

PRODUCT MANUAL

NAUT^NCAST A2

Class-A SOLAS/Inland AIS Transponder

Art. No. 100 1001



Nauticast GmbH
Lützowgasse 12-14 / 3.OG
1140 Vienna, Austria
T: +43 (1) 5 237 237-0
F: +43 (1) 5 237 237-150
office@nauticast.com

DISCLAIMER

Although Nauticast GmbH strives for accuracy in all its publications this material may contain errors or omissions and is subject to change without prior notice. Nauticast GmbH shall not be made liable for any specific, indirect, incidental or consequential damages as a result of the usage of this manual. Please visit our website for the latest manual revision at www.nauticast.com if necessary.

COPYRIGHT PROTECTION

This document is protected by copyright law. Copying or duplicating be it physically or electronically for any usage other than the operation of a Nauticast A2 AIS System is prohibited and any offender may be liable to the payment of damages.

Dieses Dokument ist urheberrechtlich geschützt. Jede Weitergabe oder Vervielfältigung dieser Unterlage ist ausschließlich zur Unterstützung des Betriebes eines Nauticast A2 AIS Systems zulässig. Zu widerhandlungen verpflichten zu Schadenersatz.

Ce document est protégé par le droit d'auteur. Toute redistribution ou reproduction de ce document est autorisée exclusivement pour appuyer le fonctionnement d'un système AIS A2 Nauticast. Les contrevéhants seront passibles de dommages-intérêts.

Este documento está protegido por derechos de autor. Cualquier redistribución o reproducción de este documento está permitida exclusivamente para apoyar la operación de un sistema AIS A2 Nauticast. Los infractores quedan obligados por daños y perjuicios.

GENERAL WARNINGS

All marine Automatic Identification System (AIS) units utilize a satellite based system such as the Global Positioning Satellite (GPS) network or the Global Navigation Satellite System (GLONASS) network to determine their position. The accuracy of these networks is variable and is affected by factors such as the antenna positioning, the number of satellites that are available to determine a position and how long satellite information has been received for. It is desirable wherever possible to verify both your vessel's AIS derived position data and other vessels' AIS derived position data with visual or radar based observations.

In most countries the operation of an AIS unit is included under the vessel's marine VHF license provisions. The vessel onto which the AIS unit is to be installed must therefore possess a valid VHF radiotelephone license which lists the AIS system and the vessel Call Sign and MMSI number. Please contact the relevant authority in your country for more information.

LIMITED WARRANTY

This product is warranted against factory defect in material and workmanship for a period of 24 months from the date of purchase. During the warranty period Nauticast GmbH will repair or at its option, replace the product at no cost to the buyer provided that a return authorization is obtained from Nauticast GmbH, Lützowgasse 12-14 / 3. OG, 1140 Vienna, Austria (see Section Contact & Support information). This warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification by unauthorized service personnel. For authorized service partners see our homepage www.nauticast.com or contact Nauticast support directly.

Warranty and certification void if device is opened.

© 2014 Nauticast GmbH

Nauticast™ is a protected trademark of Nauticast GmbH

Index

| | | |
|------|--|----|
| 1 | GENERAL INTRODUCTION | 6 |
| 1.1 | Description of AIS..... | 6 |
| 1.2 | AIS Networks | 8 |
| 1.3 | Inland AIS..... | 8 |
| 2 | SYSTEM OVERVIEW | 9 |
| 2.1 | Product Description | 9 |
| 2.2 | Main features | 10 |
| 3 | INSTALLATION | 11 |
| 3.1 | Installation Requirements | 11 |
| 3.2 | Installation Overview | 11 |
| 3.3 | Mounting the NAUTICAST A2 | 11 |
| 3.4 | Mount the NAUTICAST A2 VHF antenna | 12 |
| 3.5 | Mount the NAUTICAST A2 GPS Antenna | 13 |
| 3.6 | Electrical Installation..... | 14 |
| 3.7 | System Configuration..... | 19 |
| 4 | OPERATION..... | 20 |
| 4.1 | System Mode | 20 |
| 4.2 | LED's and Controls | 20 |
| 4.3 | Main Menu – Tree View | 22 |
| 4.4 | Configuration Parameters..... | 23 |
| 4.5 | Alarm and Alert Pop-ups | 29 |
| 4.6 | Status Bar | 30 |
| 4.7 | Status Icons..... | 30 |
| 4.8 | View Remote Ship Information | 31 |
| 4.9 | View Plot of Targets | 32 |
| 4.10 | View Transmitted Own Ship Information | 32 |
| 4.11 | Enter and Read Voyage Related Information | 33 |
| 4.12 | Handling Safety Related Messages (SRM) and Text Messages | 33 |
| 4.13 | Send Persons On Board | 34 |
| 4.14 | Long Range Interrogations..... | 35 |
| 4.15 | Inland ETA and RTA | 36 |
| 4.16 | Inland Water Levels..... | 36 |
| 4.17 | Regional Areas | 37 |
| 4.18 | Alarms | 37 |
| 4.19 | Status List | 37 |
| 4.20 | Non Functional Time | 38 |
| 4.21 | GPS Status | 38 |
| 4.22 | View Raw Data | 38 |
| 4.23 | SW/HW Info..... | 39 |
| 4.24 | VHF Status..... | 39 |
| 4.25 | Communication Test | 39 |
| 4.26 | Update Software | 40 |
| 4.27 | Restore Config | 40 |
| 4.28 | Save Configuration to USB memory | 40 |
| 4.29 | Load Configuration from USB memory | 41 |
| 5 | SOFTWARE UPGRADE..... | 43 |
| 6 | TECHNICAL SPECIFICATIONS..... | 44 |
| 6.1 | Transponder Physical..... | 44 |
| 6.2 | Transponder Electrical | 44 |
| 6.3 | Transponder Environment..... | 44 |
| 6.4 | Transponder VHF Transceiver | 44 |
| 6.5 | Transponder Internal GPS Receiver | 44 |
| 6.6 | AIS Alarm Relay | 44 |
| 7 | TROUBLESHOOTING..... | 45 |
| 7.1 | Troubleshooting Prerequisites | 45 |
| 7.2 | Troubleshooting with the Front Panel LED's | 45 |
| 7.3 | Troubleshooting with Alarm Messages | 45 |
| 7.4 | Troubleshooting via the Display..... | 47 |
| 7.5 | Reporting Intervals for Class A Transponders | 49 |

| | | |
|-----------|--|-----------|
| 7.6 | F.A.Q..... | 50 |
| 7.7 | Contact & Support information | 50 |
| 7.8 | Indication Messages | 51 |
| 7.9 | Long Range Definitions | 51 |
| 8 | INTERPRETATION OF INPUT SENTENCES | 52 |
| 8.1 | GPS and Sensor Input Sentences..... | 52 |
| 8.2 | General Input Sentences..... | 55 |
| 8.3 | AIS Specific Input Sentences..... | 56 |
| 8.4 | Long Range Input Sentences | 58 |
| 8.5 | Proprietary Input Sentences..... | 58 |
| 9 | INTERPRETATION OF OUTPUT SENTENCES..... | 59 |
| 9.1 | Proprietary Output Sentences (PSTT) | 59 |
| 9.2 | Long Range Output Sentences | 60 |
| 9.3 | AIS Output Sentences..... | 61 |
| 10 | GLOSSARY | 65 |
| 10.1 | Inland ERI Ship Types | 67 |
| 10.2 | Units..... | 68 |
| 11 | APPENDIX..... | 69 |
| 11.1 | Appendix A – Drawings..... | 69 |
| 11.2 | Appendix B – License..... | 72 |
| 11.3 | Appendix C – Declaration of Conformity | 75 |
| 11.4 | Appendix D – Certification..... | 76 |

History of Changes

| Date | Version | Status | Comments | Responsible |
|------------|---------|---------|--|-------------|
| 2013-07-15 | 1.2 | Release | First Official Release | Ch. Aschl |
| 2014-01-28 | 1.3 | Release | Changes due to SW update | Ch. Aschl |
| 2014-09-30 | 2.0 | Release | Nauticast, Certification, general rework | V. Janik |

Software dependencies

This revision of the Manual is valid for the Software version (s) below stated and future versions unless otherwise noted. Please find further information on the Nauticast homepage (www.nauticast.com).

| Date | AIS software Version | Status | Comments | Responsible |
|------------|----------------------|---------|---------------|-------------|
| 2014-07-01 | 1.1.10 | Release | Type approved | V. Janik |

Current software version can always be verified in the S/W info dialog as described in section 4.23.

Safety Instructions

Note the following compass safe distances:

| Equipment | Standard magnetic compass | Steering magnetic compass |
|--------------------------|---------------------------|---------------------------|
| Nauticast A2 Transponder | 0.60 m | 0.45 m |

Disposal Instructions

Broken or unwanted electrical or electronic equipment parts shall be classified and handled as 'Electronic Waste'. Improper disposal may be harmful to the environment and human health. Please refer to your local waste authority for information on return and collection systems in your area.

Contact Information

For installation, service, ordering info and technical support please contact your local Nauticast service partner. A list of dealers and service stations can be found on our website <http://www.nauticast.com>.

1 General Introduction

1.1 Description of AIS

AIS stands for: "Automatic Identification System"

What is AIS?

According to IALA regulations, AIS is defined as follows:

AIS is a broadcast transponder system, operating in the VHF maritime mobile Band (161,975 and 162,025 MHz). It is capable of sending ship information such as identification, position, course, speed and more to other ships and to shore stations. It can handle multiple reports at rapid update rates and uses Self-Organizing Time Division Multiple Access (SOTDMA) technology to meet these high broadcast rates and ensure reliable and robust operation.

The Modules of an AIS are:

- DGPS / GPS receiver
- VHF Radio
- Antenna
- Computer (CPU)
- Power Supply

Appropriate application software connects the individual modules.

In which modes do AIS operate?

AIS devices are required to function flawlessly in a variety of modes. The relevant regulations require that the system shall be capable of

- An "autonomous and continuous" mode for operation in all areas. This mode shall be capable of being switched to/from one of the following alternate modes by a competent authority;
- An "assigned" mode for operation in an area subject to a competent authority responsible for traffic monitoring such that the data transmission interval and/or time slots may be set remotely by that authority;
- A "polling or controlled" mode, where the data transfer occurs in response to interrogation from a ship or competent authority.

Types of AIS:

- Class A Transponder – This type of transponder is used on open sea waters and is mandatory for ships of 300 gross tonnage or more on international voyages, all cargo ships of 500 gross tonnage or more and on passenger ships.
- Class B Transponder – Used on smaller vessels and pleasure crafts. It transmits with less power than class A transponders and has a lower priority ranking on the data link.
- Base Station – Fixed shore station that is typically connected to an AIS network to collect information from all vessels around a certain port or shore line.
- Repeater Stations – Used to extend the coverage range by repeating incoming messages. Can be implemented as a function in an AIS Base station or an AtoN station.
- SAR (Search and Rescue) Transponder – Used on airplanes and helicopters in search and rescue missions.
- AtoN (Aids to Navigation) – A transceiver that is fitted on buoys and lighthouses in order to send information about their positions.
- Inland AIS – A European standardized extension to Class A systems for use on inland water ways. An inland transponder has additional messages to communicate with bridges, ports and locks and can also send some additional information that are useful on water ways such as blue sign indication, specific hazardous cargo etc.
- SART (Search and Rescue Transmitters) – Distress beacons for life rafts. An active SART signal will always be sorted at the top of the target list to highlight its presence.

AIS in an Operational Environment

This illustration depicts a typical AIS System, where two or more AIS equipped vessels (and shore based systems) are automatically communicating with each other.

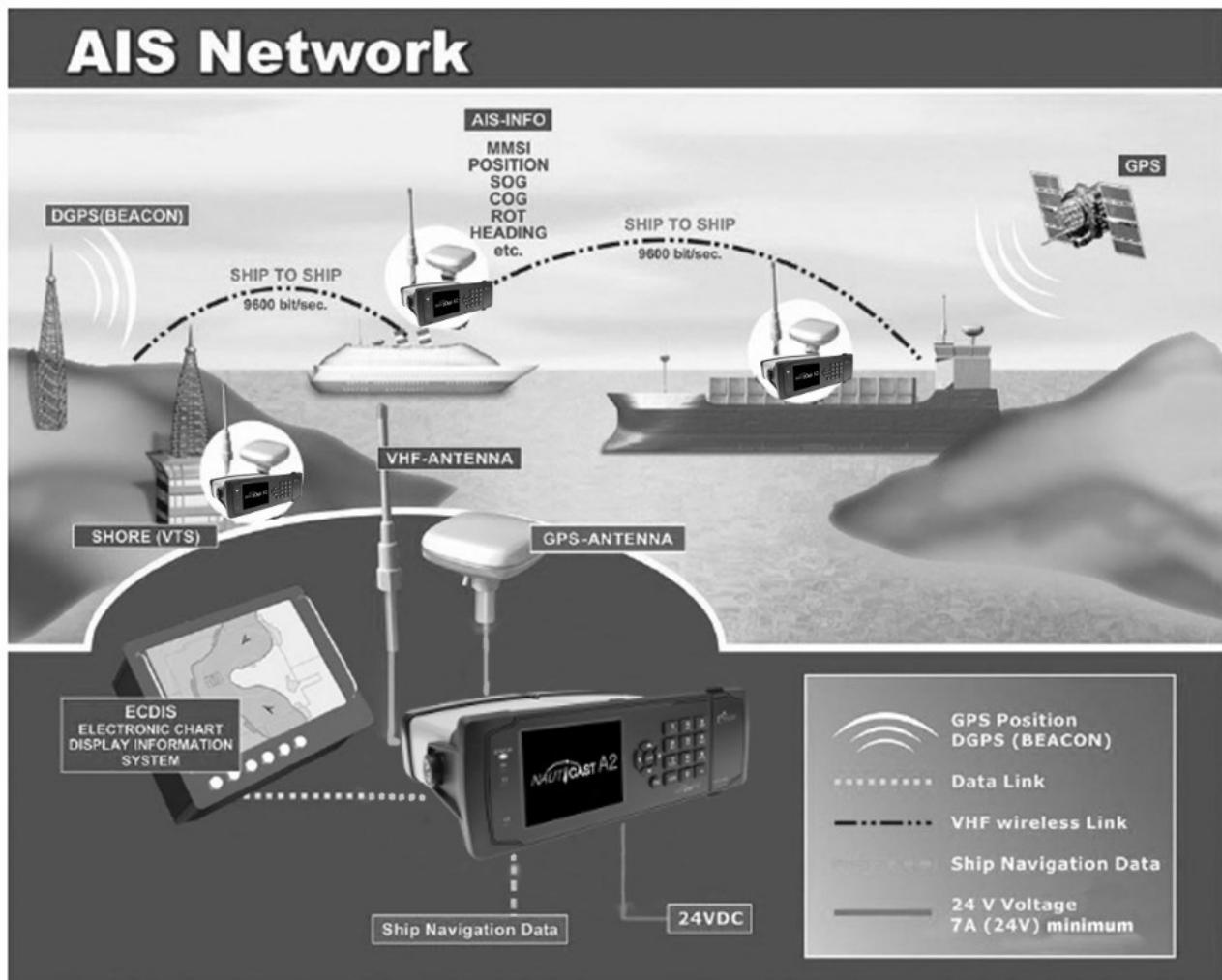


Figure 1 – AIS System

Both vessels in the above illustration are equipped with a NAUTICAST A2 (or any other certified AIS-Transponder). Due to "Time – Synchronization" they use the same organization of free and allocated windows (Slots) in the shared VHF Data Link (this method is called "Self Organized Time Division Multiple Access") to send and receive messages.

On the next page, a typical NAUTICAST A2 installation in a common environment is shown. The NAUTICAST A2 is connected to the vessel's emergency power supply, and in connection with the VHF, and GPS-Antennas, the minimal requirements for transponder operation are fulfilled. By means of standardized messages the involved AIS systems exchange certain static data and dynamic information, such as the location and the course of the other ships in the area.

1.2 AIS Networks

The illustration below shows a full AIS covered area (including applications and shore infrastructure).

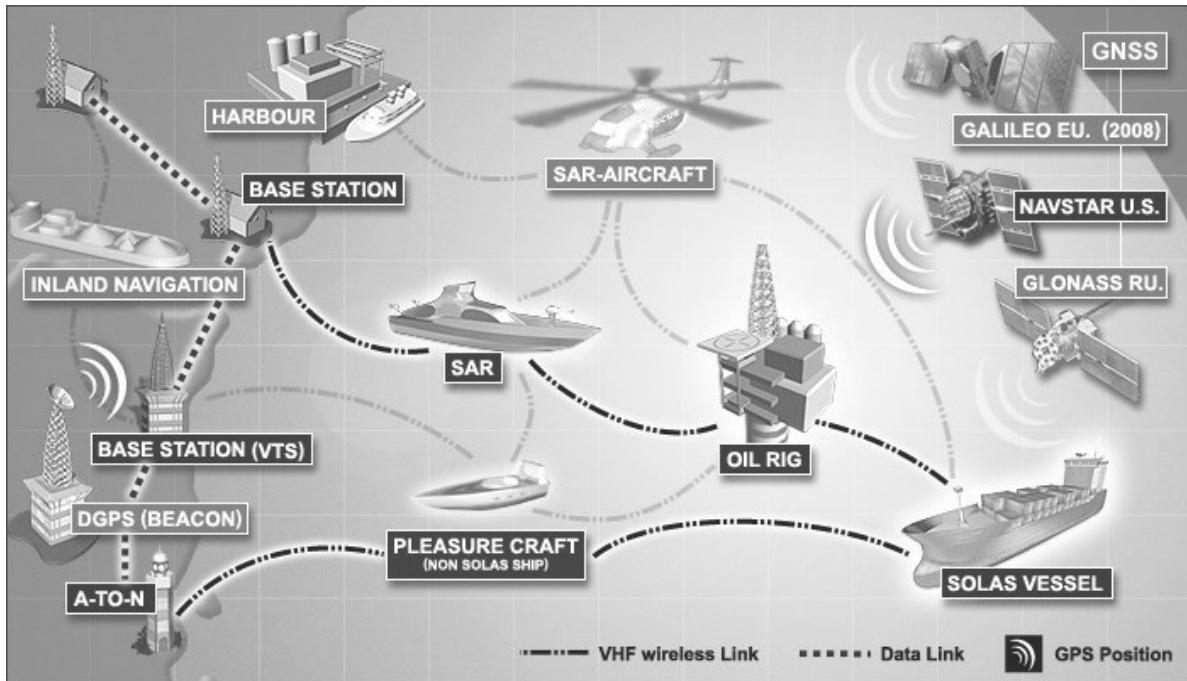


Figure 2 – AIS Network

1.3 Inland AIS

The AIS Inland Standard is an European extension to class A devices for use on inland waterways. AIS Inland transponders support additional messages for communication with Bridges, Ports and locks. Blue Sign or dangerous cargo messages can also be transmitted.

