

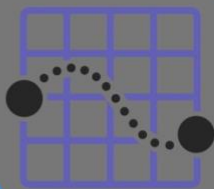


# AEROSENTRY

Ensuring Privacy At Sea



*Detect*



*Locate*



*Identify*



*Defeat*

## AeroSentry Marine

Detect, Identify & Defeat Drones using cutting edge radio frequency scanning and drone jamming technologies to ensure drones stay away from the vessel.

Up to 1km detection and defeat range meaning privacy and security are assured.



Phone

+44 (0) 843 289 2805

Email

[info@dronedefence.co.uk](mailto:info@dronedefence.co.uk)

Web

[www.dronedefence.co.uk](http://www.dronedefence.co.uk)

DRONEDEFENCE

## Privacy is Priceless

Drones are a growing risk for superyacht owners and operators to consider.

Imagine you are at anchor in the Mediterranean with your family, relaxing aboard your yacht when a member of the paparazzi uses their \$1000 drone to capture pictures of you. Or even worse, a criminal decides to target your boat in a more malicious manner.

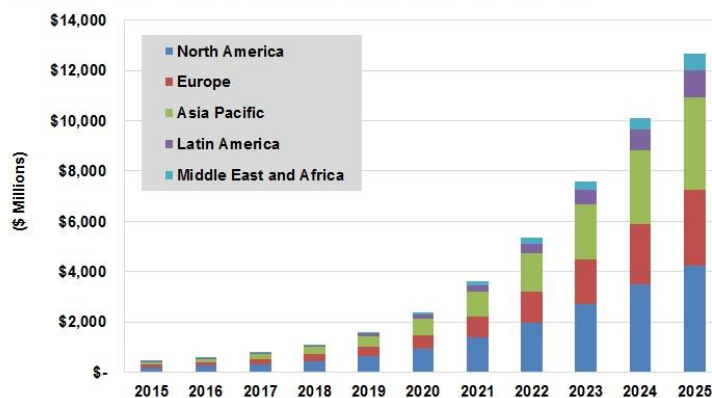
Drones are fantastic tools but in the wrong hands they can be a nuisance or they could cause a serious security breach. The use of drones to invade privacy, deploy technology, explosives or chemical weapons is increasing.

The thing about drones is that few people suspect them. The key capabilities of the drone are they're quick, easy to fly, generate imagery in real time, can carry a usable payload, readily accessible, 30min flight time with 5km command radius.

A drone is highly manoeuvrable and can access places where security is not as tight as it could be to record footage or take photographs. The implication is not that someone has done something wrong, but instead that a drone will capture a photo at an inconvenient time and use it to paint a very negative picture. Paparazzi are some of the most opportunistic and inconsiderate people in the media industry, who will stop at nothing to try and capture a shot of you or invade your privacy.

## Tractica

Commercial Drone Total Revenue by Region, World Markets: 2015-2025



Source: Tractica

As access to technology becomes more widespread so is the threat of these technologies combining to create new threats. Drones can be used to hack wireless networks, smart devices etc to gain illegitimate access to sensitive systems and information. Recent years have seen a significant advance in drone endurance, range and payload capacity whilst the price has also plummeted, leading to a proliferation of drone use.

## DRONEDEFENCE

Drone Defence are here to help protect you from this emerging threat.

We can equip your crew or security detail with the latest counter drone technology which will ensure that you, your family and your guests are able to enjoy their time aboard, safe in the knowledge that they are protected from nuisance drones.



Potential Threats

Attacks

Snooping

System Hacking

Invasion of Privacy

## How do I defend against Drones?

Drones do not conform to a common set of standards. As the demand and use of Commercial Off The Shelf (COTS) Drones grows, the more they will be used to invade privacy and more sinister activities. There have been countless incidents of drones being used to take pictures of superyachts and snaps of celebrities and the wealthy. And as technology becomes more accessible the threats presented by drones broadens to cover ever more invasive activity such as electronic snooping, system hacking, surveillance etc.

