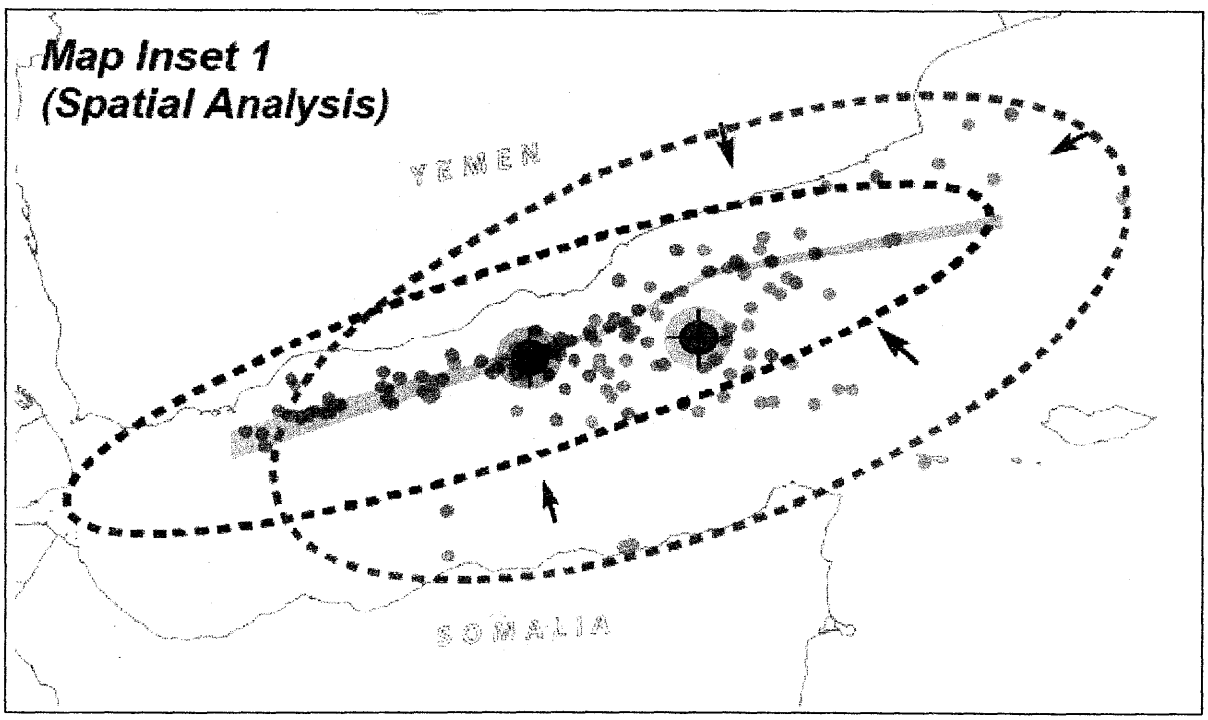
Source: NATO Research developing

Fig. 1. Region Area Attacked By Piracy 2008



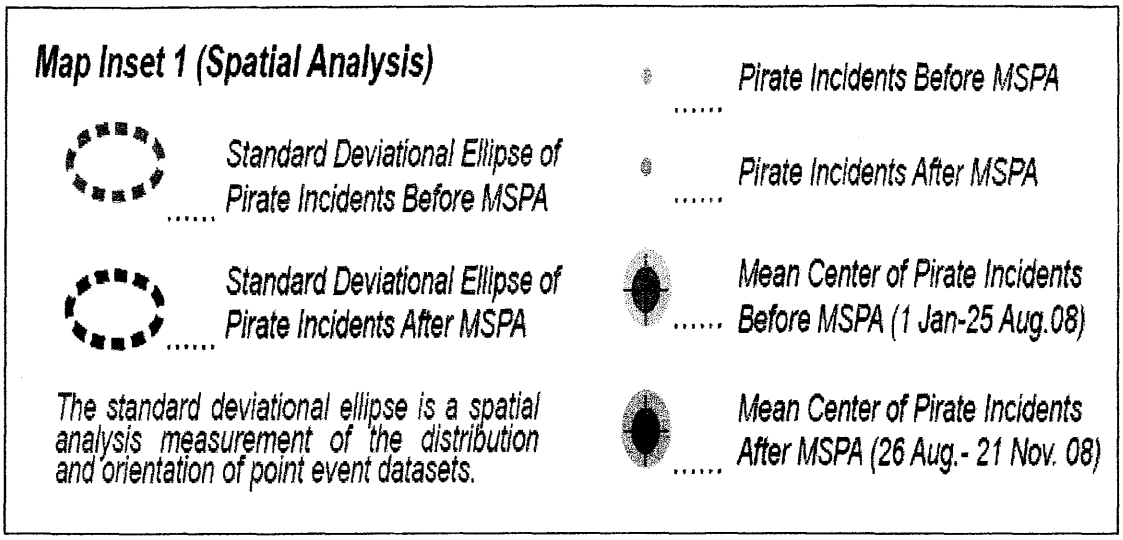
Source: UN SATCOM

Fig. 2.1. Pirates Attacks Density in the Gulf of Aden 2008



Source: UN SATCOM

Fig. 2.2. Incidents Mean Center Of Pirates Moved Toward the Center of the Marine Navy Patrols Rout!



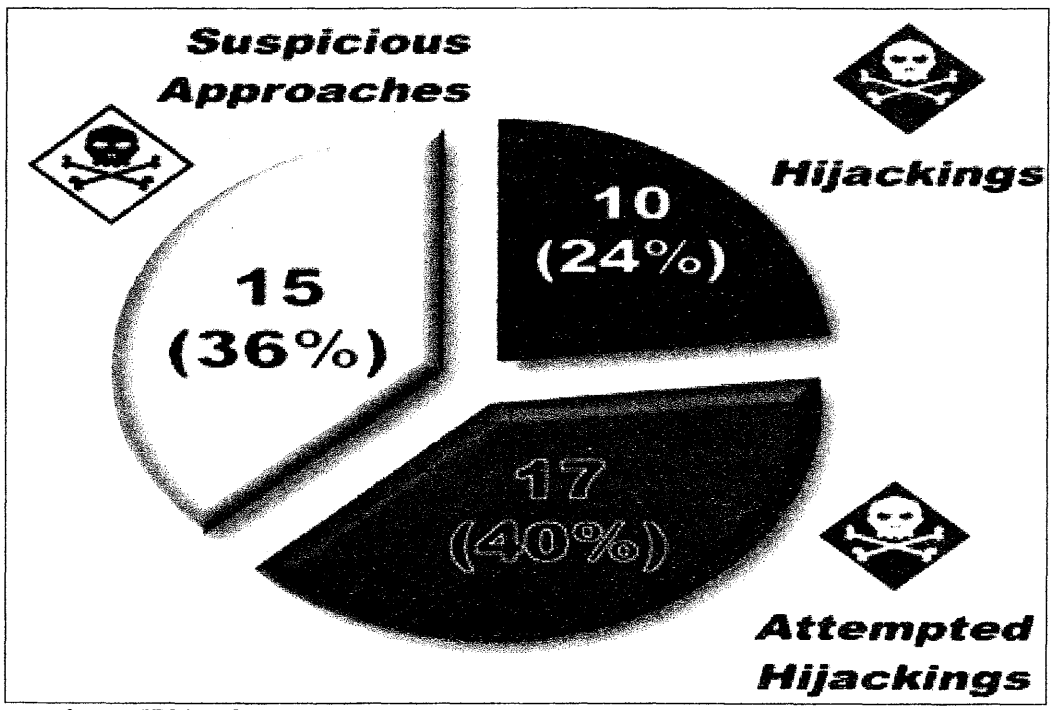
Source: UN SATCOM

Fig. 2.3. Keywords of Route

2.1. Types of Incidents:

Incidents Are Classified Into 3 Main Types:

i. **Hijacking:** where pirates have taken control of a ship.
ii. **Attempted Hijacking:** where pirates have deployed weapons & attempted to board a vessel but failed.
iii. **Suspicious Approach:** where a vessel has followed or chased another ship.



Source: UN SATCOM

Fig. 3. Types of Incidents and Percentages

3. PIRATES ATTACKERS AND USING OF INFORMATION TECHNOLOGY PIRATES STRATEGY:

The trends in latest piracy incidents are as follows:

- Targeting larger cargo / oil / gas / chemical tankers.
- Approaches / attacks conducted from 2 – 3 small speedboats with 3 – 5 armed persons each.
- Between the time you see them and the time they control the ship, it takes 15 minutes, maximum.

Pirates could be tracking their targets using modern technology that is easily available on the web and using ships identifications monitoring systems.

