



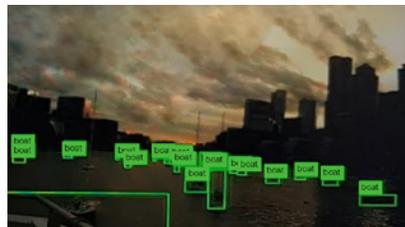
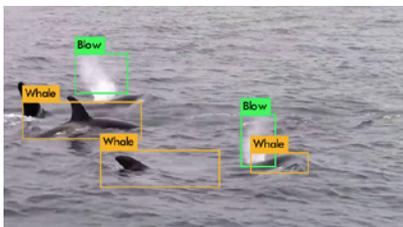
# AWARION<sup>®</sup>

## Autonomous Lookout Systems

### Autonomous Lookout System

Maintaining proper lookout is essential for detecting whales and reducing the threat posed by ship strikes. Operational safety and industry regulations demand it as collisions from large vessels with whales often go unnoticed and unreported.

Awarion<sup>®</sup> is an AI solution that complements and supports human lookouts and marine radar systems. Awarion uses electro-optical and infrared video streams to detect, analyze, and report on the presence of whales, ships, and other objects, including fishing buoys and equipment. Awarion can detect whales several kilometers away—early enough so that vessels have a chance to slow down and change course.



### Sensing for whales 24/7

Human lookouts can suffer from fatigue and distraction. People require accommodations and resources typically only found on larger vessels with a greater carbon footprint.

Awarion's algorithms never tire. They perform advanced analyses, including trajectory modeling and vessel strike assessment. Awarion works at night and in low-visibility conditions (fog, rain). Awarion shifts lookout duties from scattered watchpoints directly to the bridge.

### Detecting what radar can't see and acoustics can't hear

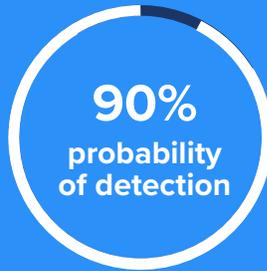
Electro-optical and infrared (EO/IR) methods provide much greater detail and resolution than radar. With EO/IR, Awarion can see what radar can't see, such as a whale blow or surfacing, and can perform object classification in real time. These capabilities are critical when whales don't make any sound for passive acoustics to hear.



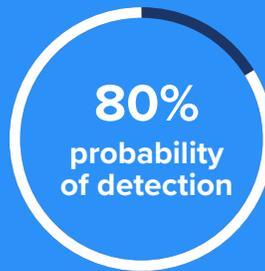
## Performance metrics

In testing on real-world data with targets at ranges up to 3 km

### Ships



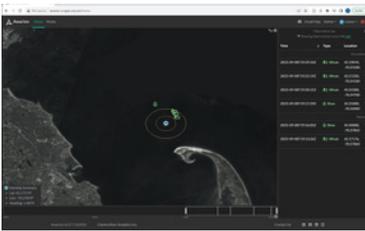
### Whales



### Whale blow



## Flexible configuration



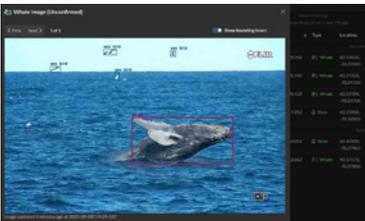
### Situational awareness analytics software

The Awarion product consists of a core software component, which can be delivered as a standalone product or as part of an integrated camera system.



### Smart camera with optional pointable mount

Single, pointable camera designed to regularly sweep 360 degrees and autonomously deliver follow-up observations.



### Advantages of UI

Ability to annotate and classify whales or other objects of interest as the images are displayed on the user interface.



### Multi-camera integration

Multiple cameras with fixed views can have their output combined to form a constant 360-degree view.

## AI maritime monitoring services

Charles River offers AI monitoring services that use Awarion to deliver situational awareness at the sea surface, helping you to detect and classify whales, ships, fishing buoys, and other obstacles. We work with highly regulated commercial industries in offshore wind, shipping, and recreational boating to enhance awareness at sea. Contact us to learn more about how Charles River and the Awarion Autonomous Lookout System can advance your maritime business needs.

### System requirements

Awarion hardware requires 120V AC power, an elevated position with a clear field of view and a railing or secure flat plate for installation, and cable penetrations or pass throughs into a climate controlled space for computers.

Awarion supports standard Ethernet connections, and if satellite connectivity is desired, a clear area for modem installation is needed. Awarion software runs in Docker containers with Robot Operating System (ROS) and RabbitMQ messaging.

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*Autonomy you can trust*

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Charles River Analytics uniquely combines agile innovation and leading-edge research with a decades-long track record of hardened engineering in austere environments to create best-in-class solutions to diverse, challenging problems.

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