Note:

The NAUTICAST A2 AIS can operate in both modes, standard (SOLAS) class A and Inland, depending the user's needs.

2 System Overview

2.1 Product Description

The NAUTICAST A2 System consists of a transceiver radio unit, a GPS receiver, a controller unit and a colour LCD with a numerical keypad. The radio has three receivers, two tuneable TDMA receivers and one DSC receiver. The transmitter alternates its transmissions between the two operating TDMA. The controller unit creates and schedules data packets (containing dynamic, static and voyage related data) for transmission based on the IMO performance standard for AIS.

The NAUTICAST A2 shall be connected to the ship's sensors as required by the installation guidelines published by IALA. The NAUTICAST A2 can interface external navigation and presentation systems that support required IEC 61162-1 sentences. Refer to chapter 8 for more information. The NAUTICAST A2 is prepared for connection to Long Range systems like Inmarsat C.

The colour LCD and numerical keypad provides a graphical user-friendly interface to the system. It is possible to plot the location of other vessels, aids to navigation and search and rescue vessels. The LCD and numerical keypad can also be used to send and receive messages, perform configuration as well as supervise the systems status.

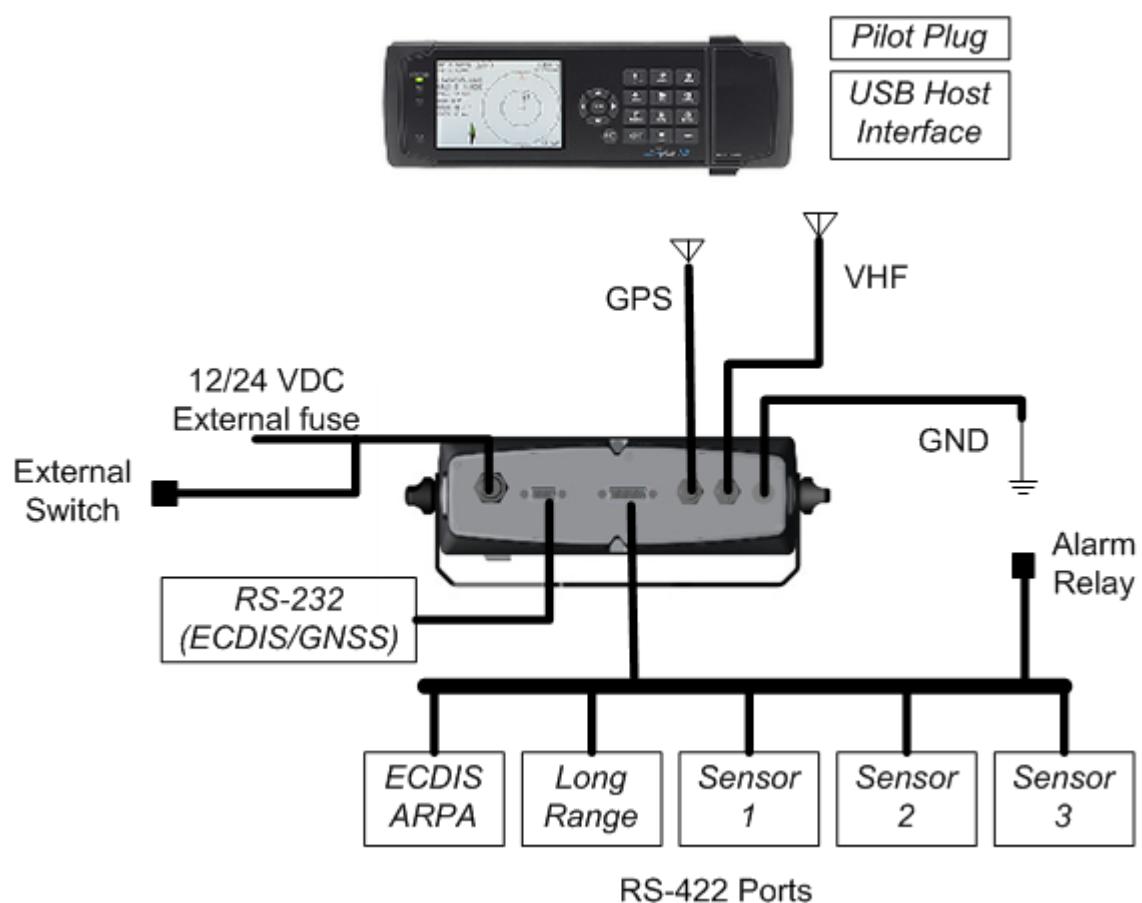


Figure 3 – System Overview

2.2 Main features

- Multi-colour 3.5" LCD with numerical keypad interface.
- USB Host interface for connection of USB keyboard and USB flash memories.
- Individual visual display settings for day and night operations.
- Broadcast of Dynamic, Static and Voyage related information.
- Standardized interface for connection to ship sensors e.g. GNSS, Gyro, Rate of Turn Indicator, ECDIS/ECS and ARPA.
- Plot capable of presenting up to 500 targets in the vicinity of the own ship.
- Messaging views for generation and presentation of safety related messages and text messages.
- Pilot plug integrated to the front of the transponder unit.
- Channel management capability for areas without access to the worldwide allocated AIS frequencies.
- Possibility to generate Long Range AIS reply over satcom equipment such as Inmarsat C.
- In addition to the normal high (12,5W) and low (1W) power mode, the NAUTICAST A2 has a 1W tanker mode in accordance with requirements for tanker operations in port.
- Reception and processing of AIS messages 18,19 and 24A/B as transmitted by AIS Class B 'CS' Transponders.
- Easily upgraded with the latest software release from Nauticast using USB memory.
- Save/Restore configuration using USB Storage.

3 Installation

IMPORTANT: AUTHORITIES MANDATE that after the physical installation has been successfully completed, all ship data and settings be entered into the AIS transponder. See Section 4 for further instructions.

3.1 Installation Requirements

General Requirements

Please note that international conventions, regulations, instructions and guidelines have to be followed when installing the NAUTICAST A2.

The following points must be observed before installation can commence:

- Permission by the local authority to install such a device must be granted.
- Trained service personnel must undertake the installation.
- The NAUTICAST A2 must be fitted in a suitable place on the bridge.
- The VHF and GPS Antennas must be installed in a suitable position, where excellent reception conditions apply (refer to Chapter 3.4)
- All available interfaces must be installed.
- The vessels power supply must suffice, and the GMDSS power supply has to be used.
- Installation of the pilot plug in conning position (close to the pilot's work place).

3.2 Installation Overview

Basic Equipment:

| Name | Part number | Qty. |
|--|-------------|------|
| NAUTICAST A2 AIS Transponder SOLAS Class A & Inland AIS | 1001001 | 1 |
| Documentation for Nauticast A2 | 1001001-1 | 1 |
| Power Cable 2m | 1001002 | 1 |

Table 1 – NAUTICAST A2 Basic Equipment

AIS is considered part of the ship's radio station and is surveyed together with radio installation. Surveys on SOLAS Convention ships should be carried out in accordance with the rules laid down in IMO Res. A 746(18) "Survey Guidelines under the harmonized system of survey and certification" (R) 8, and "Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974."

The NAUTICAST A2 consists of one unit, which integrates all necessary modules.

Step-by-Step Installation Procedure:

When installing the NAUTICAST A2, it is recommended to follow the steps described in this manual. Details of the installation procedure can be found in the coming sections.

Recommended installation steps:

1. Mount the NAUTICAST A2 at conning station
2. Mount the alarm relay unit (if available)
3. Mount the VHF antenna
4. Mount the GPS antenna
5. Connect antennas, all external systems and sensors to the NAUTICAST A2
6. Power up the system
7. Set configuration parameters
8. Perform system functional check
- 9.

3.3 Mounting the NAUTICAST A2

3.3.1 Location

The NAUTICAST A2 should be mounted close to the position from which the ship is normally operated, preferably on the bridge console close to the conning position.

When mounting the NAUTICAST A2, please consider the following:

- The NAUTICAST A2 shall be connected to ship ground using the earth terminal found on the rear plate.
- The temperature and humidity should be moderate and stable at the place of mounting, +15°C to +35°C (Operating temperature: -15°C to +55°C.)
- Select a location away from excessive heat sources

- Ensure that there is enough airflow to avoid high ambient temperatures
- Avoid areas where there is a high flow of humid salt air
- Avoid places with high levels of vibrations and shocks
- Avoid mounting the NAUTICAST A2 in direct sunlight for the best readability
- Ensure that the cables can be connected without violating their minimum bending radius
- The unit can affect magnetic compasses. The minimum compass safe distance is 0.60 meters to a standard magnetic compass and 0.45 meters to a steering magnetic compass

Regarding the physical size please see the Appendix A – Drawings containing all mechanical drawings.

3.4 Mount the NAUTICAST A2 VHF antenna

Interference to the Ship's VHF Radiotelephone

The AIS ship borne equipment, like any other ship borne transceiver operating in the VHF maritime band, may cause interference to a ship's VHF radiotelephone. Because AIS is a digital system, this interference may occur as a periodic (e.g. every 20 seconds) soft clicking sound on the ship's radiotelephone. This affect may become more noticeable if the VHF radiotelephone antenna is located close to the AIS VHF antenna, and when the radiotelephone is operating on channels near the AIS operating channels (e.g. channels 27, 28 and 86). Attention should be paid to the location and installation of the various antennas, in order to support the antenna characteristics in the best possible way.

3.4.1 VHF Antenna Location

Location of the mandatory AIS VHF-antenna should be carefully considered. Digital communication is more sensitive than analogue/voice communication to interference created by reflections caused by obstructions such as masts and booms. It may be necessary to relocate the VHF radiotelephone antenna to minimize interference effects.

To minimize interference effects, the following guidelines apply:

- The AIS VHF antenna should have omnidirectional vertical polarization.
- The AIS VHF antenna should be placed in an elevated position, as free standing as possible, with a minimum of 2 meters in horizontal direction from constructions made of conductive materials. The antenna should not be installed close to any large vertical obstruction. The AIS VHF antenna should have a visible sky of 360°.
- The AIS VHF antenna should be installed at least 3 meters away from interfering high-power energy sources such as radar and other transmitting radio antennas, and out of the way of the transmitting beam.
- There should not be more than one antenna on each level. The AIS VHF antenna should be mounted directly above or below the ship's primary VHF radiotelephone antenna, with no horizontal separation and a minimum of 2 meters vertical separation. If it is located on the same level as other antennas, the distance apart should measure at least 10 meters.

3.4.2 VHF Cabling

The cable should be kept as short as possible to minimize attenuation of the signal. Double shielded coaxial cable equal or better than RG214 is recommended to minimize the effects from electromagnetic interference from high power lines, radar or other radio transmitter cables.

The table below gives recommendation on cables that can be used for the VHF-antenna connections, the cables used should always be of marine approved type. The cable attenuation shall be kept as low as possible; a 3 dB loss is the same as cutting the signal strength in half.

| Type | Attenuation @ 150 MHz (dB/100m) | Ø (mm) | Weight (kg/100m) |
|--------|---------------------------------|--------|------------------|
| RG 214 | 7 | 10.8 | 18.5 |
| RG 217 | 5 | 13.8 | 30.1 |
| RG 225 | 8 | 10.9 | 23.3 |

Table 2 – VHF Antenna Cables

Example: A cable of 40 meter RG 214 has a cable attenuation of 2.8 dB.

All outdoor connectors on the coaxial cables should be fitted with preventive isolation, such as shrink-stocking with silicone to protect the antenna cable against water penetration. Coaxial cables should be installed in

separate signal cable channels/tubes, and at least 10 cm away from any power supply cables. Crossing of cables should take place at right angles (90°). Coaxial cables should not be exposed to sharp bends, which may lead to changes to the characteristic impedance of the cable. The minimum bend radius should be 5 times the cables outside diameter.

Grounding

Coaxial down-leads must be used for all receiving antennas, and the coaxial screen should be connected to the ground at one end.

3.5 Mount the NAUTICAST A2 GPS Antenna

The NAUTICAST A2 shall be connected to a GPS antenna type Procom GPS-4 (1001022), Nauticast Standard GPS antenna (3001002) or to a combined GPS/VHF antenna AC Marine VHF/GPS-2 (1001027). 5V DC is supplied through the antenna lead for the antenna preamplifier.

Please note the Compass Safe Distances in section 6.3 "Transponder Environment".

If the combined AC Marine GPS/VHF antenna is used the diplexer unit shall be installed in an indoor environment.

Attention should be paid to the location and installation of the different antennas on the ship in order to obtain the best possible efficiency. How and where the GPS antenna and cable is installed will greatly affect its sensing efficiency.

3.5.1 GPS Antenna Location

The GNSS antenna must be installed where it has a clear view of the sky, so that it accesses the horizon freely through 360°, with a vertical observation of 5 to 90 degrees above the horizon. Small diameter obstructions, such as masts and booms, do not seriously impair signal reception, but such objects must not eclipse more than a few degrees of any given bearing.

The antenna must be located at least three meters away from, and out of the transmitting beam of high-power transmitters (S-Band Radar and/or Inmarsat systems). This includes the ship's own AIS VHF antenna, if it is designed and installed separately.

If a DGNSS system is included or connected to the AIS system, the installation of the antenna should be undertaken in accordance with IEC 61108-4, Edition 1.

3.5.2 GPS Cabling

The gain of the GPS antenna built-in pre-amplifier shall match the cable attenuation. The resulting installation gain (pre-amplifier gain minus cable attenuation) shall be within 0 to 26 dB. A minimum value of 10 dB is recommended for optimum performance.

A double shielded coaxial cable is recommended. The coaxial cable should be routed directly between the GPS antenna and the NAUTICAST A2 GPS connector in order to reduce electromagnetic interference effects. The cable should not be installed close to high-power lines, such as radar or radio transmitter lines or the AIS VHF antenna cable. A separation of 1 meter or more is recommended to avoid interference due to RF-coupling. Crossing of antenna cables should be done at 90 degrees to minimise magnetic field coupling.

The table below gives recommendation on cables that can be used for the Transponder GPS-antenna connections, the cables used should always be of marine approved type. Due to the high frequency it's important that the attenuation in the cable is low for the specific frequency (1.5 GHz).

| Type | Attenuation @ 1.5 GHz (dB/m) | Ø (mm) | Weight (kg/100m) |
|--------|------------------------------|--------|------------------|
| RG 58 | 0.9 | 5 | 3.7 |
| RG 400 | 0.6 | 4.95 | 6.3 |
| RG 223 | 0.6 | 5.40 | 5.5 |
| RG 214 | 0.35 | 10.8 | 18.5 |
| RG 225 | 0.3 | 10.9 | 23.3 |

Table 3 – GPS Antenna Cables

For optimum performance approximately +10dB gain should be available when the cable attenuation has been subtracted from the GPS-antenna preamplifier gain. The net gain shall not exceed +26dB.

Example:

| Cable type | Preamplifier gain (dB) | Required min cable length (m) | Recommended max. cable length (m) |
|------------|------------------------|-------------------------------|-----------------------------------|
| RG 58 | 12 | 0 | 2 |
| RG 58 | 26 | 0 | 18 |
| RG 58 | 30 | 4.5 | 22 |
| RG 223 | 12 | 0 | 3.5 |
| RG 223 | 26 | 0 | 26.5 |
| RG 223 | 30 | 6.5 | 33.5 |
| RG 214 | 12 | 0 | 6 |
| RG 214 | 26 | 0 | 46 |
| RG 214 | 30 | 11.5 | 57 |

Table 4 – GPS Antenna Cable Examples

Min length = (Preamp. Gain – 26 dB)/Cable attenuation per meter

Max length = (Preamp. Gain – 10 dB)/Cable attenuation per meter

Coaxial cables (marine approved type) should be installed in separate signal cable channels/tubes and at least 10 cm away from power supply cables. Crossing of cables should be done at right angles (90°).

Coaxial cables should not be exposed to sharp bends, which may lead to a change of the characteristic impedance of the cable. The minimum bending radius should be 5 times the cable's diameter.

All outdoor installed connectors should be weather proofed, e.g. with shrink tubing, watertight seal tape or butyl rubber tape and plastic tape sealing, to protect against water penetration into the antenna cable.

Secure the cable properly near the cable ends.