3.1. Marine AIS:

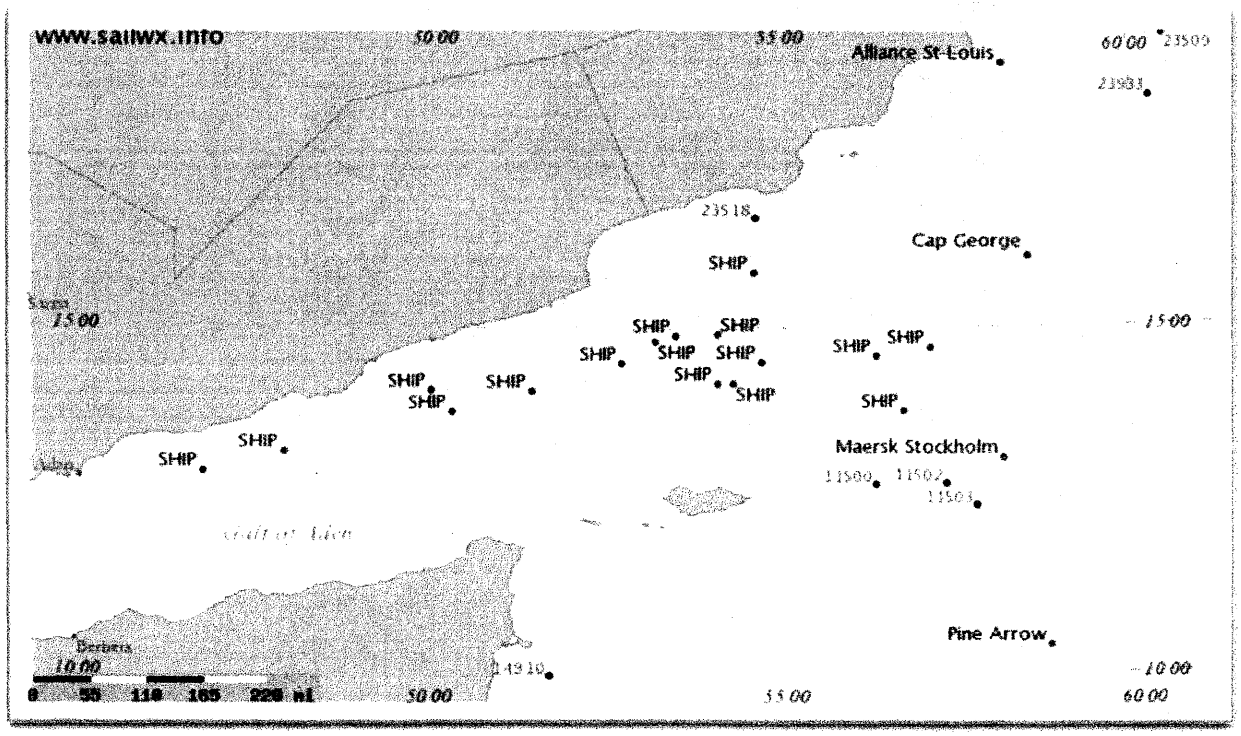
All internationally trading ships over 300 GT. were mandated under the International Maritime Organization's Safety of Life at Sea convention to install AIS and the majority of ships should be equipped with AIS by December 2004. (Merchant Shipping Notice (MSN) 1780 M).

IMO guidelines for the onboard use of AIS, resolution A.917 (22) paragraph 21 state that:

"AIS should always be in operation when ships are underway or at anchor. If the Master believes that the continual operation of AIS might compromise the safety or security of his /her ship or where security incidents are imminent, the AIS may be switched off.... The master should report this action and the reason for doing so to the competent authority."

3.2. Cargo Tracking Systems:

At least 22,000 ships pass each year through the Gulf of Aden.

