# VMS

## Vessel Monitoring System

**BlueTraker**® *vms*

# Satellite Vessel Tracking and Monitoring Solution

# BlueTraker VMS Offers

**Low Operating Costs**

**Embedded Geozones**

**True Global Coverage**

**Low Power Design**

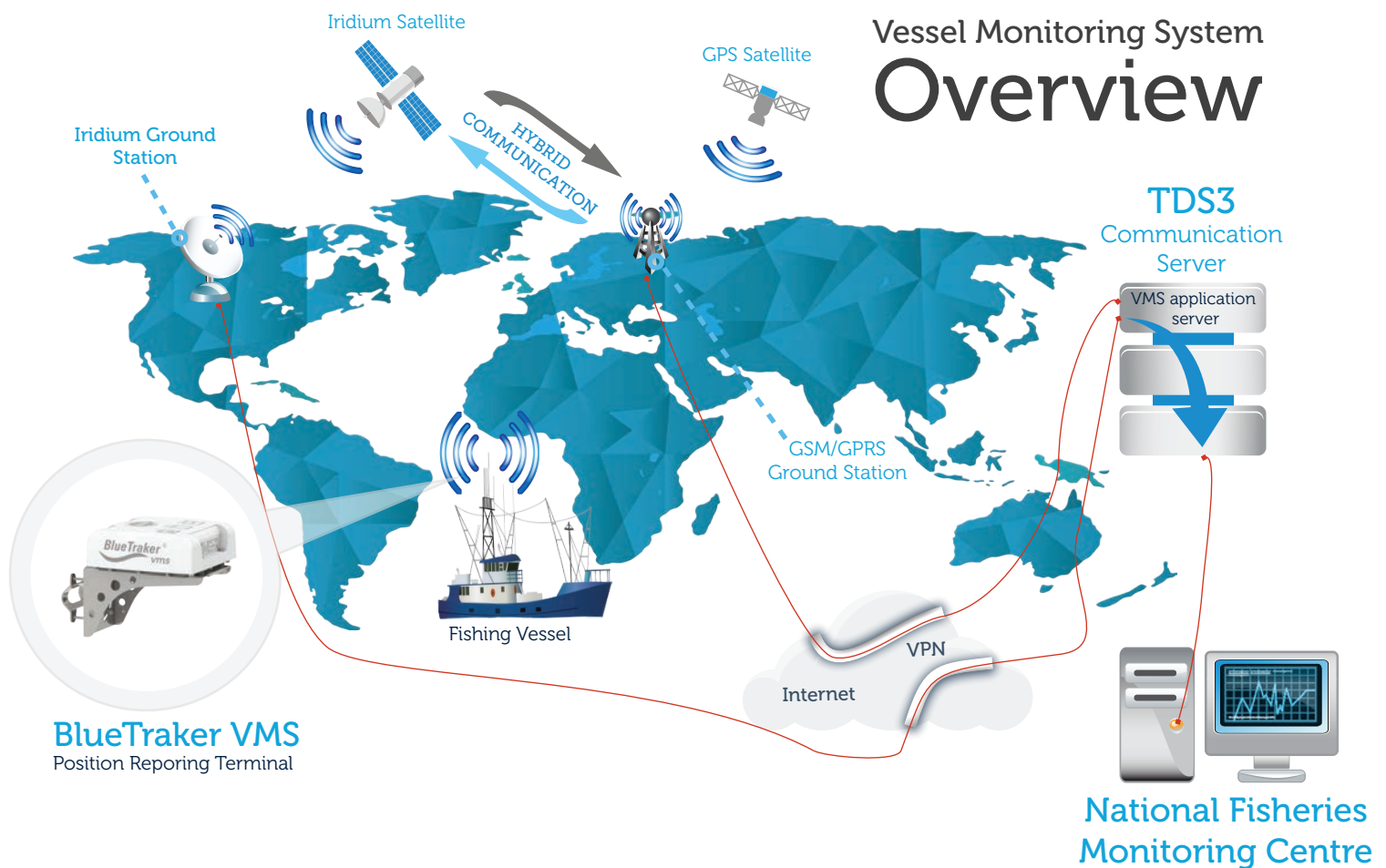**Data Encryption**

**Security Features**

# BlueTraker VMS for Fisheries

Vessel Monitoring Systems provide regular reports of the fishing vessel's location, speed, catch reports and other information to the relevant fisheries management authority.

