Maritime Security Do’s & Don'ts

Brian Kane

Sanibel, Florida
Overview

• Founded in 2005, GOST is a leading provider of maritime security, tracking, monitoring, video surveillance, acoustic deterrent, and cloaking technologies.

• Founding partner and Director of Research and Development

• Provided much of the security installation standards for NMEA

• Responsible for dozens of prevented thefts, recovered stolen boats, and Solved Police investigations
Vessel theft and break ins are a rampant + increasing problem all over the globe.

Boat owners are requesting security systems aboard as part of their electronics packages more and more.

Clients need to keep tabs on the boat and know the exact course, speed, and position. Boat Charter and rental agencies need to know where there assets are in real time.

Security systems are proven to prevent theft and make the boat a harder target.

Insurance companies often require security and tracking aboard and often offer discounts for doing so.

Boat owners are now expecting the same standards they are used to for their home and business to exist on their boat (which is often a lot more expensive).
What does a Maritime Security System consist of?

- Sensors protecting life and property aboard the vessel
- Output triggering events on alarms to drive away thieves and alert pertinent owners/crew to event
- Cameras monitoring activity aboard the boat and saving locally or offsite
- Tracking systems designed to announce boats location and theft
Considerations of Job

• Due to the inherent nature of security equipment onboard, it tends to be more of a personalized job between the installer and owner/crew.

• Installation locations tend to be a bit more covert to avoid being easily compromised.

• While various maritime security systems have different idiosyncrasies about the install. The basic terms stay the same. Follow all manufacturer installation instructions

• Think like a thief when installing a security system
Considerations

There is a high likelihood that the Maritime Security system you install next will save the owner a lot of money and hassle during ownership of their boat.
Terminology - Panel

- This is the device on board that interprets sensor inputs and can control relay outputs, while initiating alerts and events to responsible parties. It will harness hardwired or wireless entities and provide a user interface for boarding/ de-boarding control by entering predefined user codes.
Terminology - Sensors

- This defines any hardwired or wireless input “Zones” onboard. It includes but is not limited to door contacts, hatch contacts, motion detectors, beam sensors, deck sensors, high water switches, DC battery low voltage detectors, AC power loss detectors, and smoke detectors; to name a few of the most common examples.
Terminology - Outputs

• This defines a relay or switch that can control a variety of functions off panel events such as alarms. Output control is used for lights, strobes, sirens, horns, and a variety of other options that draw attention to the boat when an alarm happens.
Analog or IP cameras often have multiple functions on a boat. They assist in providing situational awareness for the crew when running the boat or when at the dock via on board monitors. Additionally, many systems provide offsite view ability of the cameras to a secure website login.
Terminology - Communicator

- This is the device that communicates specific alarm panel events and/or Video activity off the vessel. The three most common examples of this device are a Cellular communicator, Satellite Phone, or Vsat. Depending on the level of boat you are installing on these communication methods may be all used in unison.
Terminology – Tracking Antenna

• This is the device that transmits / receives GPS tracking coordinates and data. For most legitimately sized boats being used offshore, this antenna communicates via satellite. When the boat is operating inside GSM coverage most of the time, they can communicate off via this method as well. But know that antenna locations suggested in this guide are specified for satellite tracking.
This is someone who is authorized to access the security system panel. One who has an access code and/or Key Fob remote to arm/disarm. It provides an accountability structure of who is doing what and when on the boat such as owners, captains, and crew.
User management

- A user is defined as a person with access to the security system via a pass code and/or key fob remote. The Master user code is the only one that can add or delete users.

- Most security systems default Master code is “1234”. Common examples of the Master, User 2, and User 3 are the owner, crew member, and boat washer respectively.

- Every user can have only one key fob. For every user code programmed to the security system, there can be a key fob. However for every key fob programmed, there must be a user code associated to it.