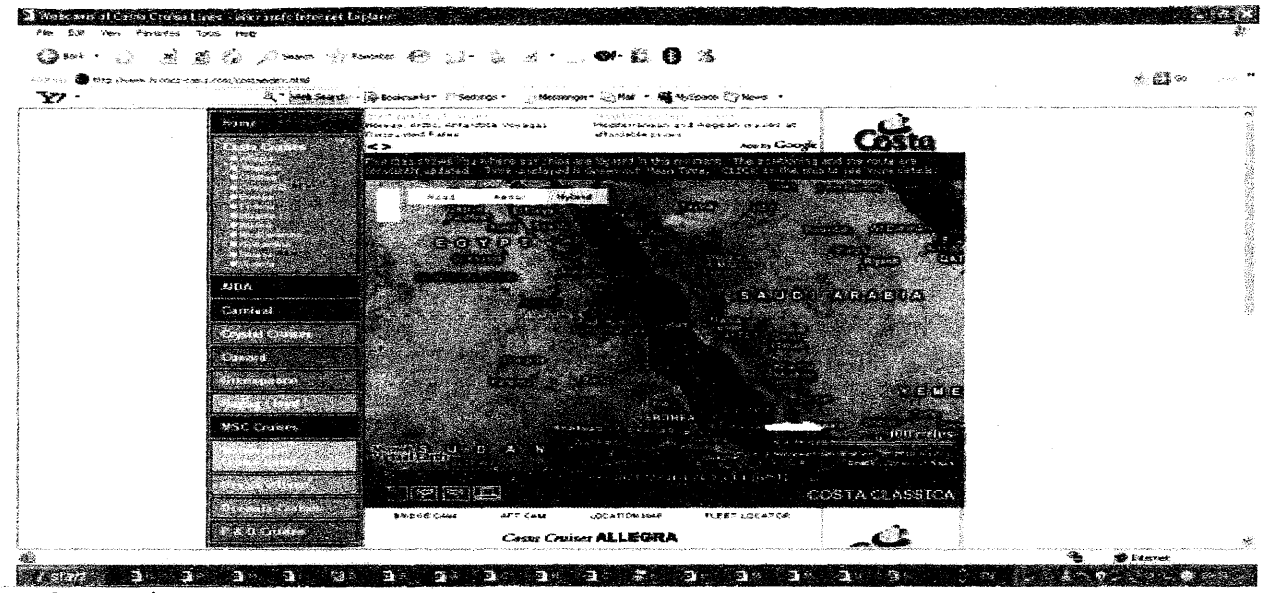


Source www.sailwx.info

Fig. 4. Cargo Tracking Systems

3.3. Just Visit the flowing Sites to get all these Information please!

Krooz-Cams.com, Cruise-Cam.com, Shipwatching.com



Source cruise.com

Fig. 5. Internet Site and Ship's Data

Source: Time.com

Fig. 6.1. Hacker Monitoring

Source: Time.com

Fig. 6.2. Somalia Attackers

IT Without Security May Lead To...? The Right Information Reaching the Wrong Hands"

4. TECHNIQUES AND TECHNOLOGIES THAT OFFER INTERESTING TIPS FOR PIRATE-ATTACK EVASION:

4.1. What is the Solution to Piracy in Somali?

This is a vote annualized by PollDaddy answers:

(http://answers.polldaddy.com/viewPoll.aspx?view=results&id=1137237).

- Naval Escorts 21 % ;
- ***Crew Training 12 %;***
- Invade Somalia 11 %;
- Private Security Firms 14 %;
- Peaceful Entry into Somalia 4 %;
- Lethal Weapons aboard Ship 28 %;
- Non-Lethal Weapons aboard Ship 9 %.

4.2. Maritime Safety Protection Area Techniques:

Liner ships tend to do consistently is gather intelligence – whether via:

- Government organizations,
- Private security companies,
- Military coalitions or
- The insurance companies that cover their ships.

4.3. The Underlying Problems In Somalia Are:

- Political instability in the region.
- Manning of vessels.
- *Lack of specific training.*

4.4. Crew Training Methodology:

a. Ships should have a security plan that anticipates an attack by pirates. "Planning and training must be on the basis that an attack will take place and not in the belief that, with some luck, it will not happen.**"Officers and crew are asked to rehearse elements of the plan"**.

