

GearSenz

DATA SHEET

Derive more **accurate fishing effort data** than ever before.

GearSenz is a wireless sensor attached directly to the rotating fishing gear i.e. net winch, longline winch/drum etc. It detects its rotation and decides whether this activity represents a deployment of a fishing net i.e. Gear-Down activity or it is just a minor maneuver of a ship in a stormy sea. An equally smart detection of the Gear-Up procedure marks the finishing moment of the fishing activity. The period between these two activities is denoted "Gear Immersion Time".

A number of other data is acquired by the GearSenz as well: the latitude and longitude of the position where the fishing gear went down and where it went up, along with the exact time-stamps of those moments, the number of winch revolutions, the registration number of the net being deployed, sensor diagnostics, and more.

GearSenz requires an operational BlueTraker VMS system in order to convey all that information to the Fisheries Monitoring Centre (FMC).

Why would you need **GearSenz**?

If you are a fishing authority or an institution doing research in sustainable fisheries management, etc., the GearSenz data might replace you costly human observers who are monitoring sites and times of actual fishing activity. The statistically processed GearSenz data, along with AI methods, would give you an unprecedented insight into the fishing effort involved with your national fleet.



**GearSenz is a part of
BlueSenz family.**

GearSenz removes the guesswork out of defining the exact whereabouts of the fishing operation in terms of its spatial and temporal parameters. The result is an unprecedented insight into the fishing effort exercised by the vessel and consequently the fleet of fishing vessels.

FEATURES:

Precise net or longline soak times and their locations.

FMCs are able to view when and where a net is deployed into the sea allowing them to determine that a vessel is fishing.

Device tamper protection and encrypted data communication.

Communication used is designed according to the advanced encryption standards. Data is protected and cannot be spoofed or jammed.

Accurate winch operation data.

GearSenz monitors winch activity and when a winch is active the BlueSenz system sends alerts to the FMC.

No wires or cables required.

The data are collected wirelessly with a WirelessGate (BlueSenz WG) and transferred to FMC by the BlueTraker terminal.

Up to three years autonomous lifetime.

Very compact and flat design - less than 10 mm thick.



KEY BENEFITS:

INCREASE FISHERMEN ACCOUNTABILITY

GearSenz provides irrefutable evidence of when and where a winch was active: revolutions and rotation direction. This allows an FMC to impose penalties on unscrupulous fishermen if they fish in prohibited areas.

REMOVE FMC GUESSWORK

FMCs are now able to see precisely when and where a vessel deployed their net into the water: length of net deployed and length of time it was deployed for. FMC no longer have to estimate when they believed a vessel was fishing.

PROVIDES FMC SPECIFIC GEAR INFO

FMCs are able to see which gear was used and where. GearSenz allows remote monitoring of the specific equipment on board a vessel ensuring that only authorized gear is used.

ALWAYS ON: CONTINUOUS REPORTING

GearSenz continually monitors the status of a winch and alerts the FMC if a winch is active. This ensures that no fishing activity goes unseen. If your fishermen are working then so is GearSenz!

READY FOR MACHINE LEARNING

GearSenz was developed with a vision of being able to validate or completely replace human observers on fishing vessels. GearSenz therefore from a data science perspective which gives us a way to automatically label voyages that fishing boats make as whether fishing or non-fishing. Giving unprecedented ability to create huge labelled datasets ready for machine learning tasks (i.e.: detecting anomalies, like whether the vessel is using it's registered gear or not).

What does GearSenz do?

GearSenz detects winch/drum activity in the form of "**Events**". Simply put, an "Event" is a winch/drum activity in one direction. Each "Event" consists of the following information:

- timestamp ("Event" start and end time),
- winch/drum rotation direction: clockwise (CW) or counterclockwise (CCW),
- number of winch/drum revolutions, and
- frequency (rotating speed).

"Events" that are less than 10 minutes apart form an "**Activity**".

Multiple "Activities" form a "**Fishing Session**". The "Fishing Session" starts with fishing net deployment and ends with the fishing net being completely hauled (meaning that the sum of CCW revolutions equals the sum of CW revolutions).

Multiple "Fishing Sessions" form a "**Fishing Trip**". A "Fishing Trip" begins when the fishing vessel leaves the port and ends when the vessel returns to the port.

GearSenz Data Flow

Each time the "Event" ends, the GearSenz sends this "Event" to the WirelessGate. WirelessGate collects "Events" and combines them into an "Activity". When there is more than 10 minutes interval between "Events", the "Activity" ends. Then this "Activity" is additionally equipped with position information and sent via the BlueTraker VMS terminal to the TDS server. There, with the help of AI, "Activities" are combined into "Fishing Sessions", and "Fishing Sessions" into "Fishing Trips".

