A LOT HAS CHANGED IN YACHT SECURITY SINCE 9/11. Certainly, technology has advanced, but in an almost revolutionary move, the International Maritime Organization (IMO) finally said that lethal force could be okay (in dangerous areas and if the flag state agrees) as an alternative to barbed wire, fire hoses and the once-vaunted LRAD.

Remember the LRAD, the Long Range Acoustic Device? After all the hype about deafening attackers, it turns out it can be neutralized by everyday ear plugs. And laser dazzlers? Well, it appears that a decent pair of photochromic sunglasses is all you need.

“If you’re going to go into an area where people have guns, well, you’ll need guns,” says Dean La-Vey of Secure Yacht, a security consultancy. “And by the way, if someone is just shining a laser at me, that probably means they don’t have guns.” La-Vey believes that yacht security should focus on earlier detection and, of course, simply bypassing dangerous areas — the Gulf of Aden or the Straits of Malacca pop to mind, if not Bayonne, New Jersey — something most yachts are free to do, unlike their commercial shipping cousins.

“Mention security and people think pirates; it’s the classic low-probability, high-impact event that probably won’t affect a yacht but grabs media attention,” says Dan Hooton, a former British Royal Navy Surface Warfare Officer, now managing director of Spearfish. “In yachting, people should be more interested in the boss’s children walking in town.”

As Marc Franken of Fränkentek observes, “Yacht security is about much more than cameras and guns.” Yacht security boils down to early detection, avoidance and displacement — making your yacht appear more prepared than the one alongside so the bad guys go there instead. That could come down to some simple, low-tech security techniques, such as a rope across the passerelle with a “No Visitors” sign or an alert, uniformed crewmember visibly standing watch at the stern.

**Threats**

Even assuming your common sense keeps you out of high-threat areas, you still need detection technology like radar, cameras and sonar. It also means keeping an eye on emails and VoIP, such as Skype, and the yacht’s own network. And let’s not forget the occasional charterer. Not so long ago, one yacht owner was surprised to learn that those nice people on the yacht alongside were professional lip readers.

There’s also the little-considered threat from the air. Most experts agree that if somebody wants to crash an aircraft into your yacht, you’re pretty much out of luck. So maybe it’s no surprise that you don’t seem to hear much about Eclipse’s alleged anti-air missile capability now that she’s out of the yard, which probably says more about the lack of commercially available technology than the diminished air threat.

The underwater threat comes from divers, but possibly not for the reason you might think. Most experts agree that divers will be coming not to blow up, but to bolt on contraband. The real explosion comes when the yacht reaches the next port to pick up a charter and an underwater port state inspection there discovers what often are drugs. “Now, how did that get there?” is unlikely to help you leave port any time soon. Scratch one charter.
**Underwater Detection**

Diver detection currently comes down to variations of 360-degree sonar from companies such as Farsounder, with its multiple sensors, to single-unit Sonardyne and Wesmar. To avoid confusing a playful porpoise with a human, the intelligent system software observes swimming patterns — as smart as they are, dolphins lack the same purposeful stroke of a diver bearing unsolicited, illegal gifts. Once the system decides that it’s not a close relative of Flipper, most initiate an alarm and/or illuminate the underwater lights.

If the water is clear, the intruder can be seen on underwater cameras, but that’s a very big if — the deep sea is dark. And shallow water in most of the world’s harbors achieves the same effect by being cloudy, if not downright filthy. So even the best underwater cameras, such as Frankentek’s Lloyd’s approved, hull-mounted, underwater PTZ Camera “U-Sea-it,” actually can’t see much.

**Surface Detection**

Visibility also is a big factor in early detection of surface threats. Radar has been making up for the human eye’s limitations since the 1940s. Although it has problems in heavy rain, it can “see” in the dark and through fog, smog, haze and glare. For all its good work, though, radar is limited by line of sight, so it can’t “see” over the horizon. If the radar antenna is 10 meters above the surface, the limit of the horizon is less than seven nautical miles. If the threat is a small boat with an air draft of, say, two meters, the radar would only begin to see it over the horizon at an additional three miles for a total range of 10 miles. Even this doesn’t give you a lot of time to react. If a boat is coming in at 30 knots, it can be alongside in just 20 minutes — just time to finish your coffee before grabbing your razor wire.

If the sea is choppy and obscures the target, he might get much closer before your radar “notices.” On the other hand, really choppy water has the benefit of making boarding more difficult, on cargo ships at least. The radar’s challenge is compounded if the boat is hard to see because it’s made of non-reflective material. Steel, in the right shape, reflects radio waves better than the rubbery material of a RIB or the fiberglass of a 30-foot “fishing” boat. But the big radar challenge is trying to figure out the detail. Unlike even side-scan sonar, radar doesn’t give you many clues about the target’s shape — is that an RPG launcher or a fishing pole, and who’s that guy with the boss?

While you’re trying to figure all that out, you’re losing precious time. So to be able to really see in poor visibility requires a special camera. Since the Vietnam War, the militaries of the world have been leading the charge to develop thermal imaging cameras that enhance whatever limited light is available or use differences in infrared where a hot surface usually appears brighter than a cold surface. A hot human holding a recently fired, and thus warm, AK-47 shows brighter than the cold aluminum from which he is taking pot shots at you.