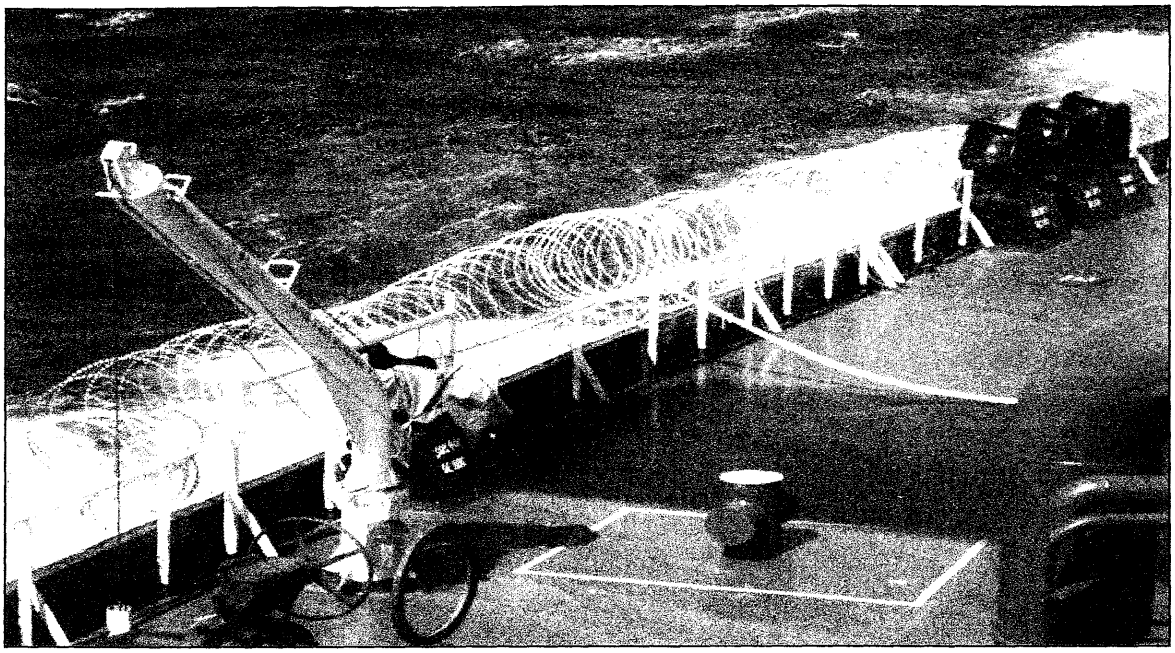
b. **Security levels referred to in the ISPS Code:**

- Security level 1: normal, the level at which the ship or port facility normally operates.
- Security level 2: heightened, the level applying for as long as there is a heightened risk of a security incident.
- Security level 3: exceptional, the level applying for the period of time when there is the probable or imminent risk of a security incident.

c. **Early detection of a possible attack is the most effective deterrent:**

The IMO guidelines stress tools to offer advance warning include:

- Low-light binoculars;
- Night vision devices and
- Barbed wire.