- The installer often needs to setup key fobs for operation with the system. Given the nature of user security access, it is suggested that you default the users to the codes “1234”, “2222”, “3333”, etc. for master, user 2, user 3, respectively. The owner/operator of the boat should be made aware of these default codes and taught how to change them to their own numbers after the install is done. This protects the installer from the liability of having an access code to the boat.
Equipment Locations - Panel

• Interior of boat, away from any direct moisture
• Common areas such as the salon, interior helm, or similar primary entry areas of the vessel.
• Easy accessibility for a user boarding/deboarding the boat to disarm/arm with code.
• On larger vessels greater than 100ft (Approx. 30 meters) try to keep the panel closer to midship to limit wire runs and maximize wireless range
• Accommodate for wire run accessibility from rear of panel to power source and GSM/Satellite phone*. 
Equipment Locations - Panel
Determine if the system you are installing is a wireless or hardwired system. If it is a hardwired system, two or four conductor wires will need to be run to each individual sensor. This often requires running these wires to detect Normally Open (N.O.) sensors, Normally Closed (N.C.) sensors, and/or power wires. Assure all wiring adheres to NMEA and ABYC Standards. If it is a wireless system, the sensors will only need batteries to transmit the sensor conditions.

• **Definition: Normally Closed (N.C) – The state of a sensor input that continually keeps a circuit complete (closed) until forced by an event to open that circuit.**

• **Definition: Normally Open (N.O) – The state of a sensor input that continually keeps a circuit incomplete (open) until forced by an event to close that circuit**
Equipment Locations – Sensor Definitions

- **Delay** - When armed, allows a predefined period to board boat interior and disarm at panel.

- **Instant** - When armed, alarms instantly on the zone opening.

- **Follow Full Arm** - When fully armed, follows delay zone timer, goes off instantly when no entry delay engaged, and disables when stay or sleep arming.

- **Instant/stay** - When armed, alarms instantly and disables when staying.

- **24 Hr buzzer** - Buzzer alarm 24/7 on opening.
Equipment Locations – Sensor Definitions

Primary Entry doors- delay 1
Secondary doors- instant
Interior entry motion detectors- follow/ stay
Interior motion detectors- instant/ stay
Exterior motion detectors- instant
Exterior deck and storage hatches- instant

Exterior beam sensors- instant
Deck vibration sensors- instant
High water sensor – 24 Hr buzzer
Low voltage sensor - 24 Hr buzzer
Smoke Detector- delay fire
These are zones around the boat that protect the boat from theft intrusion in both the exterior and interior areas. Typical exterior applications include but are not limited to cockpit, aft deck, under helm electronics cabinets, Lazzerette hatches, and Rod Storage lockers.

- Assure that these zones are IP rated and resist water spray
- Do not install hatch and door contacts where they are constantly rubbed against and/or used as a handle by unknowing guests and/or crew.
- Do not install a zone where water runoff from assorted gutters of the boat constantly flows over it or collects.
- Whenever possible, use wide gap extension sensors that allow for a bit of magnetic contact tolerance as many doors and hatches have gasket seals that cause wider areas to cover between sensor and magnet.
- Do not place sensors where they are easily visible to potential thief or a yacht owner who does not want to see it.
- Do not place motion sensors in places where they focus on dock traffic.
- Exterior sensors are usually defined as “instant” zones. This definition means that in the event the system is armed and this zone is breached, the alarm will go off immediately.
Equipment Locations – Exterior Sensors

Crew Quarters Hatch

Engine Room Hatch
These are zones on the interior of the boat that protect entry doors/ hatches, interior motions, safes, private cabinets, and staterooms. This is a broad definition as installers can be asked to protect many private areas of the modern yacht.