National FMCs (Fisheries Monitoring Centres) can track, monitor and keep continuous surveillance of fishing fleet activities and VMS is their basic tool.

BlueTraker® VMS system uses Iridium satellite communication technology which offers true global coverage for tracking fishing vessels wherever they might be.

Iridium Satellite

GPS Satellite

Vessel Monitoring System
# Overview

Iridium Ground Station

HYBRID COMMUNICATION

TDS3
Communication Server

VMS application server

GSM/GPRS Ground Station

Fishing Vessel

VPN

Internet

**BlueTraker VMS**
Position Reporing Terminal

**National Fisheries Monitoring Centre**

*National Fishery Authorities have to choose an optimal VMS system which strikes the right balance between the investment vs. expected benefits while making sure they are future-proof. With many advanced features, technology and references BlueTraker VMS is the right choice!*
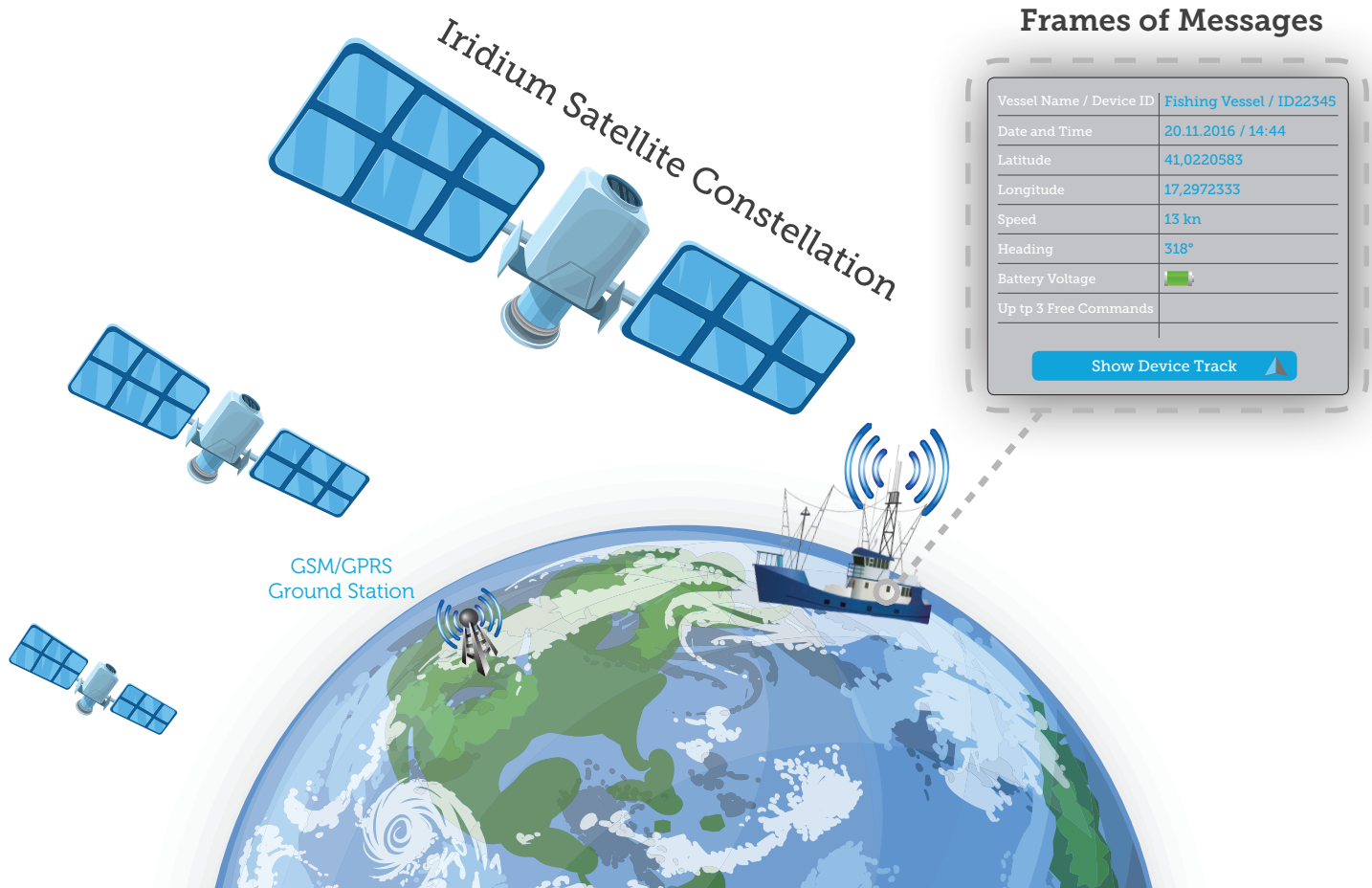
# BlueTraker VMS system is designed with three key elements:

> BlueTraker VMS Terminals

> TDS3 (Telematic Data delivery Services) communication server

> FMC (Fisheries Monitoring Centre).

The on-board BlueTraker vms terminal, collects vessel positions using GPS/ GLONASS satellite signals and sends them together with speed, heading and sensor data to the TDS communication server. BlueTraker VMS intelligently sends data via either the GSM/GPRS terrestrial network or the satellite network at predefined intervals. The TDS communication server processes the received data and delivers it to any third party VMS Fisheries Monitoring Software application in the appropriate format used at the National FMC.

## Applications
- Commercial fisheries vessels.
- FMC fisheries monitoring centres
- National VMS projects

Iridium Satellite Constellation

GSM/GPRS
Ground Station

**Frames of Messages**

| Vessel Name / Device ID | Fishing Vessel / ID22345 |
|---|---|
| Date and Time | 20.11.2016 / 14:44 |
| Latitude | 41,0220583 |
| Longitude | 17,2972333 |
| Speed | 13 kn |
| Heading | 318° |
| Battery Voltage | |
| Up tp 3 Free Commands | |

Show Device Track

# BlueTraker VMS Functionalities

## Communication System – Iridium True Global Coverage



BlueTraker VMS can report its position, send alarms and transfer »Catch« reports from anywhere on Earth! This offers an unprecedented advantage to National Fisheries Authorities tracking globally dispersed fishing fleets. BlueTraker takes full advantage of Iridium's 66 low earth orbit satellites which provide low latency data transfer enabling vessels to reliably transmit data from anywhere including Sea Area 4!

## Embedded Geozones
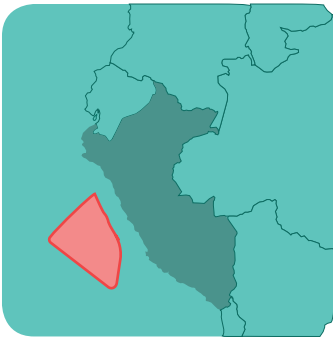


Up to 100 geographical areas (polygons and associated rules, e.g. vessel speed, time interval,...) in the form of geo fences can be remotely uploaded, edited, activated and deactivated for each and every BlueTraker VMS terminal, using land based servers and over-the-air upgrade feature. Specific geographical areas can be defined and specific operational rules can be put into effect (e.g. reporting frequency or alerts) for when a vessel is approaching / crossing geographical areas or borders. (Including entry/exit messages for authorized ports).

## Device Security Features



BlueTraker vms is designed with a high level of mechanical, electrical and electromagnetic safety and security features to avoid any tampering or fraud. The most important security and safety features are an integrated design, tamper detection, antenna blockage detection, unique serial number engraved into the housing and security seals.

## Message Data Encryption and Authentication
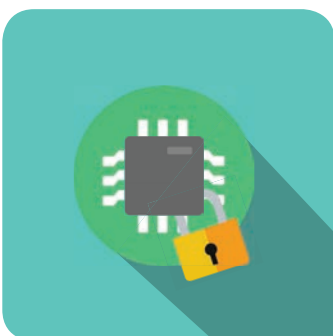


To prevent unauthorized data modification, a symmetric AES 256bit key authentication method is used. In addition to encrypting data before transmitting it, the BlueTraker VMS terminal also prevents sending unauthenticated external data (e.g. »Catch« reports) to the Fisheries Monitoring Centre to deceive the authorities.

# Position Reporting

BlueTrakers automatically change their sampling period while the vessel is within an authorized port, transmitting position on a schedule of every two hours.

When the vessel is out of an authorized port, the device transmits its position every 10 minutes while at the same time storing the message in the internal memory of the device (BlueTrakers are capable of storing more than 10000 messages).

