

SRT Marine Systems plc

VMS-100 User Manual

SRT Marine Systems plc, Wireless House, Westfield Industrial Estate,
Midsomer Norton, Bath, BA3 4BS, England. Tel: +44 (0)1761 409 500

The information contained within this document is the copyright of SRT Marine Systems plc.

No part of this document may be disclosed, reproduced or transmitted in any form, or by any means without the written permission of SRT Marine Systems plc.

The term document extends to all forms of media in which information may be embodied.

Table of contents

1.	Notices	3
1.1	Safety Warnings	3
1.2	General Notices	3
2.	About this AIS Transceiver	6
2.1	About AIS	6
2.2	Static and Dynamic Vessel Data.....	6
2.3	Important Information for US Customers	7
3.	Introduction	9
4.	General Operation	10
4.1	Product Overview	10
4.2	Button Functions	10
4.3	Indicators	11
4.4	Using the Product	12
4.4.1	Powering On	12
4.4.2	Changing State	12
4.4.3	Activating SOS Alert	12
4.4.4	Powering Off	12
4.4.5	Battery Backup.....	12
4.4.6	Error Conditions.....	13
5.	Operation with an ERS Device	14
5.1	ERS1 Screen Layout.....	14
5.1.1	To-Do Menu	15
5.1.2	Alerts Menu	16
5.1.3	Meatball Menu	16
5.2	Basic+ Configuration	18
5.3	Advanced Configuration	20
6.	External Interfaces	21
6.1	NMEA 0183 Port	21
6.2	NMEA 2000 Port	21
6.3	USB.....	21

1. Notices

When reading this manual please pay attention to warnings marked with the warning triangle shown on the left. These are important messages for safety, installation and usage of the product.

1.1 Safety Warnings



This equipment must be installed in accordance with the instructions provided in this manual.



This AIS transceiver is an aid to navigation and must not be relied upon to provide accurate navigation information. AIS is not a replacement for vigilant human lookouts and other navigation aids such as RADAR. The performance of the transceiver may be seriously impaired if not installed as instructed in the user manual, or due to other factors such as weather and or nearby transmitting devices. Compatibility with other systems may vary and is reliant on the third-party systems recognising the standard outputs from the transceiver. The manufacturer reserves the right to update and change these specifications at any time and without notice.



Do not install this equipment in a flammable atmosphere such as in an engine room or near to fuel tanks.

1.2 General Notices

Position source

All marine Automatic Identification System (AIS) transceivers utilise a satellite-based location system such as the Global Positioning Satellite (GPS) network.

The accuracy of a GPS position fix is variable and is affected by factors such as the antenna positioning, how many satellites are used to determine a position and how long satellite information has been received for.

Compass safe distance

The compass safe distance of this unit is 0.2m or greater for 0.3° deviation.

RF emissions notice

Caution: The AIS transceiver generates and radiates radio frequency electromagnetic energy. This equipment must be installed and operated according to the instructions contained in this manual. Failure to do so can result in personal injury and / or AIS transceiver malfunction.

Caution: Never operate the AIS transceiver unless it is connected to a VHF antenna.

To maximise performance and minimise human exposure to radio frequency electromagnetic energy you must make sure that the antenna is mounted at least 1.5 metres away from the AIS transceiver and is connected to the AIS transceiver before power is applied. The system has a Maximum Permissible Exposure (MPE) radius of 1.5m. This has been determined assuming the maximum power of the AIS transceiver and using antennas with a maximum gain of 3dBi. The antenna should be mounted 3.5m above the deck in order to meet RF exposure requirements. Higher gain antennas will require a greater MPE radius. Do not operate the unit when anyone is within the MPE radius of the antenna (unless they are shielded from the antenna field by a grounded metallic barrier). The antenna should not be co-located or operated in conjunction with any other transmitting antenna. The required antenna impedance is 50 Ohms.



Any attempt to tamper with or damage this product will invalidate the warranty.