- Assure that door sliding functionality is not inhibited by the magnet or switch.
- Keep it Hidden out of site if possible as most owners/crew do not want to see it and more importantly a thief should not see it.
- Interior perimeter “primary entry” door sensors are usually defined as a “delay” zone. This definition means that in the event the system is armed and this zone is breached, a delay timer will allow a defined period of time prior alarm will go off immediately. This allows the user to disarm at the panel.
- Interior perimeter “not primary entry” door sensors are usually defined as “instant” zones. This definition means that in the event the system is armed and this zone is breached, the alarm will go off immediately.
- Interior motions are usually defined as “follow” zones. This definition means that if an entry delay zone is engaged first it will follow that timer; else it will go off instantly.
Equipment Locations – Interior Sensors
Equipment Locations – Interior Sensors

Motion Detectors
Also referred to as PGMs, Outputs are used to bring attention to a boat in distress. These relay switches can be hardwired or wireless to the Panel. This switch will drive a variety of devices such as sirens, strobes, or deck lights. In most instances, the Output will be completing the circuit and the switched device should be between “COM” and “Normally Open (N.O)”.

- Assure that the output you are using is properly current rated for the device you are driving. Read the manufacturers manuals for specifics.
- Make sure the power feed to the device is constant even if the battery switches are turned off. Also assure proper breaker or fuse protection.
- **Follow Bell**- This event allows the Output to activate following the Bell cut-off delay. The event scares away would-be thieves while shutting off after a period of time as to not annoy your fellow dock mates. The unit stays in alarm and will re-initialize if a zone is breached again. It is most commonly used on Sirens.
- **Alarm activation**- This event allows the Output to activate upon alarm in a variety of ways. These methods include follow entire duration while in alarm, pulsing while in alarm, or for a specific timed duration. This is often used with strobes and Deck Lights.
- **Remote Access**- Key fob activation is often desired for boarding and deboarding timers.
Equipment Locations – Cameras

The use of cameras on the modern yacht is beneficial for situational awareness both when Underway, at the dock, and away from the vessel. Most every chart plotter onboard has multiple Video Inputs to assist in docking. Many yachts will often tie these analog cameras into splitters that feed all the images to screens throughout the boat.

- Most Analog Cameras rely off a DC voltage (usually 12VDC) and will need both power wires and an analog cable run to them. Assure it is constantly hot.
- Thoroughly review the owner/crew requirements as to the positions and amount of cameras needed.
- Common examples of cameras are Boarding Areas, Engine Rooms, Stern looking aft, in the cockpit, and also the salon entrance. Consider the privacy needs of client.
- It is a stern camera for assistance in docking, it is usually a reverse image camera
- Mount the cameras in high areas of the boat where they are more difficult to tamper with.
- Assure that the camera is not in the direct path of water runoff or collection points
Streaming Cameras off the boat

• Clients want to stream video off of the boat to keep visual tabs on their boat

• Use of a DVR for local storage

• Requires an internet connection via Cellular, Vsat, or sometimes WiFi (location specific and only works at dock)
Equipment Location Examples

Salon

Arch
Equipment Locations – Cameras
Equipment Locations – Cameras
Video Capture Examples
Video Capture Examples
Fixed cellular modules, Satellite phones, and VSATs can be used in conjunction with the onboard security systems. Determine ahead of the installation if the vessel already has these devices or if the need to be purchased. Keep these points in mind when determining the method by which you want to transmit data.

• If using the module for just a voice line “Ring + Tip”, this will call recipients via RJ-11 connection to the security system. This will be with Cellular and Satellite phones only.

• Keep the communication equipment hidden from direct view, but accessible for service when necessary.

• Whether it is a Cellular or Vsat provider, whenever possible have the communicator active upon installing for testing and commissioning.

• When using a satellite phone, it is usually necessary to enter a “#” at the end of the programmed dial out number

• If streaming video off, the fixed cellular device will need to have data enabled. Most cellular providers call this a “Internet Data” plan
Equipment Locations – Communicator
Tracking Antennas are gaining much popularity for the modern boat. The antennas take in a GPS feed and transmit the coordinates through a cellular connection, Low Earth Orbit (LEO) satellite, or Geostationary satellite networks. The installation tolerances tend to loosen up a bit with cellular based tracking, but of course GPS position data will not transmit when out of cellular coverage. Therefore legitimate tracking systems are going to be satellite based.