Grounding

Coaxial down-leads must be used. The coaxial shielding screen should be connected to ground at one end.

3.6 Electrical Installation

The protocol of the serial port interfaces is compliant to IEC 61162-1Ed.4 (2010-11).

All serial ports in the NAUTICAST A2 have the same capabilities with one exception, any Long Range equipment must be connected to the Long Range port.

The primary external position sensor should be connected to the Sensor 1 port since this port has the highest priority. The serial ports in the NAUTICAST A2 can also receive differential corrections in RTCM format for correction of the internal GPS receiver. The ports in the NAUTICAST A2 have different default baud rates but they can all be configured to any baud rate of 4800, 9600, 38400, 57600 or 115200 bps. The priority levels for input of sensor data on the different ports are listed below:

| Priority | Identification | Default Baud Rate | Port direction |
|------------------------|----------------|-------------------|--------------------------------|
| 1 (Highest priority) | Sensor 1 | 4800 bps | Input (See note 1) |
| 2 | Sensor 2 | 4800 bps | Input |
| 3 | Sensor 3 | 4800 bps | Input |
| 4 | ECDIS | 38400 bps | Input / Output (See note 2) |
| 5 | Long Range | 9600 bps | Input / Output (See note 2) |
| 6 | Pilot | 38400 bps | Input / Output (See note 2) |
| 7 (Lowest priority) | RS-232 | 38400 bps | Input / Output (See note 2) |

Table 5 Port Priorities and Default Baud Rates

NOTE 1: This means that if valid position data from external position sources are input on e.g. both Sensor 1 and ECDIS port, the position data from Sensor 1 will be used.

NOTE 2: Output will be limited if baud rate is below 38400 bps. VDM and VDO messages will not be output.

If the same data is provided using different NMEA sentences on the same port, the priority depends on the

sentence in accordance with Table 6.

| Priority | Position | COG/SOG | HDG | ROT |
|-----------------|-----------------|----------------|------------|------------|
| 1 (Highest) | RMC | RMC | THS | ROT |
| 2 | GNS | VTG | HDT | - |
| 3 | GGA | VBW | OSD | - |
| 4 | GLL | OSD | - | - |

Table 6 – Sentence priority

3.6.1 Output Drive Capacity for Serial Ports

Each serial port transmitter in the NAUTICAST A2 can have a maximum of 25 listeners consuming 2.0 mA each.

3.6.2 Input Load

Input impedance for each listener input is 6.4 kΩ.

3.6.3 Schematics of a NAUTICAST A2 Serial Transceiver

Each of the RS422 serial interfaces on the NAUTICAST A2 fulfils the requirements of IEC 61162-2 and IEC 61993-2. A detailed schematic of one of the serial ports in the NAUTICAST A2 is shown below.

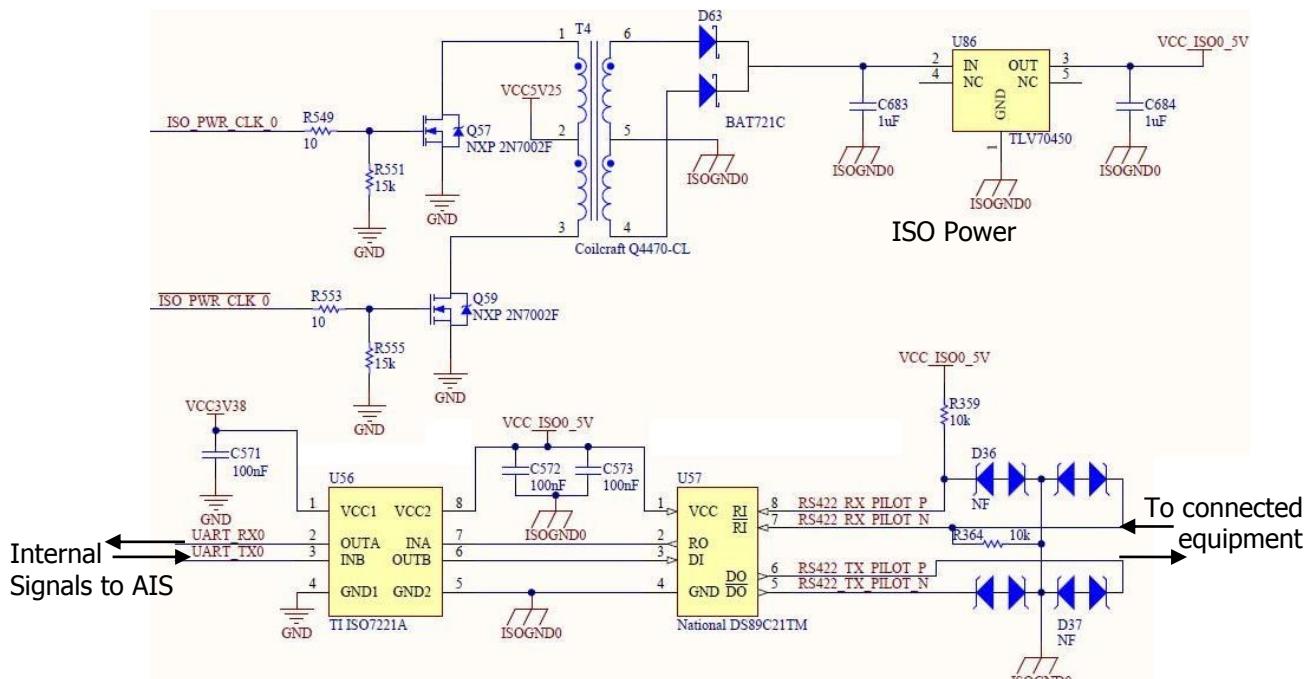


Figure 4 – Serial Port Schematics

3.6.4 Data Interface Cable with open ends, 1001003

| Pin | In/Out | Signal Name | Signal Type | Colour |
|------------|---------------|----------------------|----------------------|----------------|
| 1 | Out | ECDIS - TxB (+) | RS422 | White |
| 2 | Out | ECDIS - TxA (-) | RS422 | Brown |
| 3 | In | Sensor1 - RxB (+) | RS422 | Green |
| 4 | In | Sensor1 - RxA (-) | RS422 | Yellow |
| 5 | In | Sensor2 - RxB (+) | RS422 | Grey |
| 6 | In | Sensor2 - RxA (-) | RS422 | Pink |
| 7 | In | Long Range - RxB (+) | RS422 | Blue |
| 8 | In | Long Range - RxA (-) | RS422 | Red |
| 9 | - | Long Range - GND | RS422 | Black |
| 10 | - | ECDIS - GND | RS422 | Violet |
| 11 | In | ECDIS - RxB (+) | RS422 | Grey / Pink |
| 12 | In | ECDIS - RxA (-) | RS422 | Red / Blue |
| 13 | - | Sensor1 - GND | RS422 | White / Green |
| 14 | - | Sensor2 - GND | RS422 | Brown / Green |
| 15 | In | Sensor3 - RxB (+) | RS422 | White / Yellow |
| 16 | In | Sensor3 - RxA (-) | RS422 | Yellow / Brown |
| 17 | Out | Long Range - TxB (+) | RS422 | White / Grey |
| 18 | Out | Long Range - TxA (-) | RS422 | Grey / Brown |
| 19 | - | Alarm Relay - GND | - | White / Pink |
| 20 | Out | Alarm Relay - Out | - | Pink / Brown |
| 21 | - | GND | - | White / Blue |
| 22 | - | - | - | Brown / Blue |
| 23 | - | Sensor3 - GND | RS422 | White / Red |
| 24 | - | Alarm Relay - VCC | - | Brown / Red |
| 25 | In/Out | CAN (+) | Differential CAN bus | White/Black |
| 26 | In/Out | CAN (-) | Differential CAN bus | Brown/Black |

Table 7 – 26-pin High Density D-sub

3.6.5 RS232 Data Cable

| Pin | Signal Name |
|------------|-----------------------|
| 1 | Not Connected |
| 2 | Tx (Transponder side) |
| 3 | Rx (Transponder side) |
| 4 | Not Connected |
| 5 | GND |
| 6 | Not Connected |
| 7 | Not Connected |
| 8 | Not Connected |
| 9 | Not Connected |

Table 8 – 9-pin female D-sub

3.6.6 Power Cable, 1001002

| Pin | Signal Name | Colour |
|-----|---------------------|--------|
| 1 | 24VDC positive | Red |
| 2 | GND | Black |
| 3 | External Switch (R) | Brown |
| 4 | External Switch (F) | Orange |

Table 9 – 4-pin male circular ConXall

3.6.7 External Switch

The Power Cable enables connection of an external switch to the NAUTICAST A2. This switch can be used as a Silent switch or, if configured as an Inland AIS system, as a Blue sign switch.'

3.6.7.1 Blue Sign installation (Inland Mode only)

If the blue sign switch should be used, the parameter "External Switch" must be configured to "Blue Sign" in Misc. Interface view accessed from *Main Menu → Config → Interfaces → Miscellaneous*.

The status of the blue sign can be controlled by input on the brown and orange wires of the Power Cable.

The status of the Blue Sign will be read by the NAUTICAST A2 and output on the VHF data link when operating in "Inland Mode" (see section 4.4.16 for more details). Connect the blue sign switch to pin 3 (brown wire) and pin 4 (orange wire) of the Power Cable together with an external parallel resistor. When the switch is open, blue sign will be off. When the switch is closed, blue sign will be on.

The external resistor value depends on the power supply voltage the NAUTICAST A2 is using:

- 12V: 2.2kΩ resistor, 10% tolerance, at least $\frac{1}{8}$ W power rating
- 24V: 10kΩ resistor, 10% tolerance, at least $\frac{1}{8}$ W power rating

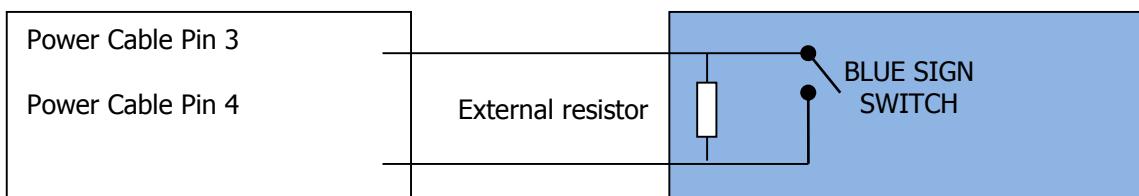


Figure 5 – Blue Sign Switch

3.6.7.2 Silent switch installation

It is possible to connect a silent switch to the NAUTICAST A2 to quickly turn off transmissions.

If a silent switch is to be used, the parameter "External Switch" must be configured to "Silent Switch" in Misc. Interface view accessed from *Main Menu → Config → Interfaces → Miscellaneous*.

The silent switch should be connected in the same way as the blue sign switch. However, the external resistor may be omitted for the silent switch.

When the circuit is closed (brown and orange wires connected with each other), the NAUTICAST A2 will transmit as normal. When the circuit is open, the NAUTICAST A2 will be completely silent.

3.6.8 Alarm Relay

It is required that the AIS alarm output (relay) is connected to an audible alarm device or the ship's alarm system, if available.

Alternatively, the ship's BIIT alarm system may use the alarm messages output on the AIS Presentation Interface (PI) provided the alarm system is AIS compatible. The AIS Alarm Relay is either mounted directly on a board or on the wall.

The alarm relay wires have the following colour codes in the 26-pole NAUTICAST A2 data interface cable:

| | |
|-----------|--------------|
| RELAY VCC | Brown/Red |
| RELAY GND | White / Pink |
| RELAY OUT | Pink / Brown |

Table 10 – Alarm Relay Wires

Figure 6 shows the alarm relay and its dimensions and explains how to connect the alarm relay to the data cable and how to connect the load (Alarm Circuit) to the alarm relay. The operating voltage of the alarm relay is 3 to 60 VDC with a load current of 0.1 to 2 A (3A when using a heat sink).

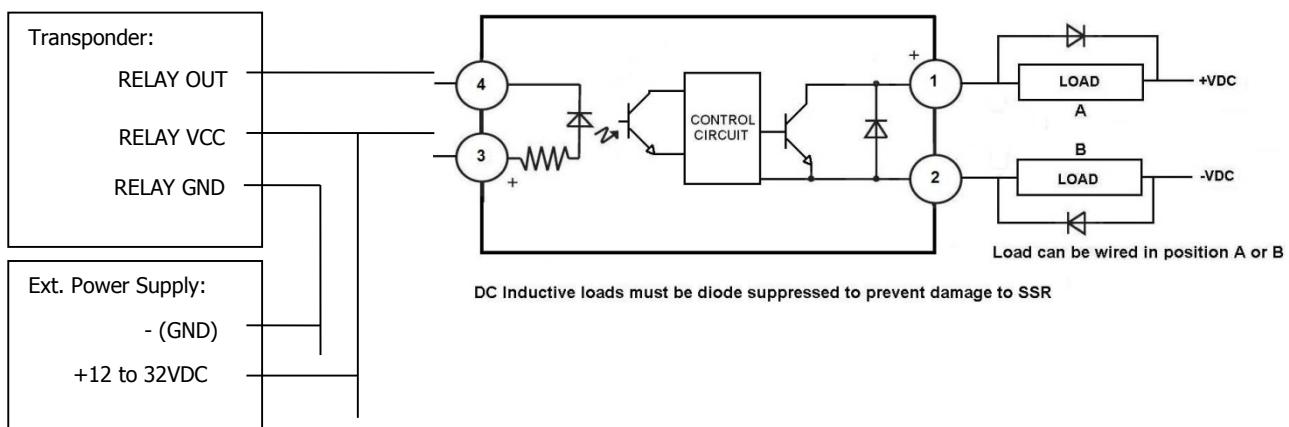
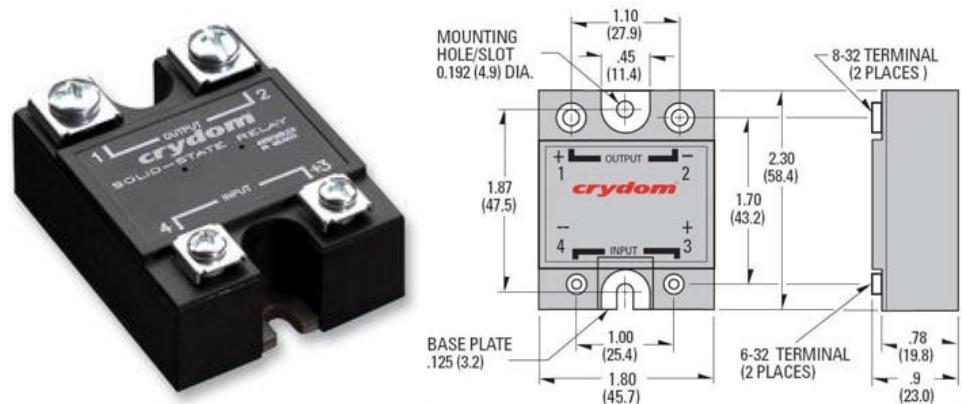


Figure 6 – Alarm Relay

3.7 System Configuration

When the physical and electrical installation of the system is complete, the NAUTICAST A2 needs to be configured. The installer is required to set the parameters listed below. For detailed information about the configuration parameters and how to set them, refer to section 4.2.1 and 4.4.

- MMSI number (Maritime Mobile Service Identity)
- IMO vessel number (should be set to zero for Inland vessels)
- Call Sign
- Ship Name
- Ship Type (Only when operating in Class A mode)
- Height Over Keel
- Ship dimensions and antenna positions. Refer to section 4.4.4 Main Menu → Config →Ship Dimensions for more information.

If the NAUTICAST A2 is operating in Inland mode, the following parameters also need to be configured:

- ENI, Unique European Ship Number
- ERI Ship Type (ERI code and standard AIS ship type will be set automatically by the NAUTICAST A2 when selecting an ERI Ship Type from list in Ship Static view.
- Quality setting for SOG, COG and HDG. Should be set to low if no type approved sensor (e.g. a gyro or speed log) is connected to NAUTICAST A2.

When the NAUTICAST A2 has been installed according to the procedures described in previous sections, it is recommended to make a first functional check of the system. Check the following things to ensure that the NAUTICAST A2 is fully functional.

- Check the Transmitted Own Ship Data view to make sure that the configured data is sent by the NAUTICAST A2 on the VHF link, refer to section 4.10 "View Transmitted Own Ship Information" for more information.
- Make sure that there are no unexpected active alarms in the alarm list, see section 4.18 "Alarms".
- Perform a communication test to ensure that the NAUTICAST A2 can send and receive messages from other AIS transponders. Refer to section 4.25 "Communication Test" for information on how to perform a communication test.

4 Operation

4.1 System Mode

The NAUTICAST A2 can operate in two different system modes, Class A mode and Inland mode. The Class A mode should be used for vessels falling under the carriage requirements of Chapter V of the International Convention for the Safety of Life at Sea (SOLAS).

The Inland mode should be used for vessels travelling on European inland waterways that falls under the carriage requirements of European River Information Services (RIS). When Inland mode is enabled, additional views for ETA/RTA messaging and convoy settings will be enabled. The NAUTICAST A2 will also output binary messages with Inland Static and Voyage data.

As default, the NAUTICAST A2 will operate in Class A mode. It is possible to switch system mode in the System Settings view, see section 4.4.16 for more information.

4.2 LED's and Controls

This section describes the controls and status LED's on the front panel of the NAUTICAST A2. It is also possible to connect a USB keyboard via the USB Host interface that can be found under the hatch of the front panel.