# Dual communication channel - Hybrid Communication
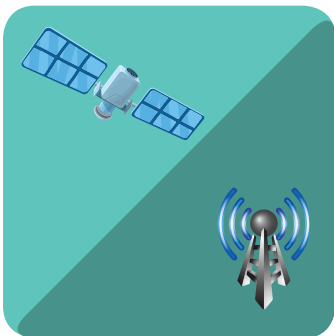
BlueTraker® VMS terminal dramatically reduces costs by using the two communication channels for reducing costs. Switching between channels depends on vessel location. When a vessel is beyond the reach of a GPRS signal, (which occurs on the high seas) tracking data is transferred via the satellite communication channel. When the vessel is in coastal waters it switches to a low cost mobile network when available.
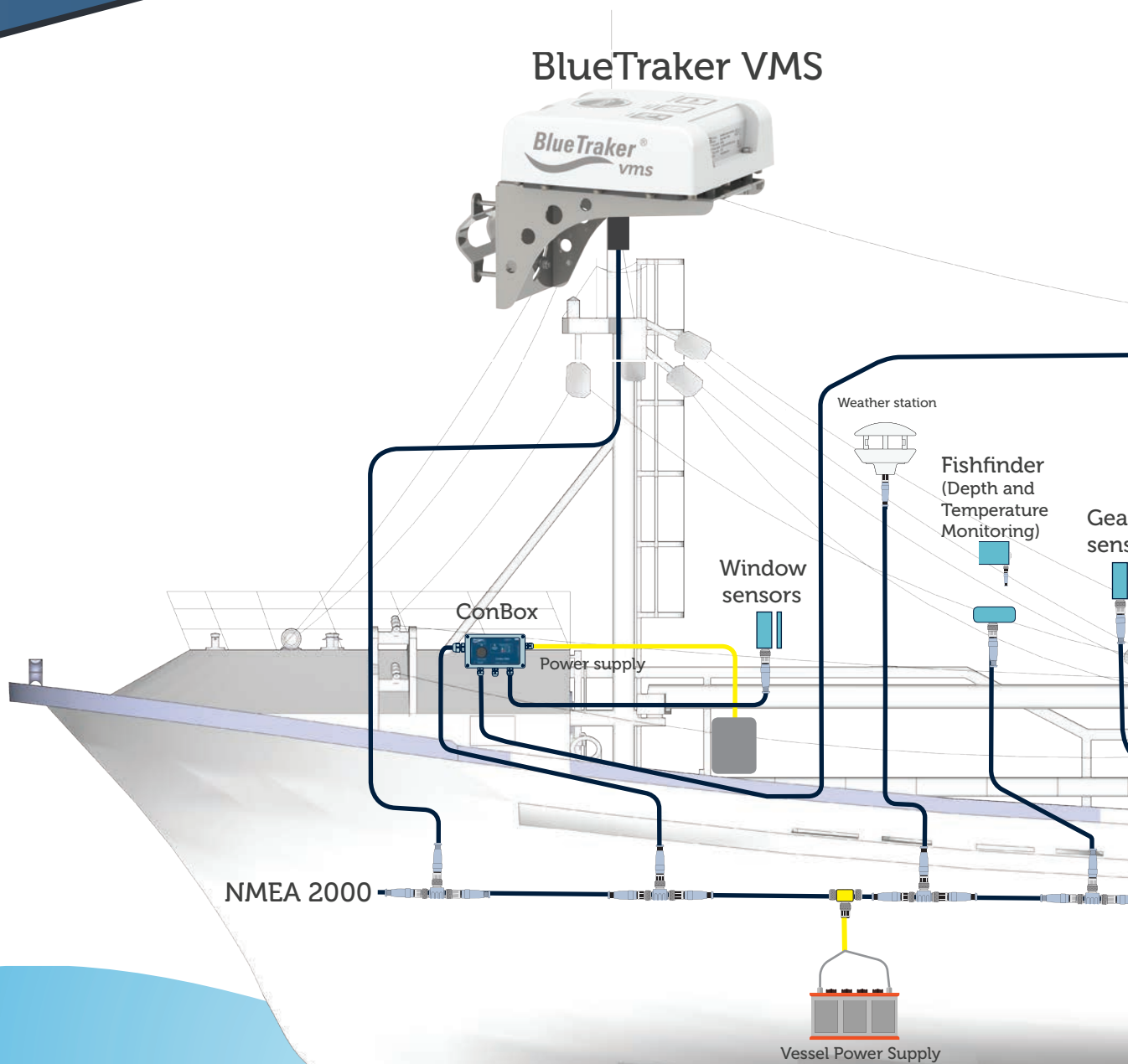
# eLogbook Ready