Source: Captain/ Ahmed Abd Al Maksoud, 2009

Fig. 7. Barbed Wire Rigged On VLCC Ship

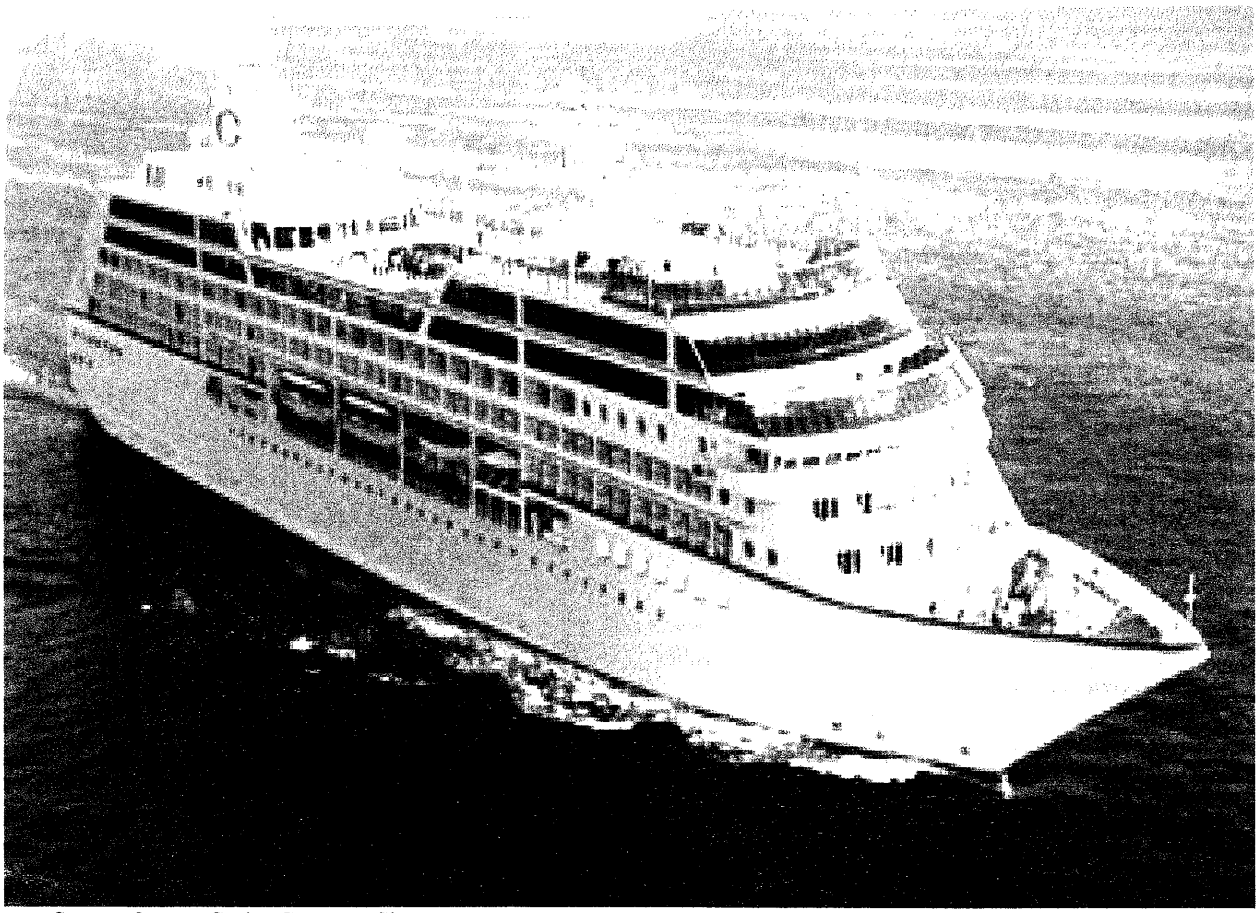
d. The IMO report notes that water pressure of 80 pounds per square inch can deter attackers. Another tactic? "Provided that navigational safety allows, masters should consider 'riding off' attackers' craft by heavy wheel movements...the effect of the bow wave and swash may deter would-be attackers."
e. The GMDSS "Piracy / armed robbery attack" Message is category of distress message for all classes of DSC equipment & INMARSAT has added a piracy Message to INMARSAT-C menu for GMDSS.
f. Long Range Acoustic Device - LRAD
   - LRAD – is a Long-Range hailing and warning, directed Acoustic Device designed to communicate with authority and exceptionally high intelligibility in a 15 – 30 degree beam.
   - LRAD – was originally conceived to support the protection and exclusion zones around U.S. Navy warships.
   - LRAD's – warning tones command attention at ranges in excess of 500 meters while it's directional and highly intelligible voice instructions can unquestionably be heard.

Source: www.icc-ccs.org

Fig. 7. Long Range Acoustic Device – LRAD

5. CASE TO STUDY:

MS/Nautica the large ship, carrying 656 international passengers and 399 crew members was able to outrun and outmaneuver them. The luxury cruise ship, (Nautica), Managed to avoid being Hijacked (Nov. 30. 08).



Source: Oceana Cruise Company Site

Fig. 8. MS/Nautica Managed to avoid being Hijacked (Nov. 30. 08)

The ship's Captain observed the approach of the attackers at approximately *1,000 yards* and *increased speed.* The attacking boats were able to approach within 300 yards, and *fired up* to eight rifle shots. Selection of feasible Evasive manoeuvres by judging the tip of own ship's velocity vector in relation to cone-shaped collision danger regions in true motion. It's suit more for Large-size High Speed Craft. The Master began *Evasive maneuvers* when the pirates were about 1,000 yards away from the ship and managed to avert the attack. The Ship Master used a Long-range Acoustic Device – which blasts a painful wave of sound – to distract the pirates.

MS *Nautica* Managed to Escape from the attempted attack **by:**

– Crew high awareness and

– Well trained staff leaded to ....

"A Good Reaction in a Reasonable Responding Time to Abortion That Pirates Attacks"

We are talking again about

– Training Crew,

– Good Handling of the Ships Equipment & ships maneuvers.

6. INTEGRATED SIMULATOR COMPLEX (ISC) AND TRAINING:

Marine Simulator Centers (MSC) is considered – by all standards – the most sophisticated and up to date simulation center in the world at large. It has been designed and installed by one of the leading USA companies in this field, namely "L3".

a. Ship Handling Simulator.
b. GMDSS Simulator.
c. Vessel Traffic Service (VTS).

Source: Marine Simulator Systems – AAST&MT, 2009

Fig. 9. AAST$MT Ship Handling Simulator

6.1. Objective of this Training is to achieve

- The experience of handling ships effectively and to be aware of all factors affecting the Evasive maneuver.
- Handling all majors and subtask on AIS operation which increase the mariner awareness in all the legal aspects of using AIS to prevent their ships from being a Victim to any Piracy.
- Develop the mariners to achieve the right handling of their GMDSS massage alert and skills to get the best results from there Station to prevent such a hazards.