Figure 7 –Nauticast A2 Front View

1. STATUS LED (multi-colour)

This LED is constant green when the transponder is operating and no alarms are active. The LED is constant red if there is an active alarm and it is flashing red if there is an unacknowledged alarm.

2. RX LED (yellow)

This LED is flashing yellow when the transponder is receiving a message on the VHF link.

3. TX LED (red)

This LED is flashing red when the transponder is transmitting a message on the VHF link.

4. LIGHT SENSOR

The light sensor will automatically dim the backlight of the display depending on measured input light to the sensor.

5. ARROW KEYPAD and ENTER

The arrow keypad (< > and ^ v) is used to navigate in menus, lists and edit fields. The center button of the keypad is an **ENTER** button which is used to select the highlighted choice in a menu, list or edit control.

6. ESC

The **ESC** button is used to return to the previous screen or to cancel an edit change of a data field.

7. ALPHANUMERIC KEYS

These keys are used for entering text and numbers. To write a number in a numeric field, press the key once. To write a character in a text field, press once for the character associated with the key, twice for the second character and so on. When pressing twice on key "1" when editing a text field, a popup view with special characters appears. Choose the desired special character by using the **ARROW KEYPAD** and **ENTER**.

When a USB keyboard is used, the normal letters, numbers and special characters can be used. Only American keyboard layout is supported.

8. OPT

This button is an "Option key" which is only active in some of the dialogs. When pressed, it gives the user a list of options that can be performed on the highlighted item. In e.g. the Target List view the **OPT** button can be used to send an SRM to the highlighted target. In the Main Menu view, the **OPT** button is used to quickly change navigational status. When a USB keyboard is used, the **ALT** button of the keyboard corresponds to **OPT** button on the NAUTICAST A2 keypad.

If the **OPT** button is pressed for more than 5 seconds, the visual settings in the NAUTICAST A2 will be restored to default, i.e. LCD backlight, LED intensity and button backlight will all be 80% and day mode will be used.

9. BACKSPACE

The **BACKSPACE** button is used to erase the character to the left of the marker in an edit field.

4.2.1 Change Settings of a Parameter

Several of the views in the NAUTICAST A2 contain parameters that can be edited. To edit a parameter, select it by using the **ARROW KEYPAD** and press **ENTER**.

Then enter data in one of the following ways:

- **Numbers:** Press the **ALPHANUMERIC KEY** that corresponds to each digit. To delete a digit, press function key **BACKSPACE**. Some of the parameters are decimal numbers. The **OPT** button can then be used to insert a decimal point.
- **Text:** Press the **ALPHANUMERIC KEY** that corresponds to each character. Press the key once for the first character, twice for the second character and so on. Press the key "1" twice to, where allowed, bring up a menu for entering special characters. To delete a character, press function key **BACKSPACE**. When entering passwords both lower and upper case letters can be used. To change between upper and lower case letters, press function key **OPT** and choose "Caps Lock Off" or "Caps Lock On".
- **List of predefined values:** Use the **A** **V** keys to select between the predefined values.
- **List of predefined values and numeric input:** In some of the views like the AIS Message Send view where it is possible to send an SRM to a target, it is possible to select an MMSI in a list of predefined values. The predefined MMSI values are the MMSI numbers that have been received by the transponder. It is also possible to enter a new MMSI number that has not been received yet. To do this, simply input a numerical value with the **ALPHANUMERIC KEYS**.

Press **ENTER** when done. If desired, use the **ARROW KEYPAD** keys to select a new parameter to be edited, or navigate to the Save/Send button located above the list of parameters and press **ENTER** to save the parameters / send the message.

Use the **ESC** key to undo changes and to return to the previous view.

NOTE: DO NOT TURN OFF TRANSPONDER WITHIN 2 SECONDS OF A PARAMETER CHANGE!

4.3 Main Menu – Tree View

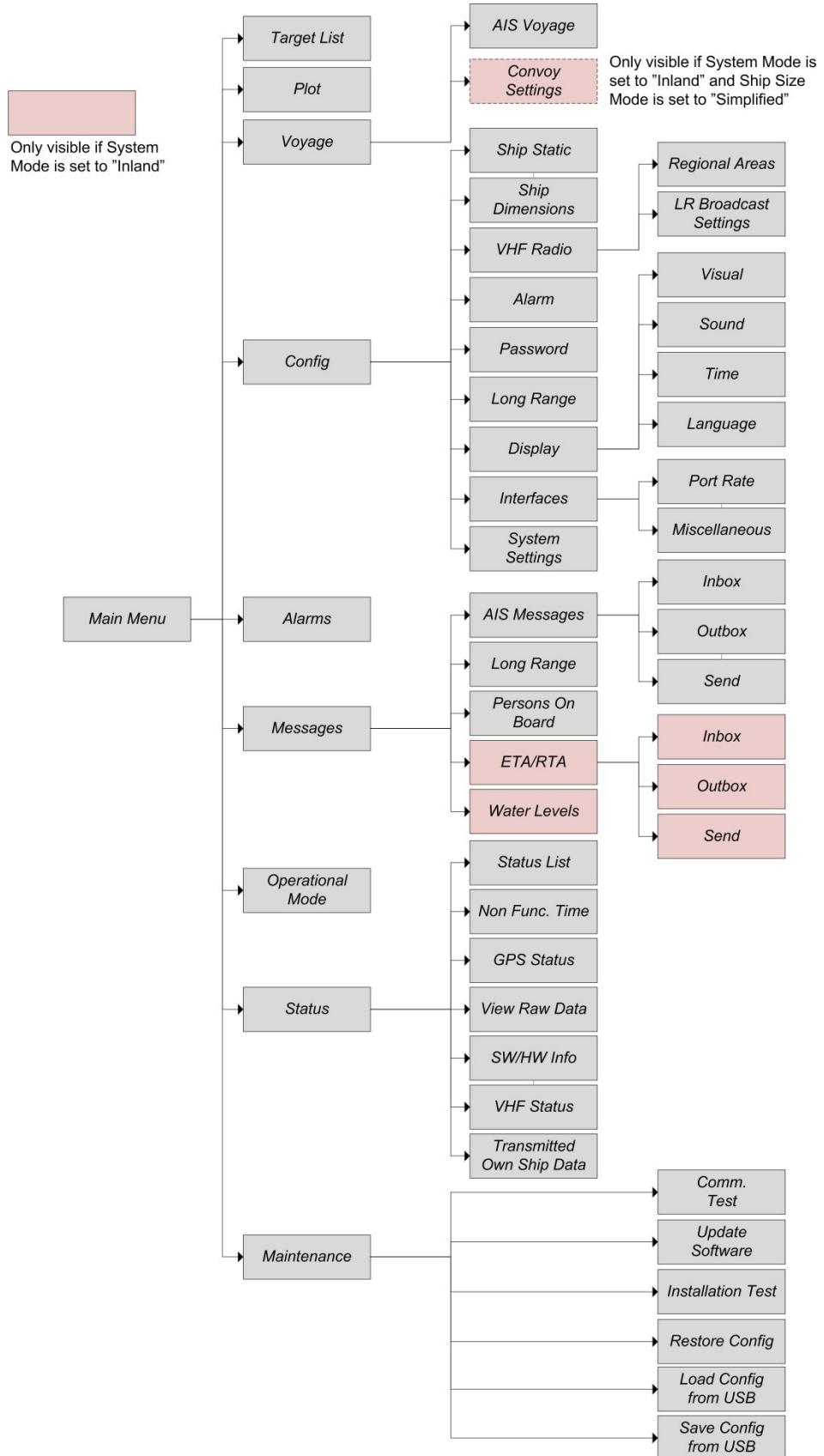


Figure 8 – Menu Tree

4.3.1 Navigating in Menus

Use the **ARROW KEYPAD** buttons < > and **Λ** **∨** to navigate between the view buttons in the different menus. Press the **ENTER** button to enter the currently selected view. It is also possible to directly select a view by pressing the **ALPHANUMERIC KEY** that corresponds to the number in the upper left corner of the view button.

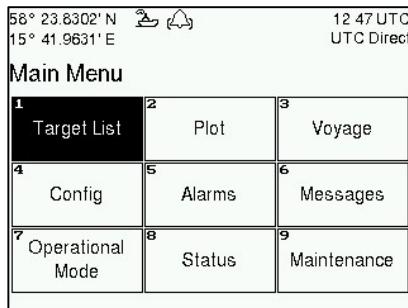


Figure 9 – Main Menu

4.4 Configuration Parameters

This section describes the different configuration parameters that can be set in the NAUTICAST A2. Some of the parameters will only be available when operating in "Class A" mode; these parameters are marked with light grey. Parameters that are only available when operating in "Inland" mode are marked with dark grey. Common parameters for both system modes are white.

4.4.1 Main Menu → Voyage →AIS Voyage

The parameters in AIS Voyage view are used for input of voyage specific information that is sent over the AIS link. These parameters should typically be configured before each voyage.

When the NAUTICAST A2 system mode is set to "Inland", additional voyage parameters for inland water way voyages are available. The system mode can be configured in the System Settings view described in section 4.4.16.

| Parameter Name | Description |
|---------------------------------|--|
| Navigational Status | Changes the navigational status reported by own ship. It is also possible to quickly change navigational status by pressing the OPT button when standing in the Main Menu. |
| Destination | The destination for the current voyage |
| Estimated Time of Arrival (ETA) | The estimated time of arrival to destination of current voyage |
| Draught (Class A) | The vertical distance measured from the lowest point of a ship's hull to the water surface, in meters (one decimal precision) |
| Persons on Board | Total number of persons on board |
| Hazardous Cargo (X,Y,Z,OS) | Classification of current cargo according to X,Y,Z,OS |
| Draught (Inland) | The vertical distance measured from the lowest point of a ship's hull to the water surface, in meters (two decimal precision) |
| Air Draught | The vertical distance measured from the ship's waterline to the ship's highest point, in meters (two decimal precision) |
| Hazardous Cargo (Blue Cones) | Blue cone classification of cargo |
| Loaded / Unloaded | Specifies if the ship cargo is loaded or unloaded |
| Crew Members | Number of crew members on board |
| Passengers | Number of passengers on board |
| Personnel | Number of shipboard personnel on board |

4.4.2 Main Menu → Operational Mode

| Parameter Name | Description |
|----------------|---|
| Tx Mode | This parameter determines the transmission of the NAUTICAST A2. If set to "Silent", the NAUTICAST A2 will be completely silent on the VHF radio and it will not answer on interrogations. If a silent switch is used, this parameter will be locked and "Silent Switch Used" will be displayed as parameter value. |

4.4.3 Main Menu → Config → Ship Static

| Parameter Name | Description |
|------------------|---|
| MMSI | Maritime Mobile Service Identity reported by own ship |
| IMO | International Maritime Organization number reported by own ship |
| Ship Name | Ship name reported by own ship |
| Call Sign | Call sign reported by own ship. Shall be set to ATIS code for Inland vessel installations. |
| Height over Keel | Height over keel in meters (one decimal precision). Height over Keel information is sent as a response to an "Extended Ship Static and Voyage Related Data" request message. |
| Ship Type (IMO) | Type of Ship according to ITU-R M.1371-4. Both numerical input and selection from list is possible. |
| ENI | Unique European Vessel Identification Number reported by own ship |
| ERI Ship Type | Ship or combination type according to numeric ERI classification. Both numerical input and selection from list is possible. See chapter 10.1 "Inland ERI Ship Types" for available types. |
| Quality Speed | Shall be set to low if no type approved speed sensor is connected to transponder |
| Quality Course | Shall be set to low if no type approved course sensor is connected to transponder |
| Quality HDG | Shall be set to low if no type approved heading sensor is connected to transponder |

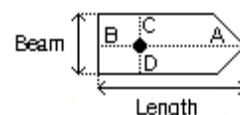
4.4.4 Main Menu → Config → Ship Dimensions

The parameters in the Ship Dimensions view depends on the configuration parameter "Ship Size Mode" in the Misc Interfaces view. The Ship Size Mode parameter can be set to either Standard or Simplified (default). The Ship Size Mode affects how the user should input ship size and antenna position information and how it is interpreted.

Standard Mode

In this mode the user must input:

- Convoy/ship length [m] (one decimal precision)
- Convoy/ship beam [m] (one decimal precision)
- A, B, C, D for internal antenna [m]
- A, B, C, D for external antenna [m]



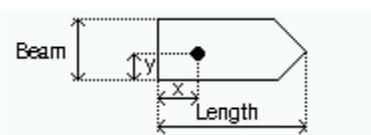
It is the users responsibility to input correctly rounded data ($A+B = \text{Convoy/ship length}$ rounded up, $C+D = \text{Convoy/ship beam}$ rounded up).

If the user inputs data which is not correctly rounded the "Ship size mismatch" alarm will be activated.
The output on the AIS data link will be exactly the values input by the user.

Simplified Mode (default)

In this mode the user inputs:

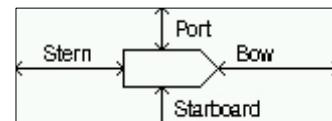
- Ship length [m] (one decimal precision)
- Ship beam [m] (one decimal precision)
- X, Y for internal antenna relative to ship [m] (one decimal precision),
- X, Y for external antenna relative to ship [m] (one decimal precision)



When operating in Inland Mode, extra convoy size can be added to ship dimension

Extra convoy size on each side (value = 0 if convoy not used):

- *Bow [m]* (one decimal precision)
- *Stern [m]* (one decimal precision)
- *Port side [m]* (one decimal precision)
- *Starboard [m]* (one decimal precision)



The extra convoy parameters can be configured from **Main Menu→Voyage→Convoy Settings** when the Ship Size Mode is set to "Simplified".

In this mode there is no way for the user to input mismatching data, all parameters uses the same precision and each measurement is entered only once (in standard mode it is for example possible to enter three different lengths of ship: *Convoy/ship length*, *internal A+B* and *external A+B*). In simplified mode the transponder will automatically calculate and correctly round the A, B, C and D values reported on the VHF link.

4.4.5 Main Menu → Config → VHF Radio → Regional Areas

This view shows the regional areas set in the transponder. To make a new regional area or to edit or delete an existing regional area, press the **OPT** button and choose the desired action. The following parameters can be edited when "New Area" or "Edit Area" is chosen:

| Parameter Name | Description |
|----------------|--|
| Channel A | The channel number for AIS channel A (2087 = default) that should be used in the regional area. |
| Channel B | The channel number for AIS channel B (2088 = default) that should be used in the regional area. |
| Zone Size | The transitional zone size of the regional area in nautical miles (NM). |
| Tx Mode | Decides on which channels the transponder will use when transmitting in the regional area. When set to "Silent", the transponder will stop automatic transmissions on AIS channels A and B. |
| Power | Output power for the transponder in the regional area. High = 12.5 W, Low = 1 W. |
| LAT NE | The latitude for the North East corner of the regional area |
| LON NE | The longitude for the North East corner of the regional area |
| LAT SW | The latitude for the South West corner of the regional area |
| LON SW | The longitude for the South West corner of the regional area |

4.4.6 Main Menu → Config → VHF Radio → LR Broadcast Settings

| Parameter Name | Description |
|--------------------|---|
| LR Broadcast Ch. 1 | The first channel number for broadcasting long range message 27. The message is sent every 6 minutes on each channel so if both channels are configured a message 27 will be broadcasted every 3 minutes. If this parameter is set to zero no long range broadcast transmissions will be sent on this channel. |
| LR Broadcast Ch. 2 | The second channel number for broadcasting long range message 27. The message is sent every 6 minutes on each channel so if both channels are configured a message 27 will be broadcasted every 3 minutes. If this parameter is set to zero no long range broadcast transmissions will be sent on this channel. |

4.4.7 Main Menu → Config → Alarm

In this view all alarms can be configured to either "Enabled" or "Disabled". When the alarm is enabled, an active alarm will affect the external alarm relay, the buzzer in the NAUTICAST A2 and show a popup dialog in the display. When the alarm is set to disabled it will not affect anything when the alarm becomes active. For more information about the alarm view, refer to section 4.18 "Alarms". For a list of all the alarms that can occur, refer to section 7.3 "Troubleshooting with Alarm Messages."