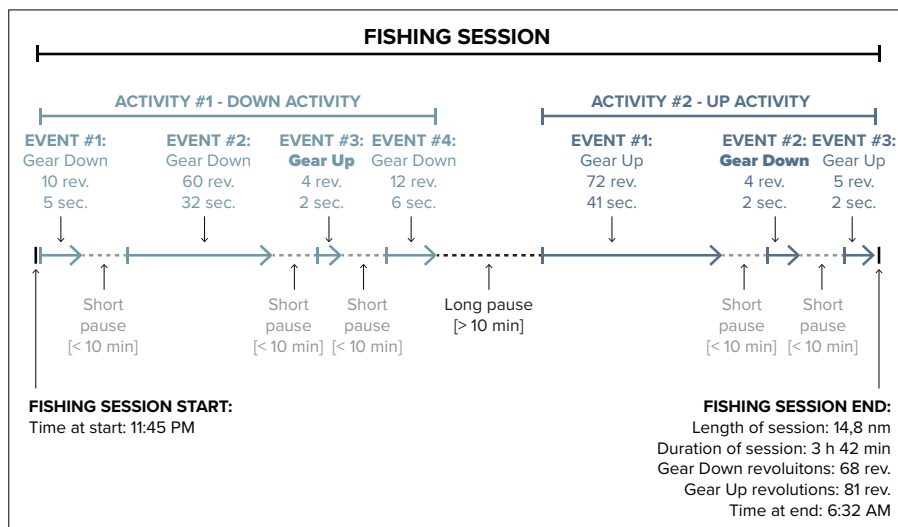
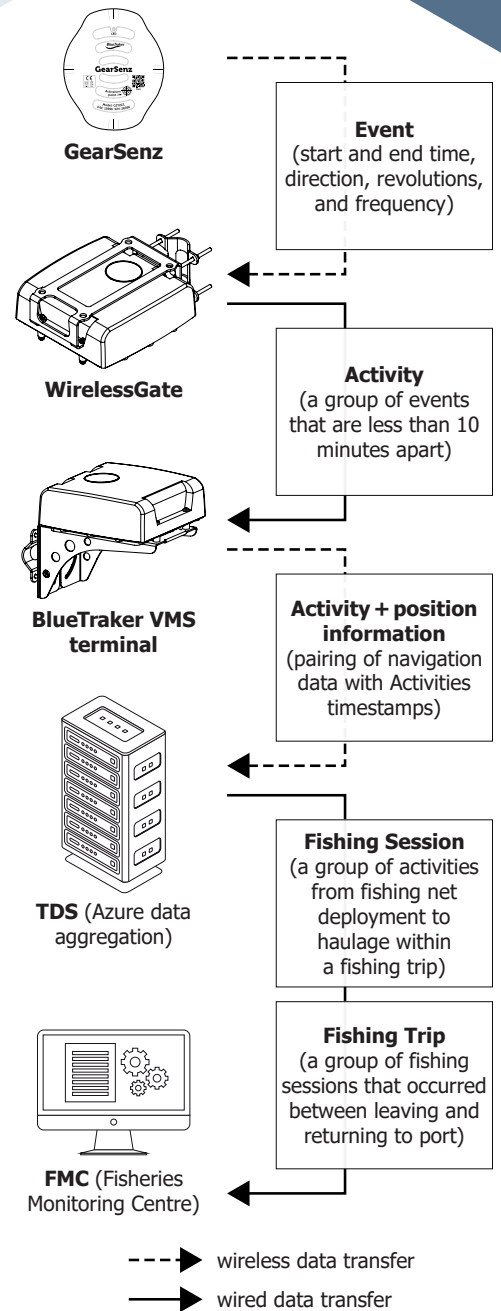


Image top right:
GearSenz Data Flow display

Image bottom left:
Fishing Session example

GearSenz

Technical Specification

Part dimensions

GearSenz (L x W x H): 123 x 10 x 150 mm

Weight

GearSenz: 210 g

Environmental

Operating temp. range: -20°C -> +60°C
 Storage temp. range: -25°C -> +70°C
 Humidity range: 10% RH -> 100% RH
 Dust and Water Ingress: IP68
 Lifetime is limited to: 2 years

RF

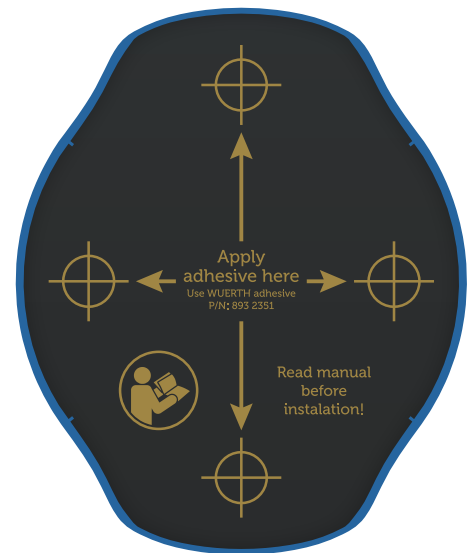
RF band: 868 MHz ISM
 Max. Transmit. Power: 0,025 W

Installation

On the side flange of the winch with special heavy-duty adhesive.



GearSenz rear view:



GearSenz wiring diagram:

GearSenz transmits data about drum/ winch activity with the help of the BlueTraker VMS onboard hardware and WirelessGate gateway.