The worldwide e-Logbook initiative is gathering pace in helping to eradicate Illegal, Unregulated and Unreported fishing (IUU). By offering an interface and built-in data-pass functionality for transferring »Catch« reports, only approved Electronic Reporting Systems (ERS) can be integrated as authentication is required each time a »Catch« report is sent using the BlueTraker VMS.

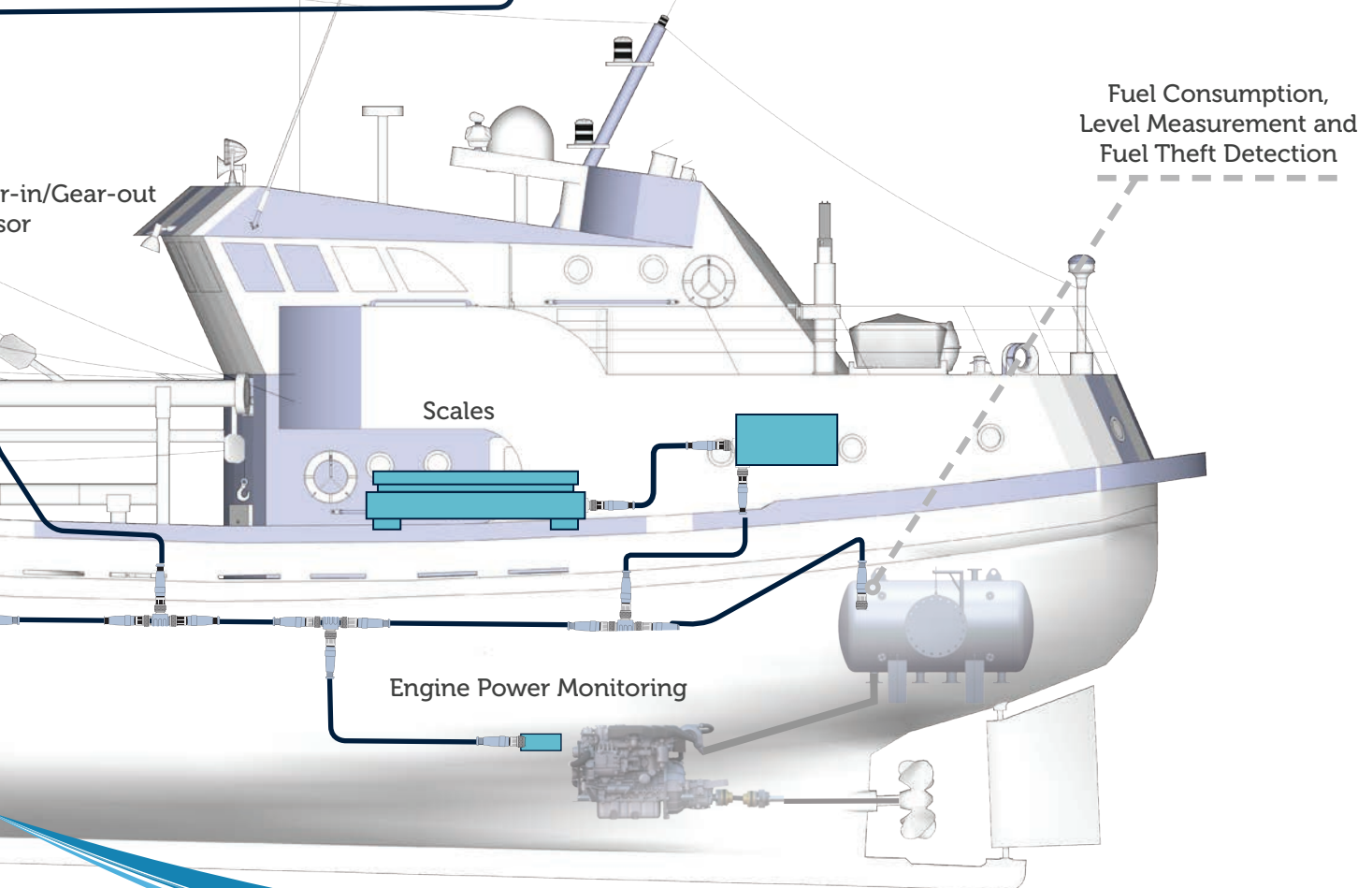# Remote Fishing Gear Monitoring - BlueSenz Ready
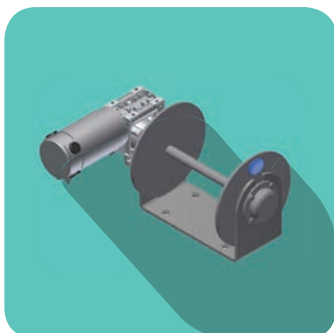
BlueTraker VMS can be upgraded with BlueSenz technology allowing Fisheries Monitoring Centres to easily monitor the precise fishing effort of their fleets. BlueSenz is collection of on-board sensors mounted directly to the fishing gear allowing accurate and precise assessment of the fishing effort for each and every vessel in the fleet.