Disposal of this product and packaging

Please dispose of the AIS transceiver in accordance with the European WEEE Directive or with the applicable local regulations for disposal of electrical equipment.

Every effort has been made to ensure the packaging for this product is recyclable. Please dispose of the packaging in an environmentally friendly manner.

Accuracy of this manual

The AIS transceiver may be upgraded from time to time and future versions of the AIS transceiver may therefore not correspond exactly with this manual. Information contained in this manual is liable to change without notice. The manufacturer of this product disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

Radio Equipment Directive

The manufacturer of this product declares that this product is in compliance with the essential requirements and other provisions of the Radio Equipment Directive 2014/53/EU and as such displays the CE mark. The RED declaration of conformity is provided as part of this documentation pack. The declaration of conformity is provided with the product document pack.



FCC notice

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



WARNING: It is a violation of the rules of the Federal Communications Commission to input an MMSI that has not been properly assigned to the end user, or to otherwise input any inaccurate data in this device.

Industry Canada notice

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- 1.This device may not cause interference, and
- 2.This device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1.L'appareil ne doit pas produire de brouillage, et
- 2.L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le Fonctionnement.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

2. About this AIS Transceiver

2.1 About AIS

The marine Automatic Identification System (AIS) is a location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed, course and other information such as vessel identity with similarly equipped vessels. Position is derived from the Global Navigation Satellite System (GNSS) and communication between vessels is by Very High Frequency (VHF) digital transmissions.

There are a number of types of AIS device as follows:

- Class A transceivers. These are similar to class B transceivers, but are designed to be fitted to large vessels such as cargo ships and large passenger vessels. Class A transceivers transmit at a higher VHF signal power than class B transceivers and therefore can be received by more distant vessels. They also transmit Class A transceivers are mandatory on all vessels over 300 gross tonnes on international voyages and certain types of passenger vessels under SOLAS regulations.
- Class B transceivers. Similar to class A transceivers in many ways, but are normally lower cost due to the less stringent performance requirements. Class B transceivers transmit at a lower power and at a lower reporting rate than class A transceivers.
- AIS base stations. AIS base stations are used by Vessel Traffic Systems to monitor and control the transmissions of AIS transceivers.
- Aids to Navigation (AtoN) transceivers. AtoN's are transceivers mounted on buoys or other hazards to shipping which transmit details of their location to the surrounding vessels.
- AIS receivers. AIS receivers will generally receive transmissions from class A transceivers, class B transceivers, AtoN's and AIS base stations but do not transmit any information about the vessel on which they are installed.

This product is an AIS Class B transceiver.

2.2 Static and Dynamic Vessel Data

There are two categories of information transmitted by an AIS transceiver: static and dynamic data.

The vessel's dynamic data, which includes location, speed over ground (SOG) and course over ground (COG), is calculated automatically using the internal GPS receiver.

Static data is information about the vessel which must be programmed into the AIS transceiver. This includes:

- Maritime Mobile Service Identity (MMSI)
- Vessel name
- Vessel call sign (if available)
- Vessel type

- Vessel dimensions

In most countries the operation of an AIS transceiver is included under the vessel's marine VHF licence provisions. The vessel on to which the AIS unit is to be installed must therefore possess a current VHF radiotelephone licence which lists the AIS system, vessel Call Sign and MMSI number.



An MMSI number is required in order for the AIS transceiver to operate. Please contact the relevant authority in your country for more information.

2.3 Important Information for US Customers

There are specific laws in the USA regarding the configuration of AIS class B transceivers.

If you are a US resident and intend to use your AIS class B transceiver in US waters, you should make sure that your retailer has configured your product prior to supplying it to you. If your AIS transceiver has not been pre-configured please contact your dealer for details of how to have it configured.



In the United States of America, the MMSI and static data must only be entered by a competent installer. The end user of the equipment is not authorised to enter their own vessel data.