4.4.8 Main Menu → Config → Password

| Parameter Name | Description |
|--------------------|--|
| New User Password | Changes the user level password for the NAUTICAST A2. The default user level password is "user" |
| New Admin Password | Changes the admin level password for the NAUTICAST A2. The default admin level password is "admin" |
| Restore Code | It is possible to restore both user password and admin password to the default values above with a secret restore code. To obtain the restore code, contact Nauticast Technical Support and be prepared to provide the serial number of the transponder unit. |

4.4.9 Main Menu → Config → Long Range

| Parameter Name | Description |
|--------------------------|---|
| Reply Mode | When set to "Auto" the NAUTICAST A2 will automatically respond to any Long Range interrogation messages. When set to "Manual" the operator is responsible for sending a response or refusal to any Long Range interrogation message. This can be done from the <i>Long Range</i> view that is accessed from <i>Main Menu → Messages → Long Range</i> . For more information see section 4.14 "Long Range Interrogations". The information that is sent in a response is automatically filled in by the NAUTICAST A2 depending on the Long Range filter settings (the parameters below). |
| Ship ID (A) | Filter setting that defines if a Long Range response message should include ship name, call sign and IMO number. |
| Message Date/Time (B) | Filter setting that defines if a Long Range response message should include information about date and time of message composition. |
| Latitude / Longitude (C) | Filter setting that defines if a Long Range response message should include position. |
| Course Over Ground (E) | Filter setting that defines if a Long Range response message should include COG. |
| Speed Over Ground (F) | Filter setting that defines if a Long Range response message should include SOG. |
| Destination And ETA (I) | Filter setting that defines if a Long Range response message should include destination and ETA. |
| Draught (O) | Filter setting that defines if a Long Range response message should include draught. |
| Ship Type And Cargo (P) | Filter setting that defines if a Long Range response message should include ship type and cargo information. |
| Ship Size And Type (U) | Filter setting that defines if a Long Range response message should include ship's length, beam and type. |
| Persons On Board (W) | Filter setting that defines if a Long Range response message should include number of persons on board. |

4.4.10 Main Menu → Config → Display → Visual

It is possible to completely turn off the backlight on LCD, buttons and LED's. It may then be difficult to read the NAUTICAST A2 display and find the way to the correct configuration parameter in order to increase the backlight again. If this should happen, it is possible to hold down the **OPT** button for 5 seconds to restore the backlight to 80%.

| Parameter Name | Description |
|---------------------|--|
| Dimming Mode | If set to "Manual", the LCD backlight, button backlight and LED brightness are controlled by the user with the parameters described below. If set to "Automatic", the LCD backlight, button backlight and LED brightness will automatically be controlled with the light sensor on the front of the NAUTICAST A2. The less ambient light registered by the light sensor, the lower percentage of backlight and brightness will be used. |
| Toggle Day/Night | Toggle between day or night mode. In Day mode the display background is white and in night mode the background is black. There are also separate settings for the LCD backlight, LED intensity and button backlight in the different day/night modes. |
| Backlight | Changes the LCD backlight where 0% is completely turned off and 100 % is maximum brightness. |
| LED Light Intensity | Changes the light intensity of the three LED's on the front of the NAUTICAST A2. It is possible to turn off the LED's completely by setting a 0% light intensity. However, if there is an active, unacknowledged alarm in the NAUTICAST A2, the light intensity of LED's will temporarily be set to 10% until the alarm is acknowledged. |
| Button Illumination | Changes the brightness of the button backlight on the NAUTICAST A2. |

4.4.11 Main Menu → Config → Display → Sound

| Parameter Name | Description |
|-----------------------|---|
| Alarm Waiting For ACK | Determines how the NAUTICAST A2 sound buzzer should behave when an alarm is active and waiting for acknowledgement. This setting does NOT affect the behavior of the alarm relay or any external alarm system. |
| Long Range Message | Controls the behaviour of the NAUTICAST A2 sound buzzer when an LR interrogation message is received. |
| AIS Message | Controls the behaviour of the NAUTICAST A2 sound buzzer when a SRM or binary text message is received. |
| Inland RTA | Controls the behaviour of the NAUTICAST A2 sound buzzer when an Inland RTA (Recommended Time of Arrival) message is received. |

4.4.12 Main Menu → Config → Display → Time

| Parameter Name | Description |
|----------------|---|
| Time Zone | This parameter defines if the times that are displayed in the NAUTICAST A2 should be in UTC or LOC (local) time. If local time is chosen, the offset from UTC must be specified with the three parameters listed below. |
| Offset sign | The sign of the local time offset from UTC. |
| Hours | The local time hour offset from UTC. |
| Minutes | The local time minute offset from UTC. |

4.4.13 Main Menu → Config → Interface → Language

| Parameter Name | Description |
|----------------|---|
| Language | Changes the language in all the menus and views of the NAUTICAST A2. The changes will take effect immediately when pressing "Save". |

4.4.14 Main Menu → Config → Interface → Port Rate

| Parameter Name | Description |
|----------------|--|
| Baud Rate | Changes the baud rate (bits per second) for the corresponding serial port. |
| Checksum | When set to "Required", all messages that are input on the corresponding serial port to the NAUTICAST A2 must have a valid checksum. When set to "Disabled", messages both with and without checksum are accepted on the corresponding serial port. |

4.4.15 Main Menu → Config → Interface → Miscellaneous

| Parameter Name | Description |
|-------------------------|--|
| SSD Password | Changes the value of the SSD password level. When set to "None", no password is required when configuring the transponder with an SSD sentence from e.g. an ECDIS via the serial port interface. When set to "User", an SPW sentence with the correct user level password must be sent before the SSD on the serial port interface. |
| Ship Size Mode | This affects how the user should input the ship size, convoy size and antenna positions. See section 4.4.4 for more details. |
| AIS GPS Output Port | Defines on which serial port the NAUTICAST A2 should output data from the internal GPS. When set to "None" no internal GPS data will be output. |
| External Switch | This parameter specifies if there is a blue sign switch or silent switch connected to the orange and brown wires of the NAUTICAST A2 Power Cable. If no switch is used, set the parameter to "No Function". See sections 3.6.7.1 and 3.6.7.2 for more information about the blue sign switch and silent switch. |
| Require Text Msg ACK | This parameter determines if an ACK msg is required as a response when sending addressed binary text messages to another target. |
| Automatic PoB Broadcast | Enable automatic 6 minute periodic broadcast of passenger information. See section 4.13 for details on message types. |

4.4.16 Main Menu → Config → System Settings

| Parameter Name | Description |
|----------------|---|
| System Mode | Determines if the NAUTICAST A2 should operate as a Class A transponder or as an Inland transponder. This parameter affects which config parameters and menus that are visible in the system. |
| Range Unit | This parameter determines the unit for the range value of targets in the Target List, Extended Info view and Plot view. The range value can be calculated in nautical mile (NM), kilometre (km) or statute mile (Sm). |
| Speed Unit | This parameter determines the unit for the SOG value of targets in Extended Info view and Plot view. The SOG values can be calculated in knots (kn), kilometres per hour (km/h) or miles per hour (mph). |
| Plot Compass | This parameter determines how the plot of AIS targets should be oriented. |

| | |
|--|--|
| | If set to "North Always Up", the plot will always have north up and own ship will rotate according to heading input. If set to "Own Ship Bow Always Up", the plot will always have own ship pointing up and rotate the rest of the plot according to heading input. |
|--|--|

4.4.17 Main Menu → Maintenance → Installation Test

| Parameter Name | Description |
|--------------------|---|
| Sensor Data Source | This parameter specifies which port the NAUTICAST A2 should use as its external sensor source. The default value of this parameter is "Automatic" which means that the NAUTICAST A2 will accept sensor information on any port and use the information on the port with highest priority. If Sensor Data Source is set to anything other than "Automatic", the NAUTICAST A2 will only accept sensor information if it comes from the port specified by this parameter. The parameter reverts to "Automatic" after a reboot. |
| SART Test Mode | This parameter determines if SART Test targets should be displayed in Target List and Plot views of the NAUTICAST A2. It also controls if connected systems, for example ECDIS, will receive SART Test targets. |

4.5 Alarm and Alert Pop-ups

The NAUTICAST A2 features alarm and alert pop-ups that can appear any time during operation. To acknowledge an alarm or alert message, press **ENTER**. An example of an alarm message is shown below.

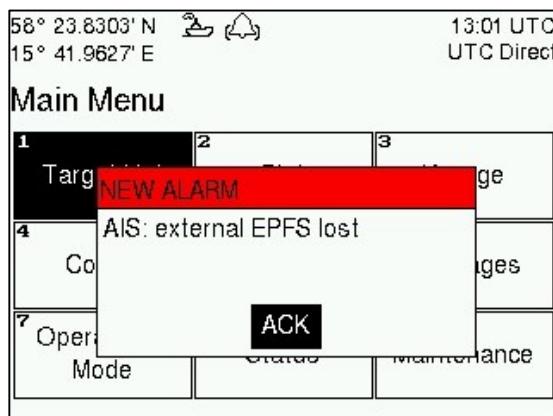


Figure 10 – New Alarm Message

4.6 Status Bar

The top of the screen of the NAUTICAST A2 always displays a summary of the system's status. See illustration below.

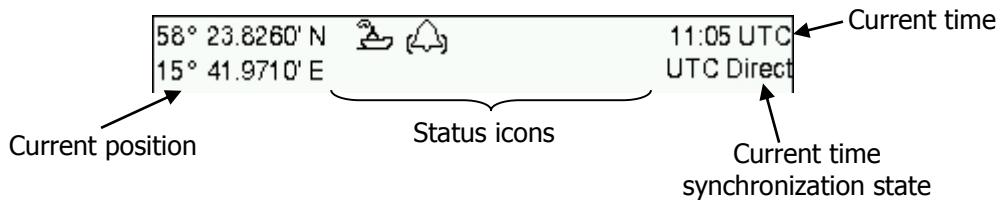


Figure 11 – Status Bar

If a valid navigation position is available, it is displayed to the left. The status icons are displayed in the middle and the current time is shown to the right. Time is either UTC or local (LOC). Beneath the current time there is also information about the transponder's synchronization state.

The synchronization state can be:

- **UTC Direct** – This is the normal state where the NAUTICAST A2 gets the UTC time from its own internal GPS receiver.
- **Indirect Synchronization** – The NAUTICAST A2 is synchronizing based on receipt of data from other AIS transmitters.

NOTE: It is possible to be in Indirect Synchronization but still have a valid position in the upper left corner of the status bar. The position information may be from an external GPS sensor, but UTC Direct synchronization can only be taken from the internal GPS receiver.

4.7 Status Icons

The status icons that can be displayed are:

- ✉ — Unread message (safety related message, text message or RTA)
- ✉ — Unread Long Range message (automatic reply)
- ✉ — Unread Long Range message (manual reply)
- ⚠ — Active alarms
- 1W — 1W mode (Indicates 1 Watt TX mode for Tankers is enabled.) See NOTE below for details.
 - Blue Sign On (only available when System Mode is "Inland")
 - Blue Sign Off (only available when System Mode is "Inland")
- TX — Silent Mode activated, either with Tx Mode parameter or silent switch.

Navigational status, being one of:

- ⚠ — Navigational status is undefined
- ⚓ — At anchor or moored
- ⚠ — Under way using engine
- ⚠ — Navigational status is one of: Not under command, Restricted manoeuvrability, Constrained by her draught, Aground, Engaged in fishing, Under way sailing, Reserved for future use.

NOTE: The transponder will automatically engage 1W mode when the following conditions are met: Ship type = Tanker, Nav Status = Moored and SOG <= 3 knots, otherwise 1W mode will be automatically disengaged. The Tanker 1W mode is fully automatic and cannot be disengaged by other external control.

4.8 View Remote Ship Information

The NAUTICAST A2 will power up in *Target List* view. This view, also referred to as the *minimal display*, is accessed from the *Main Menu* view. The *Main Menu* view can be reached by pressing **ESC** repeatedly from any other view. The *Target List* view displays a list of all targets sorted by range from own ship (closest first). The list includes MMSI or ship's name (Ship Id), range (RNG), bearing (BRG) and time since last report was received (Age) for each AIS target received by the system.

| | | | |
|---|-----------|-------------------------|-------|
| 58° 23.8264' N 15° 41.9715' E | | 14:16 UTC UTC Direct | |
| Ship Id RNG BRG Age | | | |
| ⊗ SART ACTIVE: 97 | ► 10.2 NM | 199 ° | 2m39s |
| Δ BLACK PEARL | 0.0 NM | 298 ° | 0s |
| Δ CATRINA | 17.8 NM | 354 ° | 2m39s |
| Δ LUDWIG II | 18.5 NM | 128 ° | 2m39s |
| ■ BS: 477995087 | 21.7 NM | 55 ° | 2m39s |
| ✚ HELI 13 | 30.8 NM | 200 ° | 2m39s |
| ✚ R4AS | 106 NM | 349 ° | 7s |

Figure 12 – Target List

The **OPT** button can be used in the *Target List* view to send a safety related message (SRM) to the selected target. For more information about AIS messages, refer to section 4.12.

For extended information about a target in the list, select the ship with the **Δ** key and press **ENTER**.

The *Extended Information* view includes static, dynamic and voyage related data for the selected target. In this view it is also possible to query for static and voyage data as well as persons on board information by using the **OPT** button.

| | | |
|----------------------------------|-------------------------|-------------------------|
| 58° 23.8269' N 15° 41.9730' E | | 08:54 UTC UTC Direct |
| Extended Info. | MMSI: 477995050 | |
| Parameter | Value | |
| --Static data-- | | |
| Callsign | IA56 | |
| IMO | 9876541 | |
| Type of Ship | Ship Type Not Available | |
| Ship Name | LUDWIG II | |
| Length of Ship | 200.0 m (A:100, B:100) | |
| Beam of Ship | 20.0 m (C:10, D:10) | |

Figure 13 – Extended Info

Press **ESC** to return to *Target List* view.

4.9 View Plot of Targets

The location of targets relative to your own ship is visualized in the *Plot* view. The view is accessed from the *Main Menu* view. Use the **ARROW KEYPAD < >** to select any of the targets on the display or **Λ v** to Zoom In and Zoom Out.

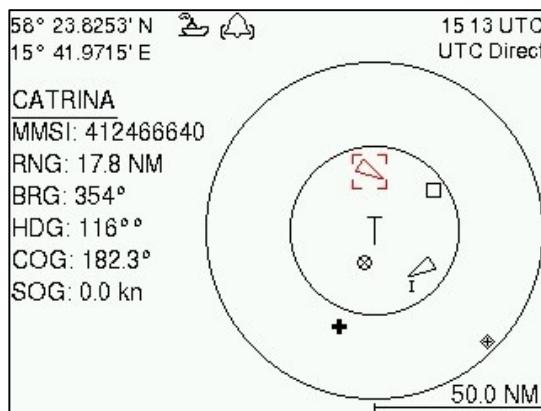


Figure 14 – Target Plot

For extended information about a target select it using the **< >** key and press **ENTER**.

The own ship target is displayed as a 'T' shaped symbol. Class B targets are indicated by a 'B' appended to the target icon and Inland targets are indicated by either an 'I' or by a blue sign symbol appended to the target (not shown in the figure above).

The **OPT** button can be used in the *Plot* view to send a safety related message (SRM) to the selected target. For more information about AIS messages, refer to section 4.12.

4.10 View Transmitted Own Ship Information

The information transmitted by the NAUTICAST A2 on the VHF link is viewed in the *Transmitted Own Ship Data* view. This view is accessed from *Main Menu* → *Status* view and includes the static, dynamic and voyage related data actually sent by the NAUTICAST A2. The view reflects the contents of the last transmitted AIS message, thus there may be some delay from the time the parameters are changed until they are displayed in the *Transmitted Own Ship Data* view.

| | | |
|---------------------------|----------------------|------------|
| 58° 23.8305' N | | 09:28 UTC |
| 15° 41.9626' E | | UTC Direct |
| Transmitted Own Ship Data | MMSI: 463986124 | |
| <hr/> | | |
| Parameter | Value | |
| <hr/> | | |
| --Static data-- | | |
| Callsign | BJ 73 | |
| IMO | 71283656 | |
| Type of Ship | Passenger Ship | |
| Ship Name | M/S ROXEN | |
| Length of Ship | 118 m (A: 113, B: 5) | |
| Beam of Ship | 10 m (C: 3, D: 7) | |

Figure 15 – Transmitted Own Ship Data

4.11 Enter and Read Voyage Related Information

Voyage related information (for transmit via AIS) is displayed in the *AIS Voyage* view. The view is accessed from *Main Menu*→*Voyage*→*AIS Voyage*. Voyage related data includes destination, estimated time of arrival (ETA) and number of people aboard.

| | |
|----------------------------------|-------------------------------------|
| 58° 23.8272' N 15° 41.9720' E | 11:06 UTC UTC Direct |
| AIS Voyage | <input type="button" value="Save"/> |
| Parameter | Value |
| --General AIS-- | |
| Navigational Status | Under Way Using Engine |
| Destination | STOCKHOLM |
| ETA (mm-dd hh:mm) | 04-29 12:30 UTC |
| --Inland AIS-- | |
| Draught | 4.60 m |
| Air Draught | 17.00 m |

Figure 16 – AIS Voyage

4.12 Handling Safety Related Messages (SRM) and Text Messages

Safety related messages (SRMs) and text messages can be sent to specific targets (addressed messages) or broadcast to all targets. The Inbox, Outbox and Send views for SRMs and text messages can be accessed from *Main Menu*→*Messages*→*AIS Messages*.



Figure 17 - AIS Messages

4.12.1 Read Received Messages

Received messages can be accessed in the *Inbox* view. Unread SRMs and text messages are indicated with a letter icon in the status bar and are marked with red color in the inbox.

| | | | | |
|----------------------------------|-------------------------|----------------|----------------------------------|-------------------------|
| 58° 23.8302' N 15° 41.9626' E | 11:37 UTC UTC Direct | Inbox | 58° 23.8257' N 15° 41.9727' E | 11:21 UTC UTC Direct |
| Time (UTC) | Sender | Type | Message Content | |
| Mar 16 11:36 | 222333444 | Broadcast Text | WARNING, STORM AHEAD! | |
| Mar 16 11:36 | 222333444 | Broadcast SRM | | |
| Mar 16 11:36 | 266125000 | Addressed SRM | | |
| Message Content | | | | |
| WARNING, STORM AHEAD! | | | | |

Figure 18 – AIS Message Inbox

Select a message with **ARROW KEYPAD** buttons **Λ v**. A preview of the selected message is shown at the bottom of the screen. To read the entire message and mark it as being read, press **ENTER**. When the message is read, navigate back to the inbox by pressing **ESC**.

It is possible to reply to, forward or delete the selected message by pressing the **OPT** button.

4.12.2 Send SRMs and Text Messages

SRMs are composed and sent in the Send view accessed from *Main Menu→Messages→AIS Messages→Send*. Use the **ARROW KEYPAD** buttons **Λ v** to navigate between the text input field, list of parameters and "Send" button.