ISO9001:2008
Quality management
system certifcate

ISO 9001:2008
Q-463

# BlueTraker Vessel Monitoring System
# On-Board Connection

BlueTraker VMS

Weather station

Fishfinder
(Depth and
Temperature
Monitoring)

Gea
sens

Window
sensors

ConBox

Power supply

NMEA 2000

Vessel Power Supply

# Octopus 10

Octopus 10

Fuel Consumption,
Level Measurement and
Fuel Theft Detection

r-in/Gear-out
sor

Scales

Engine Power Monitoring

# BlueTraker Security and Safety Features

**BlueTraker internal tamper alert sensor**

**Integrated design with no antenna cables**

**Tamper-evident security seals with serial numbers**

**Laser engraved product serial number**

**Cable break detection**

**Double shell housing**

**Impossible to remove BlueTraker or UniMount without first disconnecting the mail cable set**

**LED indicators – Displays current device status**
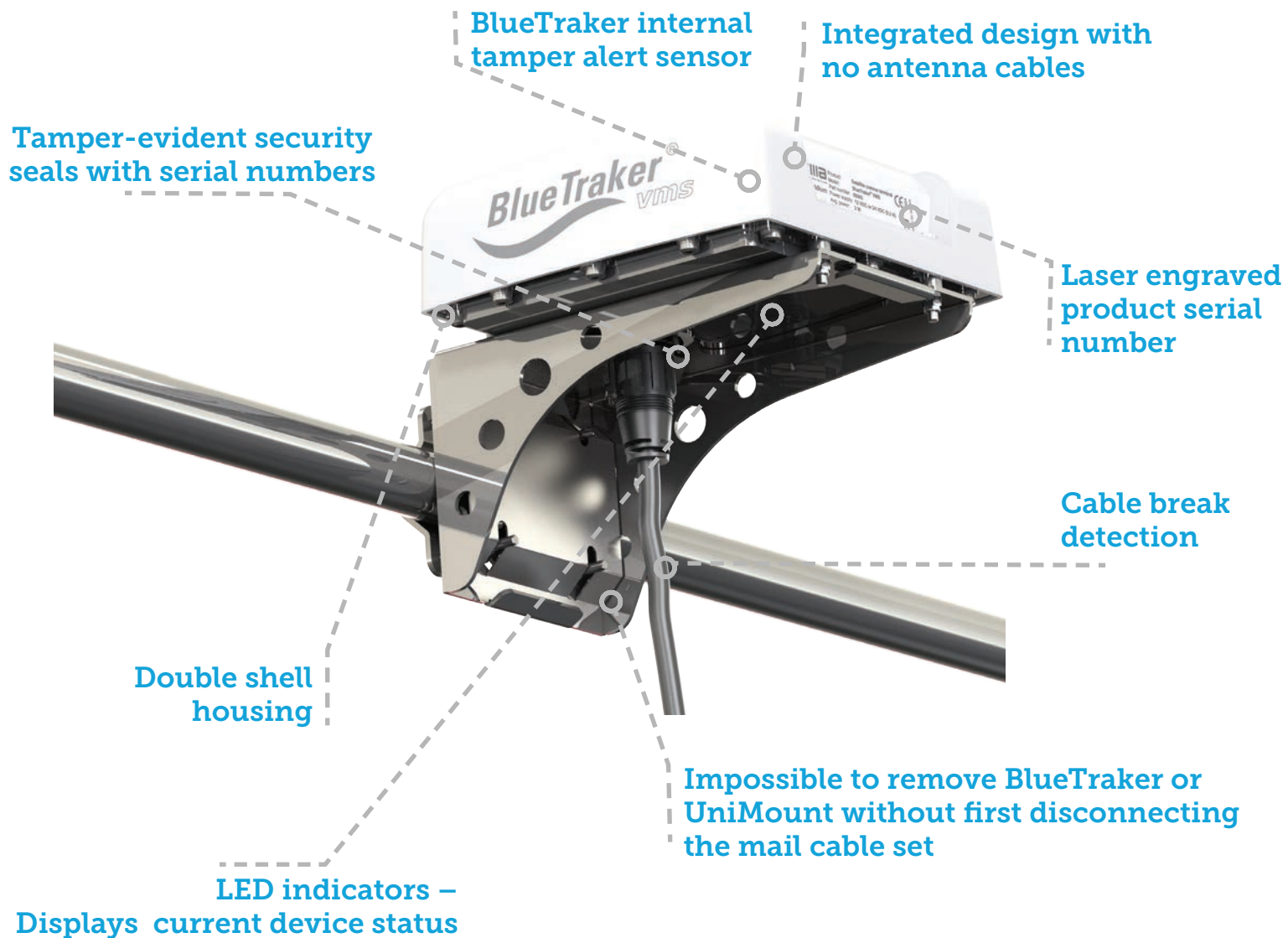
"Several layers of tamper proof design offer an unprecedented level of security currently not available in any other VMS on the market to date."