3. Introduction

This document provides the user instructions for the VMS-100 (and where appropriate the ERS products). It is intended to be a detailed description on how to use the VMS-100 system, suitable for SRT Customer Support and our installation/training partners. A separate quick start guide will be provided with the VMS-100 transceiver for use on the vessel. It assumes that the product has already been installed under a separate set of installation instructions.

4. General Operation

4.1 Product Overview

The VMS-100 product is an AIS Class B Device which will transmit the vessel position, status, and catch related information to a central monitoring centre such that the location of the vessel can be monitored to prevent illegal, unauthorised and unregulated (IUU) fishing. All transmissions are encrypted such that only authorised control centres can view the location of each vessel. Transmissions are received by coastal receiver stations and satellites, ensuring full coverage wherever the vessel is located. The transceiver will also receive messages from the control centre warning of weather alerts.

The transceiver will have been configured on one of three configurations:

Basic – The simplest of all configurations, using just the buttons on the transceiver to identify what is happening on the voyage.

Basic+ - Identical to the basic configuration but will use the ERS1 (described later) for some additional reporting.

Advanced – uses an ERS1 (described later) to interact with the transceiver and provide additional catch reporting or other voyage information.

4.2 Button Functions

There are four buttons located on the top of the transceiver. Three of these are used to identify the state of the vessel, and the fourth is an SOS Button to be used in emergency situations.

Once a button has been pressed, the vessel will be flagged as in that state and the button will light up showing that this state is selected.

Port – This button is selected when the vessel is inside a port boundary. This is the usual power on state of the transceiver.

Transit – This button is selected when the vessel is outside the port boundary but not engaged in a fishing operation. This is usually selected when transiting to a fishing ground.

Fishing – This button is selected when the vessel is actively engaged in fishing or searching for a fishing ground.

In the Basic+ or Advanced configuration the ERS1 can be used to change these states.

SOS – The fourth button is for activating SOS messages in emergency situations. This is described later.

Figure 1 shows the controls and indicators.



Figure 1 - VMS-100 Controls and Indicators

4.3 Indicators

The transceiver has three indicators on the top panel. These are located as shown in Figure 1 and provide the following information:

Power – This indicator is lit green when the vessel is operating normally under vessel power. It will flash when the vessel power has been lost and send a message to the control centre. The product is fitted with internal rechargeable batteries which allow it to operate for 24hrs is vessel power has been lost.

GeoFence – This indicator will light up when the vessel has breached a defined Geo Fence. Geo Fences are prohibited areas that the vessel is not allowed into. The indicator will only be extinguished when the vessel has moved out of the prohibited area. If a geo fence has been breached, an internal buzzer will sound in the transceiver and a message sent to the control centre. The buzzer can be silenced by pressing any of the buttons on the top of the transceiver.

Error – If the transceiver detects an error, it will light up this indicator red. If the indicator flashes, this indicates that there is a problem with the transmissions from the device. In both cases, guidance should be sought as to what to do next.

Tamper Alert – If all three indicators flash together, this indicates that the product has been tampered with and an appropriate message will be sent to the control centre. Once the product starts this sequence it cannot be stopped without a supervisor resetting it.

4.4 Using the Product

4.4.1 Powering On

The transceiver does not have an on/off switch and will operate immediately that power is applied to the unit.

4.4.2 Changing State

The transceiver will always power on in the state that it was shut down in, unless an exceptional event has previously occurred.

Whilst within the port boundary, the transceiver should remain in the Port state. When exiting port and in a transit the Transit button should be pressed. This will inform the control centre that the vessel is no longer in the port and is transiting to a fishing ground, for example.

When the vessel is in the act of fishing or searching for fish, the Fishing button is pressed and the transceiver will inform the control centre that the vessel is engaged in fishing. When fishing is over, the Transit button should be pressed to inform the control centre of this. If another fishing activity starts, the Fishing button should be again pressed to indicate this, and so on.

When all activities are complete, the transceiver should be put in the Transit state by pressing the Transit button until the vessel returns to port. When inside the port boundary, the Port button should be pressed to indicate this to the control centre.