To combat this threat there are a number of solutions on the market, and they generally fall into one of 4 categories;

Detection Technology	Effectiveness	Range	Pros	Cons
Radar (Detect & Track)	80-90%	750m+	Can detect RF silent drones Established Tech	Struggles with ground clutter High False Alarm Rates, High Costs Struggles on moving platforms such as yachts 'Active Device' Requires Permission
Cameras (Detect & Identify)	30-50%	Up to 1000m (depending on weather)	Capture Image of Drone	Poor Weather Performance High False Alarm Rates Poor against multi targets
Acoustics (Detect)	5-10%	Up to 200m	Can act as last line of detection	Very poor in built up areas Can't identify or locate
Radio Frequency Analysis (Detect, Track & Identify)	70-80%	Up to 5km	Single – Detect & Range & Bearing Multi – Geo-location	Cannot detect a drone when not transmitting Updates Needed

The main issue facing a yacht is that it is moving constantly. This impairs the performance of radar, cameras, and acoustics as real time drone detection solutions. As a result the best detection method available to superyachts is RF.



Introducing AeroSentry Marine. To provide effective protection we have developed a marine specific superyacht drone defence system based on RF technology Called AeroSentry. Integrated or mobile the choice is yours, we are able to customise the capabilities of the system to your exact needs. Essentially the System consists of two parts.

Part 1 – Detection and Identification  
Utilises our AeroSentry DND 360 RF detection system

Part 2 – Countermeasures  
Utilising either AeroDome our integrated fixed system, or the Paladyne E1000MP Mobile system, or a combination of the two

## How does it work?

### Detect



The AeroSentry DND360 detects drones up to a 5km range. Early warning is provided through graphical interface, and mobile alerts enables reaction and response times to be maximised.

### Defeat



Once a real drone threat has been established, the system activates the chosen countermeasure automatically, or alerts the crew. Should the drone approach the boat, its control/video signal will be blocked, initiating its fail-safe return to home mode forcing it to return to its take-off point. It does this by blocking the signal between the controller and the drone not unlike when trying to talk to someone in a noisy environment.

### Identify



AeroSentry uses multiple detection algorithms to alert when a drone is within range. Where possible we can also conduct signal analysis to determine the type of drone. Complex algorithms enable the AeroSentry to confirm the identity of drones, avoiding false positives.

Speaker



Loud Music



Listener



If you imagine that you are in a room with loud music and you want to talk to someone else. The loud music will prevent you from speaking to the listener unless you are very close.

Signal jamming works on the same principle, by drowning out the Controller's signal we prevent the message from reaching the drone.



## Defeat

There are a number of options in the suite of countermeasures available through Drone Defence each providing a higher degree of protection.

	Level 1	Level 2	Level 3
Equipment	<p><b>Paladyne E1000MP</b></p> <p>The Paladyne E1000MP – a versatile mobile backpack based system that can be incorporated, or used as a complete standalone counter-measure system with either omni (500m protection) or directional (1000m) antenna. It stops drones in their tracks and forces them to return to home.</p>	<p><b>AeroSentry – Marine</b></p> <p>AeroSentry is a highly advanced drone detection system developed with the marine industry in mind. Provides an early warning of drone activity around your yacht up to 5km.</p> <p><b>AeroDome</b></p> <p>AeroDome is an integrated countermeasure that generates a 500m 360° electronic bubble ‘no drone zone’ around the yacht. This prevents drones from getting close to you, your clients and guests.</p>	<p><b>AeroSentry – Marine</b> - Detection</p> <p><b>AeroDome</b> - Primary Countermeasure</p> <p><b>Paladyne E1000MP</b> - Enhanced protection</p>
Application	Mobile	Fixed	Mobile and Fixed
Installation	Available immediately	Requires installation normally in refit window	Requires installation normally in refit window



## Specification and Technical Summary

# Detect



- Deep learning activities to detect and identify the drones
- Versatile and upgradable hardware backbone to ensure that the latest threats are covered

