

# BAD BUOYS

SHIP JUST GOT REAL



# Bad Buoys: A Modular Swarm for Autonomous Maritime Monitoring and Defense

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## I. Executive Summary

**Bad Buoys** is a revolutionary maritime monitoring platform composed of autonomous, modular ocean buoys capable of operating in coordinated swarms. These low-cost, mobile units are equipped with interchangeable payloads for diverse missions including surveillance, environmental data collection, and disaster response.

By leveraging open-source architecture and scalable deployment strategies, Bad Buoys empower coastal nations, researchers, and humanitarian organizations to establish sovereign control over their maritime domains without reliance on conventional naval assets.

## II. Introduction

Maritime threats continue to escalate, from illegal fishing and piracy to oil spills and coastal disasters. Traditional ocean-monitoring systems — satellites, manned patrols, and fixed buoys — are often prohibitively expensive, inflexible, and slow to deploy.

**Bad Buoys** introduces a new paradigm: a swarm of intelligent sea drones that work together, adapt to changing conditions, and operate with minimal oversight. They're built for mobility, rapid response, and scalability.

## III. Technical Architecture

Each Bad Buoy unit includes:

- **Raspberry Pi or equivalent microcontroller**
- **GPS and IMU navigation**
- **Solar or battery-based power system**
- **Propulsion and directional control**
- **Modular payload bay** (e.g., camera, sonar, RF, hydrophone)
- **Mesh or satellite communications**

The swarm operates using open protocols like LoRa, Wi-Fi, or Iridium, allowing autonomous behavior even in low-bandwidth environments. Buoys can hold position, respond to anomalies, or relocate as a group.

## **IV. Applications**

Bad Buoys are designed to serve across commercial, scientific, and defense sectors:

### **Maritime Security**

- Detect unauthorized vessels and spoofed AIS beacons
- Patrol EEZ boundaries with swarm formations

### **Environmental Monitoring**

- Sample ocean pH, temperature, and pollutants
- Track acoustic signals from marine life or vessels

### **Disaster Response**

- Rapid deployment after storms, spills, or earthquakes
- Temporary relay stations for comms and search-and-rescue

### **Scientific Research**

- Collect long-term datasets for climate or biodiversity
- Support decentralized academic fieldwork

## V. Case Studies

### Scenario A: Island Nation Security Grid

An island nation deploys 75 Bad Buoys to form a perimeter defense and maritime observation mesh. The system detects unauthorized trawlers and reports them with photo and GPS data.

### Scenario B: Smart Port Contamination Watch

A busy commercial port outfits its anchorage area with Bad Buoys capable of detecting oil sheen and bilge discharge — automatically alerting environmental agencies.

## VI. Future Developments

Planned upgrades include:

- AI-enhanced pattern recognition
- AI-classified hydroacoustic data
- Underwater drone attachment
- Satellite uplink mission control
- Integration with open-source MDA (Maritime Domain Awareness) platforms


The open-source nature of the system means continuous community improvements and forks are encouraged.

## VII. Conclusion & Call to Action

The future of maritime defense and monitoring is decentralized, affordable, and open-source.

Whether you're a developing nation with vulnerable borders, an oceanographer with a laptop, or a DEF CON hacker group with a 3D printer — **Bad Buoys** gives you the power to observe, defend, and adapt.

**Join the swarm.**

Feature	Bad Buoys	Saildrone	NOAA Spotters	Military Systems 
Open-source hardware/software	✔ Yes	✗ No	✗ No	✗ No
Modular payloads	✔ Interchangeable	✗ Fixed	⚠ Limited	✗ Classified
Swarm coordination	✔ Yes	✗ No	✗ No	✔ Yes (but costly)
3D-printable components	✔ Yes	✗ No	✗ No	✗ No
Cost	💰 Ultra-low	💰💰💰 High	💰💰 Medium	💰💰💰💰 Very High
Designed for civilian DIY use	✔ Yes	✗ No	✗ No	✗ No
Powered by Raspberry Pi or similar	✔ Yes	✗ No	✗ No	✗ No
Disaster/emergency deployment	✔ Rapid	⚠ Limited	⚠ Limited	✔ Yes
AIS monitoring & spoof detection	✔ Integrated	⚠ Optional	✗ No	✔ Yes



## FEATURE HIGHLIGHTS — TL: DR



### Open-source hardware/software

Built on Raspberry Pi and open platforms—anyone can build, customize, or fork the system



### Modular payloads

Interchangeable sensors and modules for mission-specific use, from sonar and hydrophones to cameras and weather tools



### Swarm coordination

Multiple buoys collaborate, forming an intelligent mean to track, report, and adapt across wide areas



### Ultra-low cost

A swarm costs less than a single commercial drone—empowering nations or groups with limited defense budgets



### 3D-printable components

Printable housings and mounts make them deployable even in low-leisure or disaster-struck areas



### Raspberry Pi-powered

Modular and programmable on a global standard microcomputer—plug in, flash, and go



### Rapid deployment

Drop from a boat, air, or dock, buoys self-right, stabilize, and join the swarm in minutes



### AIS spoof detection

Cross-check; check AIS messages against real-world data (sound, motion, RF) to catch ghost ships or forged broadcasts

## IX. Feature Highlights — TL;DR

## ISLAND NATION DEFENSE DEPLOYMENT