6.2. Simulation of the Riding off Technique

A Sample of Two Scenario Run in one of the Integrated Simulation Complex (ISC) marine simulators to investigate and answer a very critical questions regarding Ridding off technique: **W**hich Type Of Ships Can Use This Maneuvers, **W**hen and **H**ow to apply it?, and test the relation between ship's dynamic behavior and evasive maneuver technique at the study area (Somalia), the experimental method technique

and different attacker's technique will be applied on a standard vessels types in the simulated study area. For the purpose of tests, a tanker ship (80000 DWT, fully loaded condition) and LNG (140.000M³ – fully loaded condition) that has a six degree of motion was used.

6.3. Feed and Results

6.3.1. 1st Scenario – Tanker 80.000 DWT Loaded

The evasive maneuver carried on 15 knots speed, it made high jacking operation difficult its observed that the chasing boat took longer time to be able to be alongside the tanker. The wave created by the evasive maneuver created a hard task for the small draft high speed boat attackers.

6.3.1.1. Maneuver Feedback Lessons

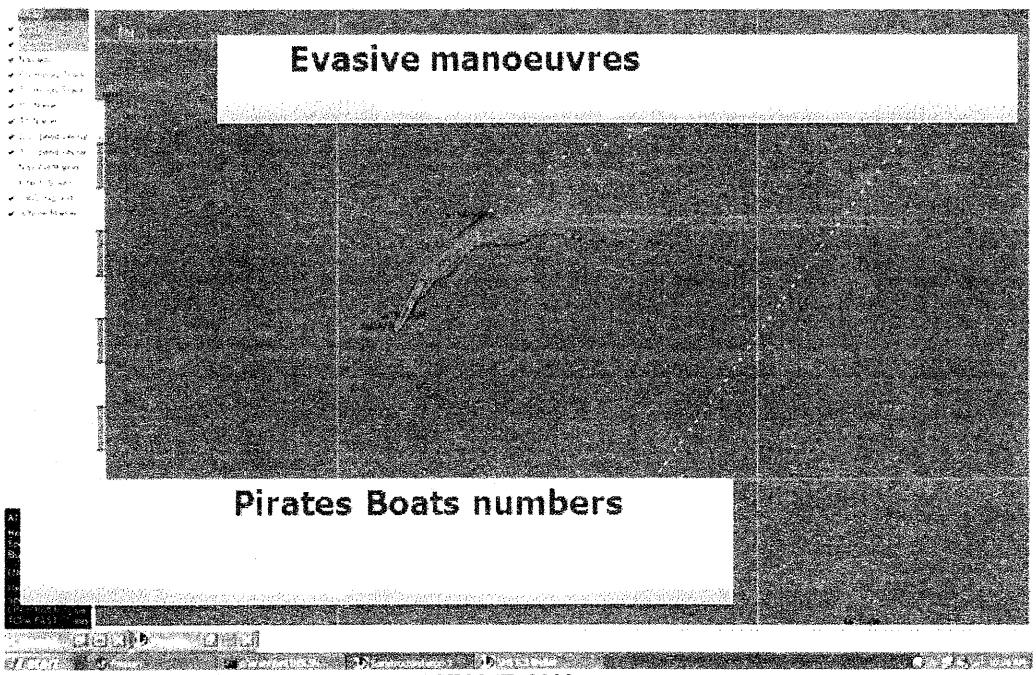
The longer the chaser will maintain the chasseing the more chances to board the victim tanker that her speed is decreasing due the maneuvers. Rate of turn for the tanker (loaded) is slowly created and slowly to be killed (overshooting), and reverse over other side to establish the evasive maneuver technique.

6.3.2. 2nd Scenario – LNG 140.000M³ Loaded

THE evasive maneuver carried on 25 knots speed; it made high jacking operation extremely difficult. It's observed that the chasing boat took too long time to be able to be alongside the tanker even for few seconds. The wav created by the evasive maneuver created a hard task for the small draft high speed boat attackers.

6.3.2.1. Maneuver Feedback Lessons

The longer the chaser will maintain the chasseing the more chances to board the victim LNG that her speed de accelerates with acceptable value for that maneuvers. Rate of turn for the LNG and reverse over other side helm to establish the evasive maneuver technique (Over shooting) was effective.