# Defeat



		Fixed System	Portable System
Range	Up to 5km, 360° x 180° coverage	500m, 360° x 180° beam coverage	Directional Antenna - 1000m Omni directional antenna- 500m
Operating Principle	Software defined radio, digital signal signature analysis	RF Jamming	RF Jamming
Frequency Range	100 - 6000MHz	Tri-band 1560 - 1610MHz (GPS/GLONASS); 2400 - 2500MHz; 5710 - 5880MHz	Tri-band 1560 - 1610MHz (GPS/GLONASS); 2400 - 2500MHz; 5710 - 5880MHz
Power Output	N/A	10W Maximum per channel Low power solution no interference / damage to onboard systems	10W Maximum per channel Low power solution no interference / damage to onboard systems
Integration	Full integration with ship onboard systems	Full integration with ship onboard systems	Either full integration with ship onboard systems or portable
Deployment	Continuous	Fixed - Manual or Automated	Mobile - Manual or Automated
User Interface	Web browser/touchscreen	Selectable operating frequency bands	Selectable operating frequency bands
Power Supply	100-240V AC, 70W	24-29V DC	24V 15A 2 hours operation (high power), 4hr charge time
Temperature Range	-20C to +70C	-20C to +70C	-20C to +70C
IP Rating	IP67	IP67	IP54
Weight	6.3kg	3kg	10kg

## Drone Counter Measure Comparison

	FIXED	PORTABLE
Range	Up to 500m	Up to 1000m
Mobile protection (Vessel, Vehicle, Residence)	Vessel Only	Yes
Defeat drone swarm	Yes	Yes
Effective without visual sight of drone	Yes	Yes
Requires operator skill	No	No
Interferes with local WiFi	Minimal	Minimal
Susceptible to vessel movement	No	No
Limited operating time	No	No
Covert deployment	Yes	Yes
Instantly deployable	Yes	Yes
360-degree coverage	Yes	Yes
Re-charge required	No	Yes

## Prepare yourself

Finding the right solution is crucial for maintaining effective ongoing security protocols. There are a number of solutions in the market, and there are a number of key differences to look out for. Spend time doing your research and understanding the technology available. The following may be useful;

- Is the solution OEM specific? A number of drone detection solutions are specific to a single OEM Drone supplier e.g. DJI. What this means is they will be ineffective against all other manufacturer drones as they are built to recognise only their own. This can leave your security seriously exposed.
- Are the suppliers drone experts, or backed by drone experts? There are a number of systems in the market being sold by organisations that may not fully understand the drone threat, how drones are actively deployed in the real world, their limitations and their flaws.
- Beware of cheap equipment. By all means explore and do your research. Look out for tell-tale signs of high power output countermeasures above 10w, wide frequency ranges etc. High power output equipment has serious health and safety implications as well as serious implications for interference and damage to onboard systems.
- Are the suppliers able to share reference sites in support of the actual technology? Many will claim to have installed on x,y,z Yacht. In our experience the privacy of our customers is paramount, and they don't like to publicise. Look for organisations that hold regular demonstrations, and have real reference sites that are contactable to give you first hand feedback on solutions.

## Why work with Drone Defence?

- We are Drone manufacturer agnostic. As a result we are able to detect 99% of COTS (Commercial Off The Shelf) drones.
- We are industry experts who are at the cutting edge of the conceptual development of not only the drone sector but we are setting the standard in counter drone applications.
- We sit at the top table of UK Governmental Strategy and Policy makers and have strong and established connections into the UK MOD, DSTL, CAST, NOMS, Met Police amongst others.
- We take part in all of the physical and conceptual simulated exercises for UK Government stakeholders meaning we remain market leaders.
- We have built up an extensive knowledge of drones, their capabilities and risks that they pose.
- We have award winning record-breaking security experts on staff who stand ready to support our customers.
- We provide full spectrum support for our products and our customers.
- Our systems are low power emitting - This means we remove and RF leakage and minimize impact on the boat's systems. Our systems are completely safe for the owner, guests and the crew.
- We offer regular Demonstrations Days for clients to attend to witness the systems in operation