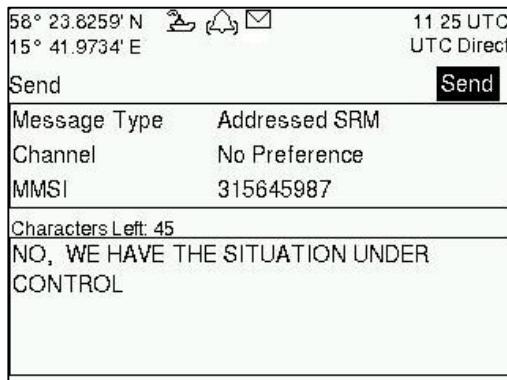


Figure 19 – AIS Message Send view

Sent messages can be viewed in the *Outbox* view accessed from *Main Menu→Messages→AIS Messages→Outbox*.

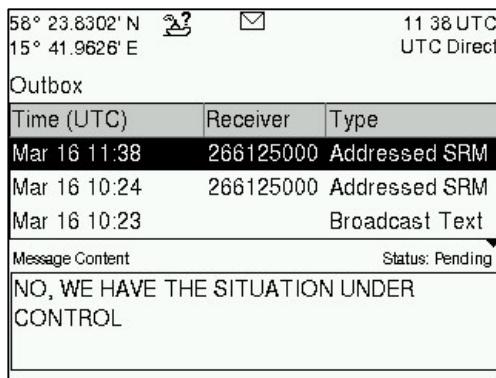


Figure 20 – AIS Message Outbox

4.13 Send Persons On Board

In the *Send Persons On Board* view it is possible to send information about the number of persons on board (PoB) to another vessel. The PoB message can be sent as either addressed or broadcast. The PoB message can also be sent in two different versions:

The IMO version sends the total number of persons on board as a binary message with international FI 16. The Inland (IWW) version sends a message with number of crew, personnel and passengers as a binary message with inland FI 55. The information sent in the messages is automatically filled in by the NAUTICAST A2 depending on the voyage configuration made in *Main Menu→Voyage→AIS Voyage*.

| | | |
|--------------------------|--|-------------------------------------|
| 58° 23.8260' N | | 14 42 UTC |
| 15° 41.9735' E | | UTC Direct |
| Persons on Board | | <input type="button" value="Send"/> |
| Parameter | | Value |
| Message Type | | Broadcast (Inland) |
| Channel | | No Preference |
| --PoB Info (Read Only)-- | | |
| Crew Members | | 75 |
| Passengers | | 1320 |
| Personnel | | 98 |

Figure 21 – Persons On Board

4.14 Long Range Interrogations

An AIS transponder can receive long range interrogation messages to poll for certain information. A received interrogation message is indicated by a LR icon in the status bar. If the “Long Range Reply Mode” parameter has been configured to “Auto”, the NAUTICAST A2 will automatically send a response to the interrogation. If the “Long Range Reply Mode” parameter is set to “Manual”, the operator must send a response or refusal from the *Long Range Message* view accessed from *Main Menu* → *Messages* → *Long Range*. For more information about the “Reply Mode” parameter and Long Range filter settings, see section 4.4.9.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------|------------|---------|---|---|---|---|---|---|---|---|---|-------|---|---|---|---|---|---|---|---|---|--|------------------|--|--|--|--|--|--|--|--|
| 58° 23.8302' N | | 11:43 UTC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15° 41.9626' E | | UTC Direct | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Long Range | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Time (UTC) | Sender | ABCEFIOPUW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mar 16 11:42 | 666777888 | XXXXX----- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <td>A</td><td>B</td><td>C</td><td>E</td><td>F</td><td>I</td><td>O</td><td>P</td><td>U</td><td>W</td> </tr> <tr> <td>?</td><td>?</td><td>?</td><td>?</td><td>?</td><td>?</td><td>?</td><td>?</td><td>?</td><td>?</td> </tr> </table> | | | A | B | C | E | F | I | O | P | U | W | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | | | | | | | | | | |
| A | B | C | E | F | I | O | P | U | W | | | | | | | | | | | | | | | | | | | | | | | |
| ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <td>Request</td><td>X</td><td>X</td><td>X</td><td>X</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td> </tr> <tr> <td>Reply</td><td>X</td><td>X</td><td>X</td><td>X</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td> </tr> <tr> <td></td><td colspan="9">Mar 16 11:42 UTC</td></tr> </table> | | | Request | X | X | X | X | - | - | - | - | - | Reply | X | X | X | X | - | - | - | - | - | | Mar 16 11:42 UTC | | | | | | | | |
| Request | X | X | X | X | - | - | - | - | - | | | | | | | | | | | | | | | | | | | | | | | |
| Reply | X | X | X | X | - | - | - | - | - | | | | | | | | | | | | | | | | | | | | | | | |
| | Mar 16 11:42 UTC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Figure 22 – Long Range

To send a reply or refusal to the interrogation or to delete an interrogation from the message list, use the **ARROW KEYPAD** buttons **Λ** **∨** to mark the desired interrogation and then press the **OPT** button and choose the desired option.

The Long Range view uses the following symbols to indicate the status of a request or reply message:

- ? – The information is requested by the sender
- X – The information is available and provided
- ! – The information requested is refused

4.15 Inland ETA and RTA

The NAUTICAST A2 has capability to send Inland ETA (Estimated Time of Arrival) messages and receive Inland RTA (Recommended Time of Arrival) messages which are used when communicating with ports, locks and bridges on the inland water ways. This is done from the *ETA/RTA* view that can be accessed from *Main Menu* → *Messages* → *ETA/RTA*. Sent ETA messages can be viewed in the *Outbox* view, received RTA messages can be viewed in the *Inbox* view and new ETA messages can be composed in the *Send* view.

| | | | |
|---|-------------------------|----------------------------------|-------------------------|
| 58° 23.8297' N 15° 41.9621' E | 14:25 UTC UTC Direct | 58° 23.8269' N 15° 41.9731' E | 13:59 UTC UTC Direct |
| ETA/RTA | | Send | |
| Inbox | Outbox | Send | Send |
| MMSI 7990101 | | | |
| ETA (mm-dd hh:mm) 05-20 13:00 UTC | | | |
| UN Country Code AT | | | |
| UN Location Code VIE | | | |
| Fairway Section 00003 | | | |
| Fairway Hectometre 00008 | | | |
| Terminal Code SPG1 | | | |
| Tugboats (7 = N/A) 7 | | | |
| 58° 23.8292' N 15° 41.9613' E | 11:55 UTC UTC Direct | 58° 23.8267' N 15° 41.9719' E | 14:29 UTC UTC Direct |
| ETA Outbox | | RTA Inbox | |
| Status | Receiver | ETA (mm-dd hh:mm) | MMSI |
| Received by targ | 7990101 | 05-20 13:00 UTC | 7990101 |
| Recommended Arrival 05-20 13:00 UTC | | | |
| UN Country / Location Code: AT VIE | | | |
| Fairway Section No. / Hecto.: 00003 / 00008 | | | |
| Terminal Code: SPG1 | | | |
| Tugboats (7 = N/A): 7 Air Draught: 13.00 | | | |
| UN Country / Location Code: AT VIE | | | |
| Fairway Section No. / Hecto.: 00003 / 00008 | | | |
| Terminal Code: SPG1 | | | |
| Operational Status: Limited Operation | | | |

Figure 23 – ETA/RTA

4.16 Inland Water Levels

The NAUTICAST A2 can receive and display Inland water levels messages. All received water levels messages can be viewed in the *Water Levels* view that can be accessed from *Main Menu* → *Messages* → *Water Levels*.

| 58° 23.8262' N 15° 41.9731' E | 15:11 UTC UTC Direct | | |
|----------------------------------|-------------------------|-----------------|-------------|
| Water Levels | | | |
| Clear | | | |
| Country | Gauge ID | Water Level [m] | Age [h:m:s] |
| DK | 123 | 10.00 | 00:00:26 |
| DK | 124 | -20.00 | 00:00:26 |
| DK | 125 | 30.00 | 00:00:26 |
| DK | 126 | -40.00 | 00:00:26 |
| NO | 1 | 30.00 | 00:00:05 |
| NO | 10 | -5.00 | 00:00:35 |
| NO | 20 | 1.00 | 00:00:35 |

Figure 24 – Inland Water Levels

4.17 Regional Areas

All regional areas that are stored in the NAUTICAST A2 can be viewed in the Regional Areas view which is accessed from *Main Menu* → *Config* → *VHF Radio* → *Regional Areas*. The list shows the north east and south west corners of the area. The area is marked with blue color if it is in use by the NAUTICAST A2. To view more information about the area, edit the area or create a new area, press the **OPT** button and choose the desired option.

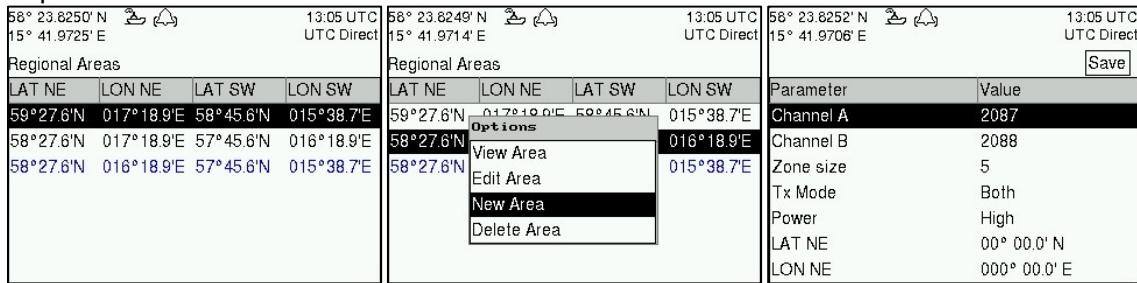


Figure 25 – Regional Areas

4.18 Alarms

All currently active and enabled alarms are shown in the *Alarm* view that can be accessed from *Main Menu* → *Alarms*. As default, only alarms that are configured as "Enabled" will be shown in the list. It is possible to also show disabled active alarms by pressing **OPT** button and choose "Show All Alarms". For a list of all alarms, see section 7.3.

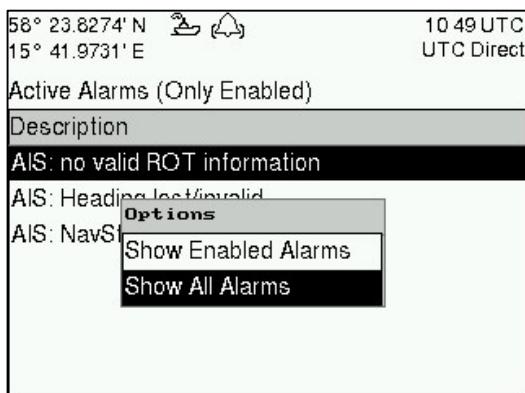


Figure 26 - Alarms

4.19 Status List

Current status indications are listed in the *Status List* view that can be accessed from *Main Menu* → *Status* → *Status List*. The different status indications that can occur are listed in section 7.8.

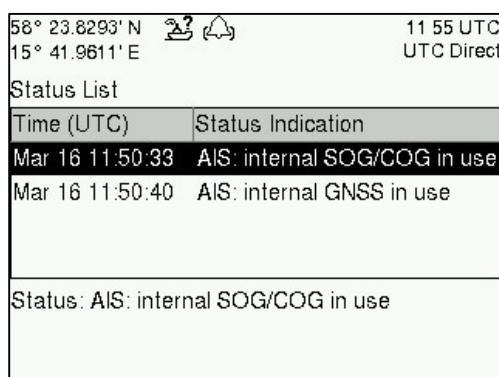


Figure 27 - Status List

4.20 Non Functional Time

This view displays information about times when the NAUTICAST A2 has been turned off or for some other reason not been transmitting for more than 15 minutes. The view is accessed from *Main Menu → Status → Non Func. Time*.

| | | |
|--|-------------------|------------|
| 58° 23.8293' N | | 11:56 UTC |
| 15° 41.9611' E | | UTC Direct |
| Non Functional Time | | |
| Date/Time Off (UTC) Date/Time On (UTC) | | |
| 2012 Mar 07 13:15 | 2012 Mar 08 11:51 | |
| 2012 Mar 08 15:15 | 2012 Mar 08 15:36 | |
| 2012 Mar 08 16:22 | 2012 Mar 09 13:19 | |
| 2012 Mar 09 13:20 | 2012 Mar 09 13:37 | |
| Reason: Power Off | | |

Figure 28 - Non Functional Time

4.21 GPS Status

This view displays the satellites received by the NAUTICAST A2 internal GPS receiver. The list is sorted by the satellites ID (PRN number) and shows elevation, azimuth and signal to noise ratio (SNR) for each satellite. The view also displays the total number of satellites in view and the total number of satellites used in the position calculation reported by GGA sentence.

| | | |
|------------------------|---------------|-------------|
| 58° 23.8269' N | | 10:22 UTC |
| 15° 41.9720' E | | UTC Direct |
| GPS Status | | |
| ID | Elevation (°) | Azimuth (°) |
| 2 | 22 | 242 |
| 3 | 5 | 63 |
| 4 | 4 | 207 |
| 5 | 49 | 289 |
| Satellites in View: 14 | | |
| Satellites in Use: 9 | | |

Figure 29 – GPS Status

4.22 View Raw Data

This view displays the incoming data on the selected serial port. It is also possible to pause the data on the screen by pressing the "Freeze" button. Use the **ARROW KEYPAD** buttons **Λ** **∨** to navigate to the Freeze button and press **ENTER**. The View Raw Data view can be a helpful tool when trouble shooting the system to see what sensor input is actually received on each port. The view can be accessed from *Main Menu → Status → View Raw Data*.

| | | |
|--|--|--|
| 58° 23.8301' N | | <input type="checkbox"/> 12:37 UTC |
| 15° 41.9616' E | | UTC Direct |
| View Raw Data | | <input checked="" type="button" value="Freeze"/> |
| View Port | | Internal GPS |
| \$GPVTG,,T,,M,0.007,N,0.013,K,A*26 \$GPGLL,123712.00,5823.83016,N,01541.96161,E,1,09,0.95,60.0, M,30.5,M,,*65 \$GPGSA,A,3,01,17,20,32,23,31,12,11,14,,,1.54,0.95,1.22*0E \$GPGSV,3,1,09,01,70,173,49,11,45,167,47,12,06,014,38,14,30,05 0,41*73 \$GPGSV,3,2,09,17,37,295,45,20,62,246,48,23,15,199,43,31,21,10 2,46*75 \$GPGSV,3,3,09,32,82,135,49*41 \$GPZDA,123712.00,12,01,2012,00,00*61 \$GPGBS,123712.00,13,1,2,1,4,,,*41 | | |

Figure 30 - View Raw Data

4.23 SW/HW Info

This view displays the software and hardware revisions for the NAUTICAST A2 and is accessed from Main Menu → Status → SW/HW Info. **NOTE: This information should always be provided when in contact with Nauticast Technical Support.**

| | | |
|----------------------------------|----------------|-------------------------|
| 56° 23.8299' N 15° 41.9614' E | | 12:36 UTC UTC Direct |
| SW/HW Info | | |
| Parameter Value | | |
| S/W Version | R5 0.11 | |
| H/W Version | R5 Solid 0 | |
| Serial Number | 000001 | |
| H/W Part Number | 7000 118-130 A | |
| --Unlocked Modules-- | | |
| Class A Mode | Unlocked | |
| Inland Mode | Unlocked | |

Figure 31 - SW/HW Info

4.24 VHF Status

The VHF Status view shows the currently used settings. Channel number, frequency, power and operation mode are displayed for each VHF transceiver in the NAUTICAST A2. This information is useful when troubleshooting to make sure that the NAUTICAST A2 transponder uses the expected VHF radio settings. If e.g. a regional area is set and in use, this will affect the parameters in the VHF Status view.

| | | |
|----------------------------------|------------|-------------------------|
| 56° 23.8299' N 15° 41.9616' E | | 12:37 UTC UTC Direct |
| VHF Status | | |
| Parameter Value | | |
| --Transceiver A-- | | |
| Rx Channel | 2087 | |
| Rx Frequency | 161975 kHz | |
| Tx Channel | 2087 | |
| Tx Frequency | 161975 kHz | |
| Tx Power | 12.5 W | |
| Tx Control | Active | |

Figure 32 - VHF Status

4.25 Communication Test

When installing the NAUTICAST A2, or when performing annual testing, a communication test shall be done to ensure that other transponder system can receive the NAUTICAST A2 transmissions. This can be done from the Communication Test view accessed from Main Menu → Maintenance → Comm. Test.