# ConBox Security and Safety Features

**Visual LED indicator**

**Sound alert buzzer**

**ConBox internal tamper alert sensor**

**Security seal**

## Audio and Visual Status Levels

BlueTraker ConBox contains audio and visual status levels which allows the captain of the fishing vessel to recognize a potential malfunction or error of the device as well as indicating normal operation.

Operational Status Level

Normal Operation
- 1 signal [1] -

Backup Battery Operation
- 2 signals [2] -

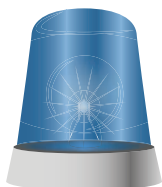Other Alarm Event
- 3 signals [3] -

[1] 1 signal: One Audio Pulse & One LED Flash

[2] 2 Signals: Two Audio Pulses & Two LED Flashes

[3] 3 Signals: Three Audio Pulses & Three LED Flashes

# Alert messages

BlueTraker Alert messages are classified into two levels (Serious/Slight) and are automatically transmitted upon the occurrence of the following events.

## Serious Technical Alert

### Switch Off

Occurs when the device starts working on internal battery due to external power failure and the battery voltage drops below the required threshold to function occurs before device powers down.

### Switch On

Occurs when the device's power is restored.

### GPS Blocked

Occurs when the GPS signal is unavailable for 2 hours.

### Cover Open / Cover Closed

This feature works with both the BlueTraker terminal and ConBox so it alerts in case of opening the devices.

### Unit Relocated

Device and UniMount are immovable without first disconnecting the main cable set

### Device Reconnected

Device is reconnected to the main cable set.

### Internal Device Malfunction

Crew is notified about the failure.

## Slight Technical Alert

### Power Disconnection

Occurs when the device is disconnected from external electric power supply.

### Power Restored

Occurs when external power supply is restored to the device.

### POLL Command

Report request for immediate vessel position.

# Key Benefits

### Lower Operating Costs

The embedded 'authorized port' function ensures that the devices only transmit positional messages every 2 hours.

### Low Power Design

BlueTraker terminals only draw an average of 2W @ 12V DC.

### Unmatched Securuty and Tampering Protections

BlueTraker have implemented multiple mechanical and electrical security measures to protect data integrity and security from tampering/spoofing or fraud.

- Hardwired circuit security codes prevent swapping of communication modules
- Tamper-evident seals with laser marked wiring.
- Access to the on—chip software code can be disabled electronically to protect against hacking/patching of the terminal's functionality.