But sadly, some of the best equipment isn’t always pretty. One example, only de-classified in the last 18 months, is HGH’s IR Revolution 360 — a high-sensitivity camera with a difference. It generates real time, 360-degree infrared panoramic images every second, detecting a human at one to three kilometers and vessels from three to 15 kilometers, in total darkness, or through smoke, haze or precipitation. Its Cyclope software then interprets the data from the rotating camera for automatic intrusion detection.

Current Corporation’s Night Navigator 3 combines three cameras: a high-resolution thermal imager, a high-definition day camera and a gated image-intensified HD night-vision camera in a gyro-stabilized gimbal with 360-degree rotation. The 17-inch-high unit weighs just over 80 pounds. When using the system, the Centre for Whale Research was able to observe whales giving birth at night.

FLIR’s Voyager III is reputed to be the only commercial maritime thermal night-vision camera with continuous thermal zoom and the longest thermal lens — size matters. Its active gyro-stabilization provides a steady image and the radar-tracking feature lets users identify and track specified radar returns and Internet remote control allows operation from anywhere. FLIR’s video tracking system also lets users select and track targets, then follow them with the Voyager III’s thermal and visual camera.

“It’s important to know when intruders are coming, and from where,” says David Zutler of LSN Early Warning Perimeter Protection Systems, a company that applies its experience with luxury estates ashore to provide safety and security protection for superyachts. To provide a constant electronic watch on a perimeter set by the crew, LSN uses software to integrate sensors and provide a visual presentation on security monitors and selected monitors throughout the vessel. Bottom line, if someone enters its crew-designated, early-warning protection zone, a thermal-imaging camera and a CCTV camera lock on to track the threat wherever it goes.
The LSN uses a small, high-speed 60-rpm, low-radiated power radar to track swimmers as well as fast-moving targets, i.e. RIBs, WaveRunners, etc. While X-band navigational radar uses an eight-foot rotating wing, the LSN radar is only 14x17 inches and is concealed in a low-profile dome, so it’s easily incorporated into existing mast configurations (which should keep the designers happy). Because the LSN radar has a radiated power output of only .5 watts, approximately that of a mobile phone, it can be operated in a marina or crowded anchorages where most tender thefts, art thefts, intrusions and other such unpleasant situations occur. (X-band has a power output of approximately 10,000 watts and therefore cannot be used in marinas and crowded anchorages to avoid frying the neighbors.) Sonar also can be integrated into the LSN.

Security Deficiencies
All of this detection capability generating all of this information amounts to nothing if no one is watching it, interpreting it and then acting on it properly, which brings us to that potential weakest link — the crew. “An early warning system is only as good as your reaction to it,” says Franken. “If you don’t have a plan, are not trained and/or don’t react, who cares?”

Emphasizing the point, La-Vey says, “A yacht’s crew is the deciding factor; in fact, the owner, family and guests are in the crews’ hands.” Two things conspire to make this a crew challenge — training isn’t cheap and crews are constantly changing. Intelligent, automatic equipment becomes as important as the technology itself.

One onboard threat that not many people seem to recognize is that friendly charterer. What better way to get into the inner workings of a yacht’s security system than chartering her for the week so that the guest and the 11 associates can take a long, quiet, “please do not disturb us” look to hack the network, study the system or plant surveillance equipment? After all, if it’s a $10 million ransom or the details of next week’s $100 million deal, the cost of the charter is still cheap at twice the price. Solution? Maybe doing more than a simple check merely to see if the charterer can pay.

Security aboard yachts differs from commercial vessels in another way — security equipment in superyachts becomes a status symbol. “There seems to be a natural attraction to cutting edge/military-grade technology without bothering to make sure that it all works,” says Hooton.

De-Vey agrees. “Some want a battleship, not a pleasure yacht.” And then it turns out that there’s also conflict with the designers, “They want the technology, they just don’t want to see it,” observes La-Vey.

Considering the forest of huge domes camouflaging the underlying ugliness that blossom above many yachts — some of them empty, there just to balance out appearances — “pretty” means bigger and, as one security expert says, “It just gives me a bigger target to shoot at.”

Security Enhancements
“You can never take people out of the security equation,” says Hooton. “We’re talking about a discreet level of efficient security; in general, it should be robust, proven technology.”

Onboard detection is gradually changing, although people still are hiding pressure pads under teak decks where, after a few months of flexing, they have the nasty habit of not working. It seems there’s a new biometric touchpad from German company e-DATA that doesn’t mind saltwater. However, smaller infrared motion detectors — until now, so large that the bad guys and the designer could see them — may be stealing the show. Once considered too visible for use on a yacht — from a design, not security perspective — now you can be alerted that someone is on board, moving in an elevator, the garage, the bridge or on a PC by an infrared detector measuring just 4.7x4.7x2.4 millimeters like Murata’s IRS-B (the pupil of the human eye averages four millimeters). That should keep the fussiest designer happy.

With all the rage in personal computing, the iPad is taking center stage, playing its part in superyacht security. Where once keeping watch over all the displays and sensors meant sitting in a darkened room, trying to keep your eyes open while scanning TV screens, now you can do it almost anywhere with your iPad.

“Everything now is iPad, iPad, iPad,” says Franken. “It used to be where do we put the monitors...bridge, captain’s cabin? But with a powerful WiFi and an iPad, [wherever] you’re doing anything, you have the alert in your hand.”

Pass the popcorn, please. I think we may have an incoming diver. DW