At the end of the fishing voyage when the catch has been landed and the vessel is docked the vessel power can be turned off. The transceiver will automatically shut down after a short period of time.

Throughout this sequence of events, the transceiver will continually be sending position and status reports to the control centre.

4.4.3 Activating SOS Alert

Pressing and holding the SOS button for 5 seconds will cause this button to light up and the buzzer to sound. Pressing any other button will silence the buzzer. When active, the SOS button will continually transmit a 'MAYDAY MAYDAY' message over the AIS network. This message is transmitted no matter what other errors or alerts are active on the transceiver and will transmit even if the transceiver is operating off its internal batteries.

To cancel the SOS alert, press and hold the SOS button for 5 seconds. The button light will be extinguished.

4.4.4 Powering Off

There is no need to switch the transceiver off. It will automatically detect that it can shut down if a set of conditions are met, including being In Port and docked with vessel power switched off.

4.4.5 Battery Backup

The transceiver contains a set of internal, rechargeable, batteries to act as a reserve power supply in the event of the main power supply failing. If vessel power fails, or is removed, the








transceiver will continue to operate normally but will flash the Power light. In this event, the transceiver will also send a message to the control centre to indicate that it has lost power.

If power returns, the light will stop flashing and the control centre will be informed that the power error has ended.

The transceiver internal batteries provide enough power for the product to continue transmissions for a minimum of 24hrs.

4.4.6 Error Conditions

The following error conditions can be displayed on the transceiver:

 Flashing	External Power has been lost	Check power connection Check vessel power supply
 Flashing	A geo fence boundary has been breached	Check position, move back to designated areas
	An internal transceiver error has occurred	See advice
 Flashing	The transceiver is not transmitting	Seek advice
   Flashing	The unit has been tampered with	Return to port immediately

5. Operation with an ERS Device

The general operation of the product detailed in Section 2 described the Basic configuration of the product, which is just the AIS Transceiver installed on the vessel.

The other two configurations both use a device known as the ERS1 to act as a mechanism for entering data into the transceiver and the transceiver reporting this to the control centre, automatically.

The ERS1 device is a rugged mobile phone with a Bluetooth connection directly to the transceiver. It also uses mobile data to connect to the control centre, as needed. Figure 2 shows the ERS1 device.



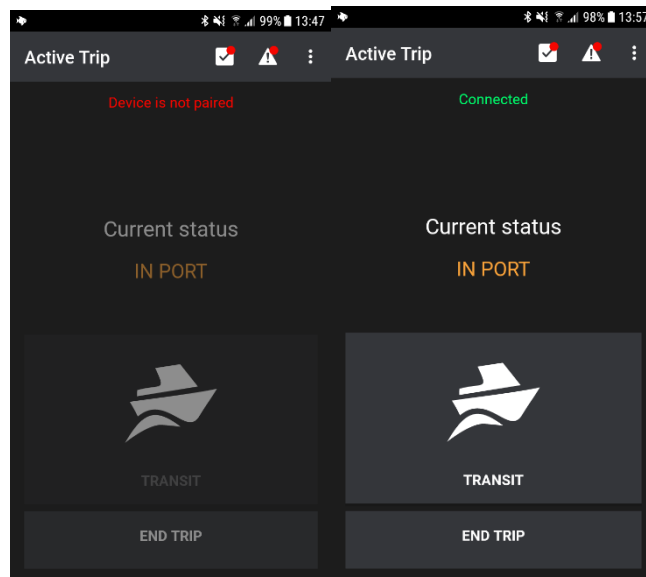
Figure 2 - ERS1 Device

To use the ERS1, a user account name and password must have been set up when the VMS-100 and ERS1 were installed on the vessel. If this is not the case, then contact must be made with an authorised support contact. If the username or password have been lost or forgotten, then a support contact must again be identified to reset this.

The ERS1 can be recharged by connecting the adapter cable provided into the USB port on the front of the transceiver as shown below.