### IP68 Rated Device

**IP68**

BlueTraker's unique double shell housing protects the components against anything that the hostile marine environment can throw at it: extremes of temperature / wind-chill/humidity etc.

### Aler Messages

A full set of remote alert messages allow interference / equipment failures to be detected and rectified by either crew or the FMC should they arise.
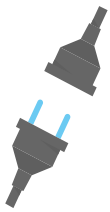
## Simple to Install With no Axternal Antennas

BlueTraker is one of the most straightforward terminals to mount and set-up. Easy to understand user manuals and a how-to video allow for a quick and easy installation process.

## Future - Proof Device

Fully upgradable for the next generation of fisheries monitoring techniques: geozones/e-Logbooks and also the next wave of fishing gear sensor monitors (IoT sensors). No onsite intervention is required for future firmware updates.

## Bidirectional Communication

Offers bidirectional communication between vessel and Fisheries Monitoring Centres.

## Standards, Certificated and Approvals

| **IEC 60945** Maritime electronic navigation and communicatation equipment and systems | **ISO 7367-2:2004 Electrical transients along supply lines** ISO 16750-2 Environmental conditions and testing for electrical and electronic equipment - part two; electrical loads - load dump | IEC60529 – IP68 water and dust ingress protection CE European product safety CE mark ICE 60068-2-1 Low temperature functional test | Iridium Compatible Equipment (ICE) certificate MIL-STD-810G Operating temperature test | ISO9001:2008 EMA Quality management system certificate |

# BlueTraker VMS Technical Specification _____

## Phycical

| | |
|---|---|
| External dimensions | 198mm (width) x 198mm (length) x 67mm (height) |
| Weight | 1.140g (including one back-up battery) |
| Housing | Double shell housing, light colour outer shell, resistant to UV solar radiation |

## Environmental

| | |
|---|---|
| Operating temperature | -40°C to +60°C,<br>-20°C to +60°C (On Backup Battery) |
| Storage temperature | -25°C to +70°C |
| Humidity | From 10% to 100% Relative Humidity including condensation |
| Dust and water ingress | IP68 protection class (depth 6m, duration 30min.) |
| Vibration | IEC 60945:2002, 5Hz - 13.2 Hz  sweep sine, displacement 0.001m, sweep rate 0.5oct/min;13.2 - 100Hz sweep sine, acceleration amplitude $7ms^{-2}$, sweep rate 0.5oct/min |

## Electrical

| | |
|---|---|
| Input Voltage Range: | 9V DC to 36V DC (max. power supply cable length: 50m) |
| Nominal Supply Voltage | 24V DC or 12V DC |
| Energy Consumption (Average) | 2W @ 12V DC |
| Input Protection | Resettable fuses, Level 4 ESD protection according to ISO 61000-4-2, Over-voltage protection above 36 V DC, Load Dump protection according to ISO 7637-2:2004(E) (pulse 5a), ISO16750-2:2002 (load dump) |
| Back-up battery | LiPoly battery |
| Autonomy with back-up battery | More than 48 hours with a reporting interval of every 10min at +23°C |

## Satellite data communication

| | |
|---|---|
| Network | Iridium, Low Earth Orbit (LEO) |
| Satellites | Low earth orbit, total globe coverage, 66 satellites, mesh network |
| Frequency | 1.616MHz to 1.626,5MHz |
| Average radiated power | < 1W |
| Antenna | Integrated, low profile, low elevation, optimised, high gain, custom designed antenna |

## GSM/GPRS channel (Used for Firmware Upgrades and Servicing)

| | |
|---|---|
| Supported bands | Quad Band 850/900/1800/1900 MHz |
| SIM card | Global SIM, supplied with the terminal |
| Data features GPRS | Embedded TCP / IP and UDP / IP protocol stack<br>Embedded FTP<br>SSL – Secure Connection |
| Antenna GSM | Integrated |

## GPS/GLONASS positioning receiver

| | |
|---|---|
| Channels | 33 tracking, 99 acquisition |
| Acquisition: | Cold start 28s, Hot start <1s, sensitivity -167dBm @ tracking |
| Accuracy: | 5m CEP |
| Antenna | Integrated patch antenna |

# Complete Vessel Monitoring System Solution

**BlueTraker®** *vms*

**ema**
WIRELESS DATA SOLUTIONS

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