When entering the Communication Test view a suggested target with a suitable range (between 15 NM and 25 NM) will be selected in the MMSI parameter field if such a target has been received by the NAUTICAST A2. It is however possible to select a different target for the communication test. To start the test, use the **ARROW KEYPAD** button A to select the "Send" button and press **ENTER**. The status of the test will be shown beneath the parameter list. If no response is received within 15 seconds from the selected target a fail message will be shown.

| | | | | | |
|----------------------------------|--|--|--|-------------------------------------|---|
| 56° 23.8289' N 15° 41.9694' E | 10:18 UTC UTC Direct | | 10:19 UTC UTC Direct | | 10:20 UTC UTC Direct |
| Comm. Test | <input type="button" value="Send"/> | | Comm. Test | <input type="button" value="Send"/> | |
| Parameter | Value | | Parameter | Value | |
| MMSI | 578632123 Range: 0.0 333444555 Range: | | MMSI | 578632123 Range: 0.0 | |
| Status: No Test Running. | | | Status: Waiting For Reply From MMSI: 578632123 | | Status: Reply Received From MMSI: 578632123 |

Figure 33 - Communication Test

4.26 Update Software

The software in the NAUTICAST A2 is easy upgradable via the USB Host interface located behind the front hatch. To perform a software update, follow the instructions in the *Update Software* view which can be accessed from *Main Menu→Maintenance→Update Software*. For more information about the upgrade procedure, refer to chapter 5 "

| | | | |
|--|-------------------------|----------------------------------|---|
| 58° 23.8306' N 15° 41.9629' E | 10:18 UTC UTC Direct | 58° 23.8306' N 15° 41.9627' E | 10:27 UTC UTC Direct |
| Update Software | | Update Software | |
| To update the software, perform the following: | | | To update the software, perform the following: |
| 1) Insert USB memory with swload folder in the root of the memory | | | 1) Insert Rebooting...4s in the root of |
| 2) Hold down the '4'-button until the STATUS led is lit green and Rx led is lit yellow | | | 2) Hold Continue to press down the '4'-button! |
| 3) When update is complete the STATUS led is lit green and the unit will reboot | | | 3) When update is complete the STATUS led is lit green and the unit will reboot |

Figure 34 - Update Software

4.27 Restore Config

All config parameters described in section 4.4 "Configuration Parameters" can be set to default values from the *Restore Config* view which can be accessed from *Main Menu → Maintenance → Restore Config*.

NOTE: The MMSI parameter will also be reset to zero and therefore the transponder will stop transmitting and the alarm "Tx Malfunction" will become active.

4.28 Save Configuration to USB memory

The NAUTICAST A2 AIS Transponder System has the capability to save all configuration settings to an USB memory. The configuration file can be used as backup so that the NAUTICAST A2 AIS system can be restored to a previous configuration; however during normal software upgrade of the NAUTICAST A2 AIS system the configuration parameters will NOT be changed so a backup is usually not needed.

The saved configuration file can also be used to load several NAUTICAST A2 systems with the same settings. To save the configuration to a file on a USB memory, follow the steps below:

1. Insert a FAT32 formatted USB memory in the USB host interface port in the NAUTICAST A2.
2. Enter the *Save Config to USB* view which is accessed from *Main Menu → Maintenance → Save Config to USB*.

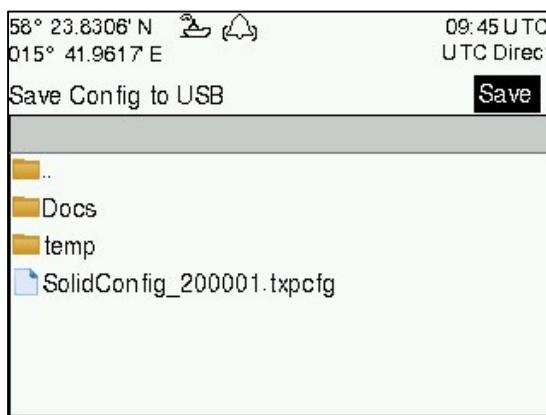


Figure 35 – Save Config to USB

3. Open the folder on the USB memory where the transponder configuration file should be saved. Use the arrow keypad to navigate between folders and files on the USB memory. Only folders and transponder configuration files will be listed in the view. To view the contents of a sub folder, mark

the folder and press ENTER. To go back to the previous folder, mark the folder “..” on the top of the list and press ENTER.

4. Press the “Save” button. A popup will appear where a file name can be entered.

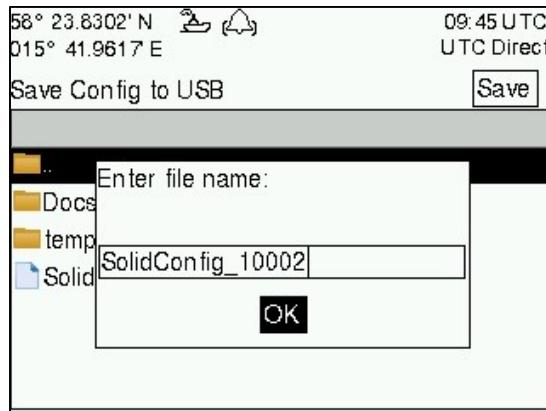


Figure 36 – Enter file name

5. Press OK to save the configuration to the specified file and directory on the USB

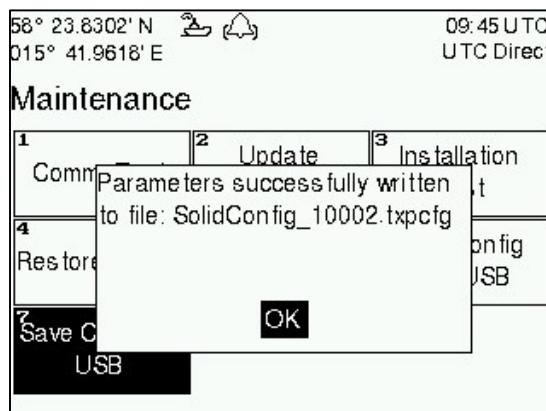


Figure 37 – Configuration Saved Successfully.

4.29 Load Configuration from USB memory

To load and directly use a configuration from an existing configuration file on a USB memory, follow the below steps:

1. Insert the USB memory with the configuration file in the USB host interface port on the NAUTICAST A2.
2. Enter the *Load Config from USB* view which is accessed from *Main Menu* → *Maintenance* → *Load Config from USB*.



Figure 38 – Load Config from USB

- Select the desired configuration file.

Use the arrow keypad to navigate between folders and files on the USB memory. Only folders and transponder configuration files will be listed in the view. To view the contents of a sub folder, mark the folder and press ENTER. To go back to the previous folder, mark the folder “..” on the top of the list and press ENTER.

- Press ENTER to load the selected file. A confirmation popup will appear.

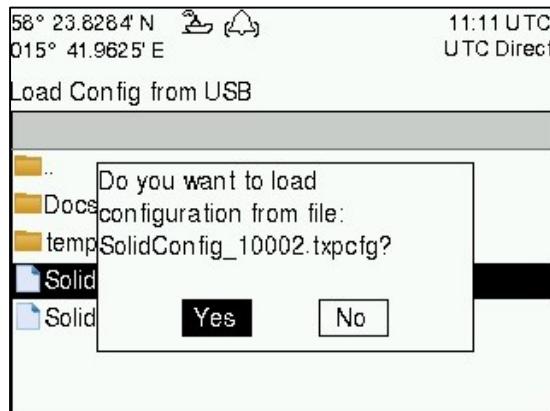


Figure 39 – Confirmation popup

- Check that the correct configuration file is selected. Press “Yes” in the confirmation popup. A password popup will appear. Fill in the admin password (default = “admin”) and press OK.

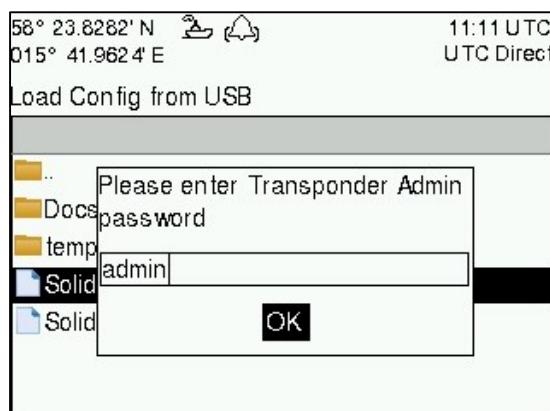


Figure 40 – Password popup

- The configuration file will be loaded in the NAUTICAST A2 and the settings will take effect immediately.

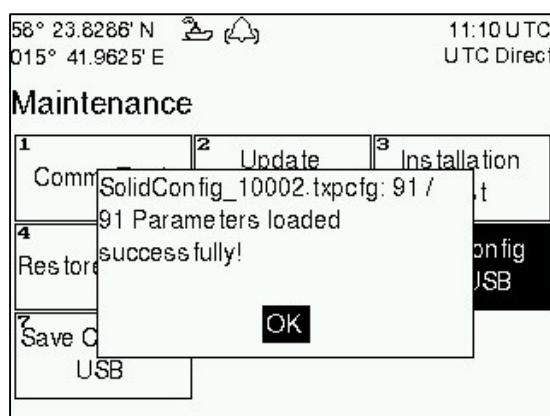


Figure 41 – Configuration successfully loaded from USB

5 Software Upgrade

Note: After updating the software add a sticker stating the new software version close to the product label.

The NAUTICAST A2 is easy upgradable through the USB host interface located behind the front hatch. To upgrade the software in the NAUTICAST A2, perform the following steps:

- Unzip the NAUTICAST A2 upgrade package in the root folder of an USB memory stick. There should now be a folder called swload in the USB root folder.
- Insert the USB memory stick in the USB host interface located behind the front hatch.

Hold down the '4'-button on the front of the NAUTICAST A2 and reboot the system. The '4'-button must be held down until the **STATUS LED** is lit green and **Rx LED** is lit yellow.

The software upgrade is complete when the **STATUS LED** is lit green. The NAUTICAST A2 will automatically reboot after 3 seconds. Check that correct SW has been loaded in the SW/HW Info view which can be accessed through *Main Menu → Status → SW/HW Info*.

If the upgrade process fails, The **STATUS LED** will be lit red and one of the **Rx LED** or **Tx LED** starts blinking. Should this happen, hold down the '4'-button and reboot the NAUTICAST A2 to try again.

The software upgrade can also be initiated from the *Update Software* view in the NAUTICAST A2. Refer to section 4.26 "Update Software" for more information.

| | STATUS | Rx | Tx |
|---|---------------|-----------------------|---------------------|
| Upgrade mode started | GREEN | YELLOW | |
| Upgrade in progress | | Blinking YELLOW | |
| Upgrade complete (automatic reboot after 3 sec) | GREEN | | |
| Error: USB Not Found | RED | Blinking YELLOW 0.5Hz | |
| Error: No SW found on USB | RED | Blinking YELLOW 4Hz | |
| Error: Flash erase failed | RED | | Blinking RED 0.5 Hz |
| Error: Flash write failed | RED | | Blinking RED 4 Hz |

Table 11 – LED Indicators during Software Upgrade

6 Technical Specifications

6.1 Transponder Physical

| | |
|-----------------------------------|--|
| Dimensions: | Height: 87 mm Width: 238 mm Depth: 173 mm |
| Dimensions: Incl. gimbal mount | Height: 124 mm (minimum) Width: 292 mm Depth: 173 mm |
| Weight: | 2.25 kg 2.45 kg incl gimbal mount |

6.2 Transponder Electrical

| | |
|--|----------------|
| Supply Voltage: | 24 VDC (12VDC) |
| Power Consumption (\emptyset /Max): | 17W/24W (48W) |
| Peak Current | 1 A (4A) |

6.3 Transponder Environment

This product complies with the R&TTE directive, 1999/5/EC

| | |
|--|--|
| Temperature: | -15°C to +55°C (Operational) -30°C to +80°C (Storage) |
| Vibrations: | IEC 60945 ed. 4 |
| EMC: | IEC 60945 ed. 4 |
| Radio Type Approval: | IEC 61993-2 ed. 2 |
| Compass Safe Distance NAUTICAST A2 | 60 cm (for standard magnetic compass) 45 cm (for steering magnetic compass) |
| Compass Safe Distance GPS Antenna AT575-68W | 30 cm (for standard magnetic compass) 30 cm (for steering magnetic compass) |
| Compass Safe Distance GPS Antenna MA-700 | 65 cm (for standard magnetic compass) 50 cm (for steering magnetic compass) |
| Compass Safe Distance Combined VHF/GPS-1 | 65 cm (for standard magnetic compass) 50 cm (for steering magnetic compass) |

6.4 Transponder VHF Transceiver

| | |
|--------------------------|---|
| Receivers: | 156 – 163 MHz (TDMA) 156.525 MHz fixed (DSC, Channel 70) |
| Transmitter: | 156 – 163 MHz |
| Channel bandwidth: | 25 kHz |
| Output Power: | High: 12,5 W Low: 1W "Tanker 1W Mode": 1W |
| VHF antenna connector: | BNC-Female |
| Antenna Input Impedance: | 50 ohm |

6.5 Transponder Internal GPS Receiver

| | |
|--------------------------|--|
| Type: | GPS L1, C/A Code, 50 Channels SBAS: WAAS, EGNOS, MSAS, GAGAN |
| Update rate: | 2 Hz |
| Accuracy: | < 2.5 m (GPS, CEP, 50%, 24 hours static) < 2.0 m (SBAS, CEP, 50% 24 hours static) |
| Antenna feeding: | 5 VDC |
| GPS Antenna connector: | TNC-Female |
| Antenna Input Impedance: | 50 ohm |

6.6 AIS Alarm Relay

| | |
|------------------------|-------------------------------------|
| Max switching current: | 0,1 – 2 A (with heat sink up to 3A) |
| Max switching voltage: | 3 – 60 VDC |

7 Troubleshooting

The Nauticast A2 is a very rugged and stable device, so that in the majority of cases erroneous configurations rather than real hardware defects are the cause of perceived malfunctioning.

7.1 Troubleshooting Prerequisites

A transponder operating environment may naturally affect and render complicated the search for the root cause of a system defect. It is always advisable to start by minimizing all possible interference sources in order to simplify the troubleshooting.

- Disconnect other NMEA equipment from the NAUTICAST A2 (ECDIS, RADAR, NAV, etc.)
- Switch off other emission sources (RADAR, SATCOM, VHF, etc.)

We encourage applying the latest software available for the NAUTICAST A2 if any problems are experienced. It may contain bug-fixes and other improvements solving already known issues. Check supplied software release notes to see what has been changed in the new software.

7.2 Troubleshooting with the Front Panel LED's

It is very fast and effective to use the LED's to verify the status of the NAUTICAST A2. This should always be the first step in the troubleshooting.

7.2.1 STATUS LED (multi-colour)

- The STATUS LED is constantly lit green when the transponder is operating and no alarms are active.
- The STATUS LED is constantly lit red if there is one or more acknowledged active alarms in the transponder, but no unacknowledged alarms. Refer to section 7.3 for interpretation of the alarms.
- The STATUS LED is flashing red if there is one or more unacknowledged alarms in the transponder. Refer to section 7.3 for interpretation of the alarms.

If neither colours are lit, nor flashing, then check the power supply and make sure that:

- The voltage is correct and stable
- The polarity is correct and not switched
- The available current is sufficient for start up and transmission
- The external fuse is functional
- The power cable is undamaged
- The power connector is properly connected and secured

Also check so that the LED backlight is not completely turned off in the Visual Config view accessed from *Main Menu*→*Config*→*Display*→*Visual*.

7.2.2 Rx LED (yellow)

The Rx LED is flashing yellow when the transponder is receiving a message from the VDL. This can be intermittently.

If there is verified traffic on the VDL and the Rx LED still is dark, then check the alarm list for any active alarms. Refer to section 7.3 for interpretation of the alarms.

Lack of reception may be an indication of a VHF antenna problem or connectivity issues. Check the installation for problems.

7.2.3 Tx LED (red)

The Tx LED is flashing red when the transponder is transmitting a message to the VDL. The transmission interval is between 2 – 360 seconds. Refer to section 7.5.

If the Tx LED is completely dark, then check so that the transmission is not switched off either through an active regional area or by the Tx Mode parameter. It is possible to check the status on each transceiver in the VHF Status view described in section 4.24.

If the transmission is activated and there is still no red flashing, then check the alarm list for any active alarms. Refer to section 7.3 for interpretation of the alarms.

7.3 Troubleshooting with Alarm Messages

The NAUTICAST A2 constantly monitors itself for failures, abnormal conditions and other important parameters. Some of the monitoring trigger alarms and those alarms are excellent aids in the troubleshooting process. An active alarm can have two states, unacknowledged or acknowledged. The state of an alarm will affect the STATUS LED. Refer to section 7.2.1.

A new alarm (unacknowledged) will raise a pop-up window that needs to be acknowledged by the user. The active alarms can be found in the alarm view. Refer to section 4.18.

All active alarms are outputted on all the serial interface ports every 30 seconds. The alarm status can for example be used in interfacing ECDIS systems or centralized alarm systems. The alarms can also be monitored or recorded for troubleshooting purposes by for example a terminal application.

The status of an alarm can be identified by two letters in the alarm sentence, "A" and "V". The alarm sentence is constructed as: **\$AIALR, hhmmss.ss, xxx, A, A, c-c**, where:

hhmmss.ss = Time (UTC) of alarm condition change

xxx = Unique alarm identifier

A = Alarm condition (A = Active, V = Inactive)

A = Alarm's acknowledge state, A = acknowledged, V = unacknowledged

c-c = Alarm's description text

\$AIALR, hhmmss.ss, xxx, V, A, c-c: Tx malfunction: Alarm is **Inactive**

\$AIALR, hhmmss.ss, xxx, V, V, c-c: Tx malfunction: Alarm is **Inactive**

\$AIALR, hhmmss.ss, xxx, A, A, c-c: Tx malfunction: Alarm is **Active** and **Acknowledged**

\$AIALR, hhmmss.ss, xxx, A, V, c-c: Tx malfunction: Alarm is **Active** and **Unacknowledged**

The alarms that can occur in the NAUTICAST A2 are listed below:

7.3.1 AIS: Tx Malfunction (ID 001)

A Tx Malfunction alarm is generated if there is a malfunction in the radio transmitter hardware or if the antenna VSWR exceeds an allowed ratio. If the radio transmitter returns to normal operation or if VSWR returns to a value below the allowed threshold, the alarm is cleared. The Tx Malfunction alarm is also generated when the MMSI is configured to "0", in which case the NAUTICAST A2 will not transmit.