Understanding Satellite based GPS tracking
Understanding Satellite based GPS tracking

**Low Earth Orbit (LEO)**
Orbit round Earth with an altitude between 160 kilometers (99 mi) and 2,000 kilometers (1,200 mi)

**Geostationary Satellite**
Circular orbit 35,786 kilometres (22,236 mi) above the Earth's equator and following the direction of the Earth's rotation
Equipment Locations – Tracking Antenna

• Think Security. The location of the antenna is critical and should be toughly scrutinized.
• The most antennas are able to penetrate up to ½ inch of solid fiberglass, making way for covert installs.
• Locate the antenna a minimum of two feet away from metallic obstructions such as hand rails, rod holders and cleats.
• Choose a location that is not directly under or near radar arrays to prevent possible interferences.
• Make sure that the underside of the antenna is accessible to connect the antenna cable.
• Keep to a constant and breaker/fused locked and fused DC supply
• Mount on a flat horizontal surface.
• If the antenna communicates its data to the Geostationary based satellite network. As a general rule, a clear line of site towards the equator is needed.
• Center Consoles - It is suggested that the antenna not be installed on T-Tops as they are more vulnerable for tampering. Popular locations include forward/aft stringers underneath the gunwale. Keep away from amidships gunwale mounting as the T-Top could potentially block the signal from getting out.
• Larger vessels - Often require exposed hardtop or arch mounting. A ¾ inch hole can be drilled and sealed under the antenna with silicon.
• Whenever possible, dry run the installation procedure and test the location beforehand.
• Have the owner/crew pre-activate prior to installation whenever possible to do active tests during and after the install is complete to assure proper functionality
• Independent battery backups in line are suggested if the manufacturer does not provide one.
• False SAT domes (for vessel congruency) on larger vessels are a good place to hide tracking antennas
Equipment Locations – Tracking Antenna
Tracking systems need to be hidden!

What are the Chances of Your Boat Being Stolen? *

Personal Watercraft 10 per 1,000
Runabouts 2 per 1,000
Cruisers (with cabins) 8 per 1,000
Trawlers 3 per 10,000
Sailboats 2.5 per 10,000

* Based on a 10 year study of the BoatUS Marine Insurance Claim Files.
Don’t make it easy for a thief to hook it up and take off.
If possible, park the trailer away from the road. If you must leave your boat in the driveway, don’t leave the hitch facing the street.
Chain your trailer to a tree or a sturdy post. If not, remove one or more tires and store them inside along with the lug nuts. Not only does this make it impossible to pull the trailer; it prolongs tire life and reduces the chances of a flat.
Consider removing the license plate and lights as well; the last thing a thief wants is a traffic stop.
Use locks on props, outboards, and outdrives. Buy good quality hardened steel locks that aren’t easily defeated.
Whenever possible, store equipment at home. If you have a small outboard engine, it’s much safer in your garage than hanging on your boat’s transom. The more stuff you take off, the less attractive your boat will be to a thief.
Consider upgrading your cabin doors or hatch boards with locks that are harder to defeat. Stainless steel hasps or bars can be fitted that are much harder to break into than what manufacturers typically offer.
Make sure there is good lighting where you keep your boat. Would a burglar feel threatened?
If you have curtains, keep them drawn to keep prying eyes off of valuables. If you can’t, be sure to store alcoholic beverages and valuables where they won’t be seen.
Don’t leave your keys in a cockpit locker. This is a common practice and thieves know it. Hide keys below or, better yet, take them home.
Invest in an alarm system. You don’t have to spend a lot of money – even simple alarms can scare off a thief.
Another worthwhile deterrent: Install a fuel or electrical cutoff device. These are simple, relatively cheap and will often thwart a theft.
Avoid having a “For Sale” sign on your boat. This gives thieves an excuse to snoop around without drawing suspicion.
If you have anti-theft device warning stickers, place them where they can be easily seen. Often thieves will pass up a boat that appears to be well guarded.
Use chains and locks to secure dinghies and small boats. Painting your dinghy in unusual colors or patterns makes it less likely to be stolen – thieves don’t want to risk possessing anything easily identifiable.

Questions and Answers