5.1 ERS1 Screen Layout

The ERS1 screen layout is as shown in Figure X.



The screen is laid out into two main areas; the user controls and the indicators.

You can see that if the device is not paired with a VMS-100 transceiver, the user controls are 'greyed out' and cannot be used.

The user control is the main part of the display and shows large, easy to use, buttons which allow the operator to switch between modes such as Port and Transit. These mirror the buttons on the front of the transceiver.

The indicator area of the display is the small bar at the top of the screen. There are icons here for a To-Do list and an Alerts notification. Also here is a button represented by three horizontal dots (sometimes known as the meatball button). Pressing this button will bring up a menu allowing for additional messages and information to be accessed.

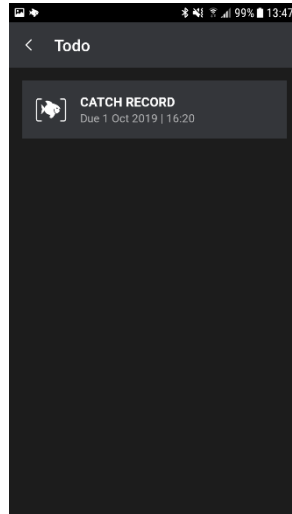
If the To-Do or Alert icon is displayed with a red dot above it, this represents an action or alert that the user is expected to respond to.

5.1.1 To-Do Menu

Within the To-Do menu will be a list of reports that the user is expected to complete. These are triggered by the VMS-100 acting on certain events, such as a Fishing event which will generate a Catch Report. The events which generate each report are shown below:

Fishing->Transit. Generates a Catch Report.

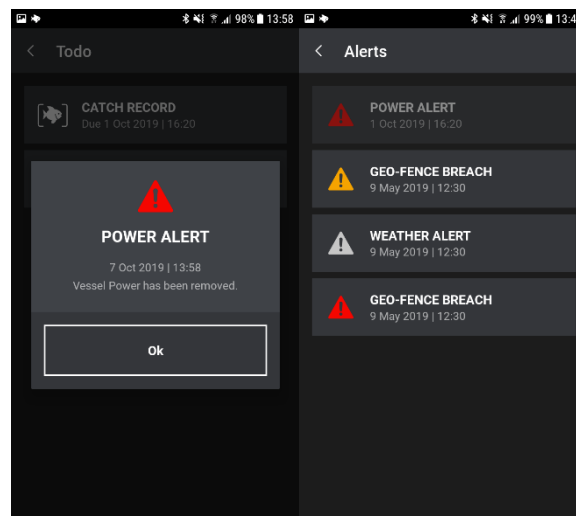
Transit->Port. Generates a Landing Report.



On the advanced configuration, Fishing is replaced with Searching and Set/Catch states. It is Set/Catch which generates the Catch Report in this mode. In addition, the advanced configuration also generates Tranship Report and Bunk/Change Reports when the Tranship and Bunk/Change states are entered.

5.1.2 Alerts Menu

The Alerts menu displays a summary of alerts that have been received by the ERS1. Each alert will immediately display a pop-up box on the ERS1 screen which needs to be acknowledged by the user. These are then collated under the Alerts menu.



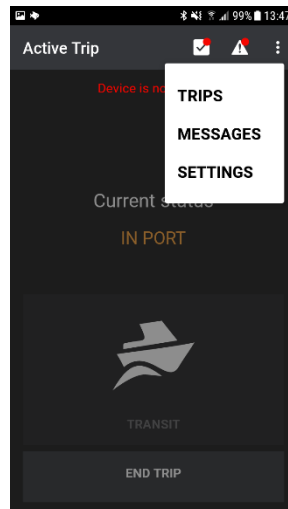
5.1.3 Meatball Menu

When this menu is selected, the ERS1 will display a drop-down menu consisting of the following options:

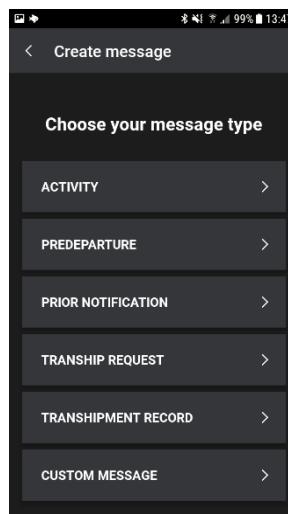
Trips

Messages

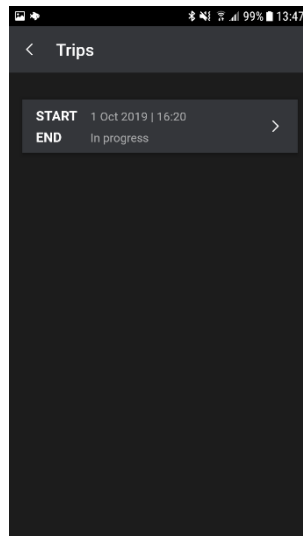
Settings



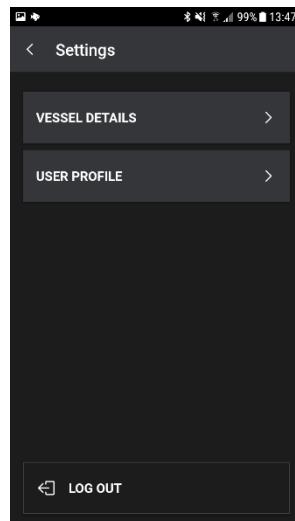
The Messages menu allows for manual creation of a number of user triggered messages. These could be required by a local authority. For example, a pre-departure message is required when authorisation to leave port is required. This menu allows for creation of these types of messages in addition to a general free-text message for non-specific communication.



The Trips menu provides details of the current trip or historic trip data.



The Settings menu shows the user and vessel information.



5.2 Basic+ Configuration

If the transceiver has been configured in the Basic+ configuration, an ERS1 device will be provided as part of the product.

In this configuration, the ERS1 can be used to change the state of the transceiver from Port to Transit to Fishing, rather than using the buttons on the top of the transceiver. Figure 3 shows how these state changes are displayed on the ERS1.

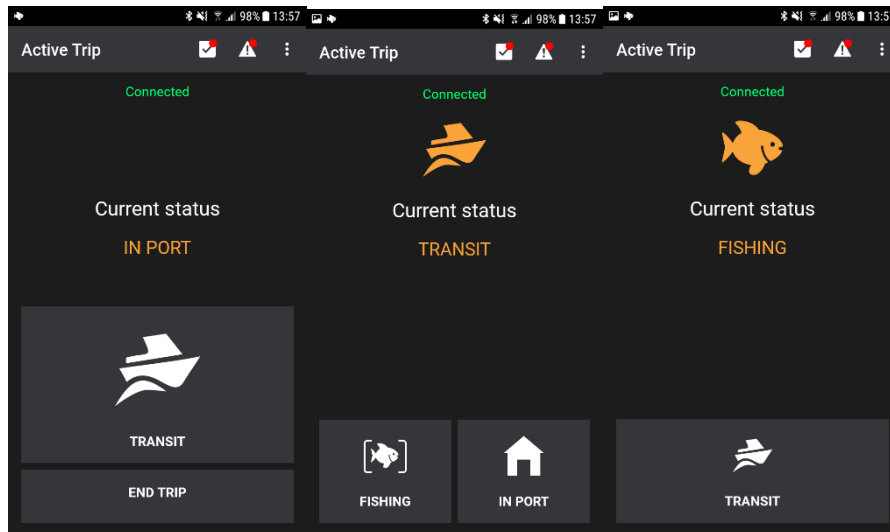


Figure 3 – Basic+ ERS1 State Changes

The ERS1 can be used on the vessel during the fishing voyage, or for its main purpose in this configuration which is to report the vessels catch.