Source: Marine Simulator Systems –AAST&MT, 2009

Fig. 10. Historical Geoplot of Evasive Maneuver for LNG 140.000M³ Loaded

7. RECOMMENDATION

a) Naval force can never **eradicate piracy,** which can only be done on-land by a stable government, which Somalia hasn't had since 1991.

b) Lessons could be learnt from **successful anti-piracy** strategies elsewhere its mean Gathering Knowledge to be ready to have the right respond in the right time (As ***MS/Nautica***).

c) Targeting the so-called **"Mother Ships".** (We have to locate those mother ships by report the areas of attacks frequently to trace them).

d) According to the Punt land authorities and experts, there are up to 700 foreign boats fishing illegally in Somali waters at a given time, we should start an official registration for it.

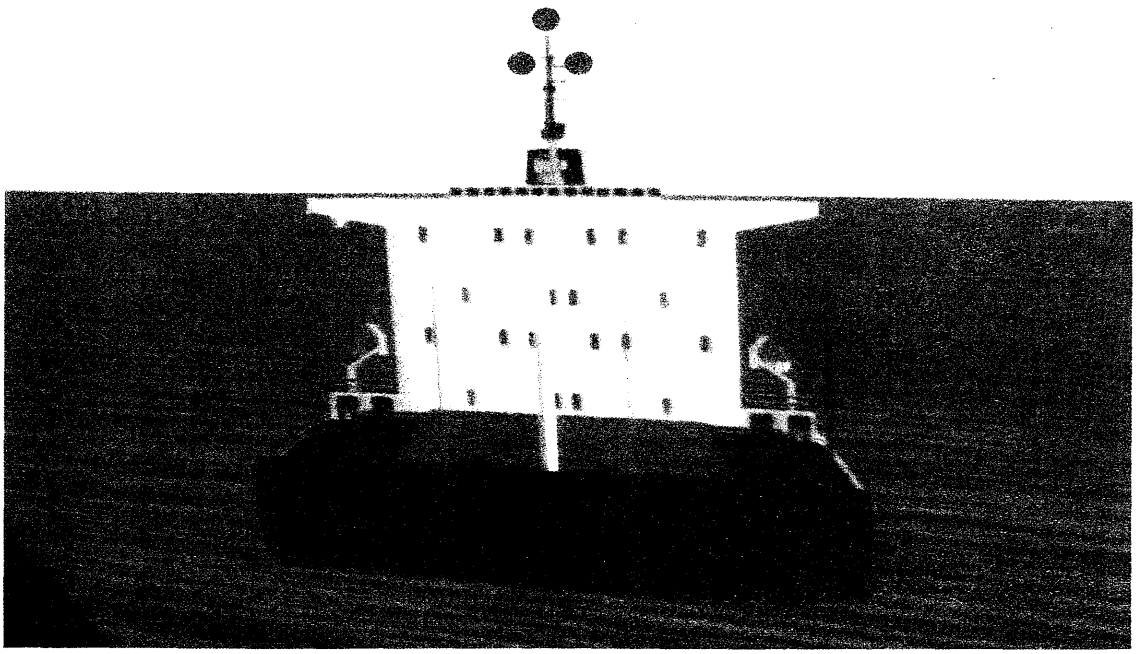
e) Involve the local community of each piracy area on the impact of having those pirates in their local community, If we will not going to we cannot achieve anything.

f) Work shop for GMDSS should established to work out on the communication tree of "piracy attacking" distress message focusing on the rule & responsibility of offshore and onshore parties.

g) A work shop to rehash the Rules of the Conduct Of Vessels in condition of piracy attackers such as Lights and Shapes (Rules 20 – 31) Sound and Light Signals (Rules 32 – 37).Example: A vessel facing pirates attacks shall exhibit:

– Three all-round round lights (night) or diamonds one at the mast head, one on each yardarm.

– It's also a Useful singe for the ships in the Area, Navy ships, Patrol Air Planes, to Declare that This Vessel is being High jacked or under pirates attack.



Source: Marine Simulator Systems –AAST&MT, 2009

Fig. 11

MARITIME IT & MODERN PIRACY

References

– Arab Academy for since and technology "Marine Simulator" (ISC).

– The half yearly report (Feb - July 2009) from the NATO Shipping Centre.

– IMB Piracy Reporting Centre "Official Web Page".

– Counterfeiting Intelligence Bureau "Official Web Page".