The ERS1 provides a screen where the catch can be entered and declared as a Landing Report. This can only be carried out when the vessel has returned to Port and the ERS1 has detected a number of Fishing events (from the Fishing button).

When the Port button has been pressed for the final time to determine that the voyage is complete, the system will require a Landing Report from the ERS1. This will be indicated on the ERS1 screen as a red badge above the To-Do list on the ERS1.

When the Landing Report has been completed on the ERS1, the transceiver will officially declare the vessel back in Port, the Port button will stop flashing, and the landing report will be sent to the control centre.

The Port screen also shows an End Trip button which can be used to inform the control centre that the current fishing trip is over.

Figure 4 shows example Landing Report screens.

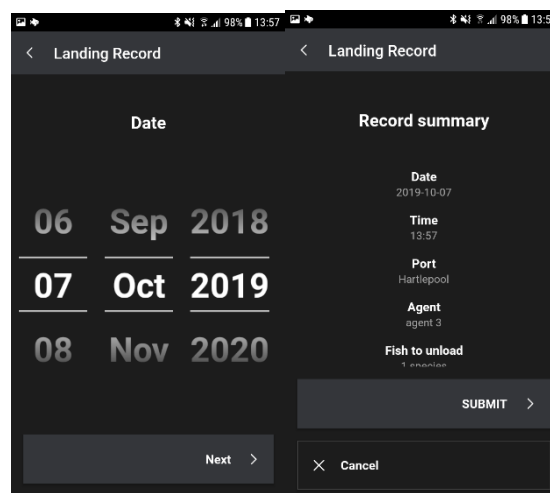


Figure 4 - Landing Report

5.3 Advanced Configuration

In this configuration, an ERS1 will be supplied with the product. This configuration tends to be for larger vessels.

There are a number of operational differences in the way the ERS1 and transceiver work for the advanced configuration and these are all controlled from the ERS1.

The ERS1 is essential for the vessel to operate in this configuration and the fishing voyage will be severely compromised if the ERS1 is unavailable.

The states that the vessel can be in are increased for the advanced configuration. Using the ERS1, the vessel can move from Port to Transit, but the Fishing state has been replaced by two new states; Searching and Set/Catch. When actively searching for fish the Searching mode should be selected from the ERS1 screen. From this screen the transceiver can return to Transit or move into the Set/Catch state which acknowledges the act of fishing. All states have the ability to return to the Transit state, and when each one exits an empty report will be created in the ERS1 To-Do list. These reports must be filled in on the ERS1 prior to returning to port, and they will be automatically transmitted to the control centre by the transceiver.

Figure x shows how these state changes are carried out on the ERS1.

Advanced ERS1 State Changes

As with the Basic+ configuration, the ERS1 must create a landing record (or a number of landing records) when the vessel is landing its catch back in Port.

In the advanced configuration, the ERS1 will also allow a Transshipment report to be created, if a catch has been transferred to another vessel at sea.

The ERS1 also allows for the bunkering or crew change report to be created.

In the advanced configuration, the transition from Port to Transit and back again is carried out automatically. It can be done using the ERS1 or buttons on the transceiver, but the technology in the transceiver is intelligent enough to know when a port boundary has been crossed.

6. External Interfaces

The transceiver has a number of ports that can be connected on vessels that have a supporting infrastructure.

6.1 NMEA 0183 Port

Located next to the GNSS connector on the side of the transceiver, this port can be connected to a Chartplotter or multi-function display (MFD) such that vessel data can be displayed graphically on a large screen.

There are two ports on this connector, the second could be connected to a vessel heading sensor to provide more accurate heading information.

Wiring for this port is shown below.

6.2 NMEA 2000 Port

Located on the opposite side of the transceiver, this connector can be used on advanced vessels that have an NMEA2000 infrastructure. It will allow the transceiver data to be linked to a wide range of on-board sensors.

6.3 USB

Next to the NMEA2000 connector, there is a circular ruggedised connector which can be used to connect up the ERS1 handset for recharging using the cable provided.