7.3.2 AIS: Antenna VSWR Exceeds limit (ID 002)

The VSWR (Voltage Standing Wave Ratio) of the antenna is checked for every transmission and if it exceeds a given ratio then a VSWR alarm is generated. If the VSWR goes below the allowed threshold, the alarm is cleared.

7.3.3 AIS: Rx Ch A Malfunction (ID 003)

7.3.4 AIS: Rx Ch B Malfunction (ID 004)

7.3.5 AIS: Rx Ch C Malfunction (ID 005)

The radio receivers are continuously monitored and if any part of the receivers' hardware should malfunction, an Rx Malfunction alarm is generated for that receiver. If the radio receiver returns to normal operation, the alarm is cleared.

7.3.6 AIS: General Failure (ID 006)

This alarm is generated if the NAUTICAST A2 fails to initiate the radio or if a severe hardware failure has occurred. If this alarm occurs, contact your retailer.

7.3.7 AIS: UTC Sync Invalid (ID 007)

This alarm is generated when the NAUTICAST A2 loses UTC direct synchronization (cannot synchronize from internal GPS receiver).

7.3.8 AIS: MKD connection lost (ID 008)

This alarm is active if the communication between the control unit and the display unit in the NAUTICAST A2 does not work.

7.3.9 AIS: Internal/External GNSS position mismatch (ID 009)

This alarm is generated if the difference between the internal and external GNSS position is more than 100 m for more than 15 minutes.

7.3.10 AIS: NavStatus incorrect (ID 010)

This alarm is generated if the navigational status is incorrect. If e.g. the navigational status is set to "At Anchor" but the ship is moving faster than 3 knots, the NavStatus incorrect alarm will become active.

7.3.11 AIS: Heading sensor offset (ID 011)

This alarm is active when SOG (Speed Over Ground) is greater than 5 kn and the difference between COG (Course Over Ground) and HDT (True Heading) is greater than 45° for 5 min.

7.3.12 AIS: Active AIS SART (ID 014)

This alarm is generated when the NAUTICAST A2 has received an active AIS SART position report.

7.3.13 AIS: External EPFS Lost (ID 025)

This alarm is generated if the position from the external Electronic Position Fixing System is invalid (i.e. no external GNSS). Due to the fallback arrangement for the positioning sensor this alarm can be inactive up to 30 seconds (during which the internal GNSS is used) before the alarm is activated.

7.3.14 AIS: No Sensor Position In Use (ID 026)

This alarm is active if the NAUTICAST A2 does not have a valid position (latitude/longitude) from any sensor.

7.3.15 AIS: No Valid SOG Information (ID 029) / No Valid COG Information (ID 030)

These alarms are active if the NAUTICAST A2 does not have a valid SOG (Speed Over Ground) or a valid COG (Course Over Ground) from any sensor. The SOG and COG is based on the speed log (if external GNSS is used and a valid heading is available) or the GNSS currently in use.

7.3.16 AIS: Heading Lost/Invalid (ID 032)

This alarm is generated if either the heading information is lost/invalid (from external sensors) or if the heading is undefined.

7.3.17 AIS: No Valid ROT Information (ID 035)

This alarm is active if ROT (Rate of Turn) is undefined or if no valid ROT information is available from external sensor or internal calculations.

7.3.18 IAIS: Ship Size mismatch (ID 060)

This alarm is active when the inland parameters length and beam of ship does not match the antenna position parameters A, B, C and D.

7.3.19 AIS: Tx disabled externally (ID 072)

This alarm is active when an external silent switch is used and the switch has disabled transmissions.

7.4 Troubleshooting via the Display

There is a lot of information and data accessible via the display that can be useful for troubleshooting, and that can help finding a presumed problem. The following items are just a few examples of what to look at.

7.4.1 Transmitted Own Ship Data View

When the transponder transmits data on the VDL, it also simultaneously outputs this data on all the serial ports. This information is displayed in the Transmitted Own Ship Data view.

| 58° 23.8305' N | | 09:28 UTC |
|---------------------------|----------------------|-----------------|
| 15° 41.9626' E | | UTC Direct |
| Transmitted Own Ship Data | | MMSI: 463986124 |
| Parameter | Value | |
| --Static data-- | | |
| Callsign | BJ 73 | |
| IMO | 71283656 | |
| Type of Ship | Passenger Ship | |
| Ship Name | M/S ROXEN | |
| Length of Ship | 118 m (A: 113, B: 5) | |
| Beam of Ship | 10 m (C: 3, D: 7) | |

Figure 42 – Transmitted Own Ship Data

7.4.2 Target List

The target list is primarily useful when analyzing the receiving functionality. The propagation characteristics of VHF radio frequencies are close to line of sight. A harsh radio environment, reflections in cables, connectors or the antenna will shorten the effective range.

| 58° 23.8261' N | | 1417 UTC | |
|-----------------------------|---------|------------|-------|
| 15° 41.9712' E | | UTC Direct | |
| <hr/> | | | |
| Ship Id | RNG | BRG | Age |
| ⊗ SART ACTIVE: 97 ► 10.2 NM | 199 ° | 3m14s | |
| Δ BLACK PEARL | 0.0 NM | 303 ° | 5s |
| Δ CATRINA | 17.8 NM | 354 ° | 3m14s |
| Δ LUDWIG II | 18.5 NM | 128 ° | 3m14s |
| ■ BS: 477995087 | 21.7 NM | 55 ° | 3m14s |
| ✚ HELI 13 | 30.8 NM | 200 ° | 3m14s |
| ✚ R4AS | 106 NM | 349 ° | 0s |

Figure 43 – Target List

7.4.3 Date and Time

The date and time (UTC) in the upper right corner of the display is provided by the transponder. If the date and time are not correct, the transponders internal GPS does not have a position fix. This will also be indicated by the alarm "UTC sync invalid". This problem is normally caused by a GPS-antenna failure or damaged antenna cables. This problem may also be caused by interference from radio equipment on-board.

7.4.4 View Raw Data

The *View Raw Data* view can be used to see received data on the ports of the NAUTICAST A2. It is useful for troubleshooting to make sure that connected sensors provide correct data to the NAUTICAST A2 unit. The "View Port" parameter determines from which port the data displayed in the view are taken. It is possible to pause the view by pressing the "Freeze" button. All data that is received while the view is paused will not be displayed in the view.

| | | |
|--|--|---|
| 58° 23.8301' N | | <input checked="" type="checkbox"/> 12:37 UTC |
| 15° 41.9616' E | | UTC Direct |
| <hr/> | | |
| View Raw Data | | |
| <input type="button" value="Freeze"/> | | |
| <hr/> | | |
| View Port Internal GPS | | |
| \$GPVTG,,T,,M,0.007,N,0.013,K,A*26 | | |
| \$GPGLL,123712.00,5823.83016,N,01541.96161,E,1,09,0.95,60.0, | | |
| M,30.5,M,,*65 | | |
| \$GPGSA,A,3,01,17,20,32,23,31,12,11,14,,,1.54,0.95,1.22*0E | | |
| \$GPGSV,3,1,09,01,70,173,49,11,45,167,47,12,06,014,38,14,30,05 | | |
| 0,41*73 | | |
| \$GPGSV,3,2,09,17,37,295,45,20,62,246,48,23,15,199,43,31,21,10 | | |
| 2,46*75 | | |
| \$GPGSV,3,3,09,32,82,135,49*41 | | |
| \$GPZDA,123712.00,12,01,20,00,00*61 | | |
| \$GPGBS,123712.00,1.3,1.2,1.4,,,*41 | | |

Figure 44 – View Raw Data

7.4.5 Status List

The status list view is used to display status indications that are stored in the transponder. The indications are created when an important event has occurred in the transponder. Time of occurrence and status indication text are shown in the view. A list of all possible indications can be found in section 7.8 Indication Messages.

| 58° 23.8261' N | | 10:23 UTC | | | | | | | | | | | | | | | |
|--|------------------------|------------|------|-------------------|--|---------------------|------------------------|--|---------------------|------------------------|--|---------------------|------------------------|--|---------------------|------------------------|--|
| 15° 41.9712' E | | UTC Direct | | | | | | | | | | | | | | | |
| Status List | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Time</th><th>Status Indication</th><th></th></tr> </thead> <tbody> <tr> <td>2011-04-28 11:38:12</td><td>AIS: Leave Semaphore ►</td><td></td></tr> <tr> <td>2011-04-28 12:40:26</td><td>AIS: Leave Semaphore M</td><td></td></tr> <tr> <td>2011-04-28 14:20:46</td><td>AIS: Leave Semaphore ►</td><td></td></tr> <tr> <td>2011-04-28 16:10:35</td><td>AIS: Leave Semaphore ►</td><td></td></tr> </tbody> </table> | | | Time | Status Indication | | 2011-04-28 11:38:12 | AIS: Leave Semaphore ► | | 2011-04-28 12:40:26 | AIS: Leave Semaphore M | | 2011-04-28 14:20:46 | AIS: Leave Semaphore ► | | 2011-04-28 16:10:35 | AIS: Leave Semaphore ► | |
| Time | Status Indication | | | | | | | | | | | | | | | | |
| 2011-04-28 11:38:12 | AIS: Leave Semaphore ► | | | | | | | | | | | | | | | | |
| 2011-04-28 12:40:26 | AIS: Leave Semaphore M | | | | | | | | | | | | | | | | |
| 2011-04-28 14:20:46 | AIS: Leave Semaphore ► | | | | | | | | | | | | | | | | |
| 2011-04-28 16:10:35 | AIS: Leave Semaphore ► | | | | | | | | | | | | | | | | |
| Status: AIS: Leave Semaphore Mode | | | | | | | | | | | | | | | | | |

Figure 45 – Status List

7.5 Reporting Intervals for Class A Transponders

The different information types are valid for different time periods and therefore they need different update intervals. These update intervals are defined in the AIS standard (ITU-R M.1371) and should be applied by all transponders. There are however some exceptions from this, which can be found in the standard. Class B transponders have for example different intervals than the Class A transponder.

All this needs to be taken in consideration while troubleshooting thus it affects the anticipated behaviour of a transponder.

| Information type / Condition | Nominal reporting interval |
|---|---------------------------------|
| Static Information | 6 min, on amendment, on request |
| Voyage related information | 6 min, on amendment, on request |
| Dynamic information (See conditions below) | |
| - Ship at anchor or moored and not moving faster than 3 knots | 3 minutes |
| - Ship at anchor or moored and moving faster than 3 knots | 10 seconds |
| - Ship 0-14 knots | 10 seconds |
| - Ship 0-14 knots and changing course | 3 1/3 seconds |
| - Ship 14-23 knots | 6 seconds |
| - Ship 14-23 knots and changing course | 2 seconds |
| - Ship > 23 knots | 2 seconds |
| - Ship > 23 knots and changing course | 2 seconds |

Table 12 – Reporting Intervals

7.6 F.A.Q

7.6.1 I cannot see the vessel on the Internet AIS service

Websites providing AIS services like e.g. www.marinetraffic.com does not cover all the seas of the world, but only specific coastal areas where AIS receivers have been installed and that upload the data to the websites. The vessel must be in reception range of these AIS receivers to show up on the Internet AIS service. If wrong information about your ship shows up on these websites (e.g. pictures or wrong position), this doesn't mean your AIS is not working correctly. If the data is shown correctly on the AIS, the incorrect information is mostly due to false information delivered to these websites through other sources.

7.6.2 I can "see" the other vessel, but they do not "see" my vessel

There are several reasons why this might happen. The first thing to check is if the NAUTICAST A2 is transmitting at all or if it is transmitting in low power mode. In *VHF Status* view described in section 4.24 it is possible to check the status on all NAUTICAST A2 VHF transceivers. Make sure that correct channels and power mode are used. There might be a regional area set in the transponder that changes the operating mode of the NAUTICAST A2. Regional areas are listed in the *Regional Area* view (see section 4.17).

The MMSI must also be configured in order for the NAUTICAST A2 to transmit. If the MMSI is zero, the NAUTICAST A2 will be silent.

Another possibility is that the other vessels' transponder requires a shorter reception range in order to receive the NAUTICAST A2 transmissions. In the *Target List* view and the *Plot* view it is possible to see the range and bearing to other vessels.

7.6.3 The VHF range seems to be short

As a general rule, the VHF range is equal to line of sight from the antenna position, which means that the higher the antenna is installed, the longer the range will be. It is also important to follow the guide lines for an antenna installation thoroughly. Section 3.4 describes how to best install the VHF antenna.

7.6.4 I can only receive a few GPS satellites

The position of the GPS antenna is of high importance to optimize the GPS reception. Follow the guide lines of GPS antenna installation described in section 3.5.

If the ship is close to a harbour or shore with high structures or travelling in an area with high terrain, the GPS reception might be lowered. The GPS antenna must be installed where it has a clear view of the sky. The objective is to see the horizon freely through 360 degrees with a vertical observation of 5 to 90 degrees above the horizon.

The GPS antenna cable should also be as short as possible and with 50 Ω impedance. A very long antenna cable or faulty impedance can heavily reduce the GPS reception.

7.7 Contact & Support information

Contact your local dealer for NAUTICAST A2 support. Please visit www.nauticast.com to see our worldwide service partners.

Nauticast GmbH

Lützowgasse 12-14/ 3. OG

1140 Vienna

Austria

Tel: +43 (1) 5 237 237-240

Fax: +43 (1) 5 237 237-150

Mail: support@nauticast.com

Web: www.nauticast.com

To enable us to provide you with precise and thorough support please contact support@nauticast.com per Email and include the "Technical Support / Problem Report using all relevant information provided by the SW/HW Info view which can be accessed from *Main Menu*→*Status*→*SW/HW Info*.

7.8 Indication Messages

The indication messages, with identity and type information, are listed below:

| ID | Type | Message text |
|-----|--------|--|
| 021 | Status | External DGNSS in use |
| 022 | Status | External GNSS in use |
| 023 | Status | Internal DGNSS in use (beacon) |
| 024 | Status | Internal DGNSS in use (msg 17) |
| 025 | Status | Internal GNSS in use |
| 027 | Status | External SOG/COG in use |
| 028 | Status | Internal SOG/COG in use |
| 031 | Status | Heading valid |
| 033 | Status | Rate of Turn Indicator in use |
| 034 | Status | Other ROT source in use |
| 036 | Event | Channel management parameters changed |
| 056 | Event | Channel management zone memory changed |
| 061 | Status | Enter semaphore mode |
| 062 | Event | Leave semaphore mode |
| 063 | Event | NVM Checksum errors |
| 064 | Event | RATDMA overflow |
| 066 | Status | Tanker Low VHF Power Mode |
| 067 | Status | Beacon correction received |
| 068 | Status | VDL correction received (id XXXX) |
| 069 | Status | No correction received |

7.9 Long Range Definitions

A = Ship's name, call sign, and IMO number

B = Date and time of message composition

C = Position

E = Course over ground (COG)

F = Speed over ground (SOG)

I = Destination and Estimated Time of Arrival (ETA)

O = Draught

P = Ship/Cargo

U = Ship's length, breadth, type

W= Persons on board

8 Interpretation of Input Sentences

All interface ports accept the full set of input listed below sentences, except the sentences listed in section 8.4.1 that are unique to the Long Range interface port.

The protocol of the serial input sentences shall be compliant to IEC 61162-1Ed.4 (2010-11) for maximum interoperability.

8.1 GPS and Sensor Input Sentences

8.1.1 DTM - Datum Reference

If local code is other than WGS84, then the positions report from that port is discarded.

\$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc

| Field | Format | Name | Comment |
|-------|--------|------------------------------|--------------------------------|
| 1 | --DTM | Sentence Id | Used |
| 2 | ccc | Local Datum Code | Interpret if it's WGS84 or not |
| 3 | A | Local Datum Subdivision Code | Ignored |
| 4 | x.x | Lat Offset (2 fields) | Ignored |
| 5 | a | | Ignored |
| 6 | x.x | Long Offset (2 fields) | Ignored |
| 7 | a | | Ignored |
| 8 | x.x | Altitude Offset | Ignored |
| 9 | ccc | Reference Datum Code | Ignored |

8.1.2 GBS - GNSS Satellite Fault Detection

If this sentence is received once a second from the position source in use, the RAIM flag will be set to TRUE.

\$--GBS,hmmss.ss,x.x,x.x,xx,x.x,x.x,x.x,x.x,x.x

| Field | Format | Name | Comment |
|-------|-----------|---|---------|
| 1 | --GBS | Sentence Id | Used |
| 2 | hhmmss.ss | UTC Time of GGA or GNS | Ignored |
| 3 | x.x | Expected Error in latitude | Used |
| 4 | x.x | Expected Error in longitude | Used |
| 5 | x.x | Expected error in altitude | Ignored |
| 6 | xx | ID number of most likely failed satellite | Ignored |
| 7 | x.x | Probability of missed detection | Ignored |
| 8 | x.x | Estimate of bias in meters | Ignored |
| 9 | x.x | Standard Deviation of bias estimate | Ignored |

8.1.3 GGA - Global Positioning System Fix Data

\$--GGA,hmmss.ss,|||.||,a,yyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx

| Field | Format | Name | Comment |
|-------|-----------|-----------------------------------|--|
| 1 | --GGA | Sentence Id | Used |
| 2 | hhmmss.ss | UTC of position | UTC Second is used to indicate Time Stamp |
| 3 | . | Latitude | Used |
| 4 | a | | |
| 5 | yyyy.yy | Longitude | Used |
| 6 | a | | |
| 7 | x | GPS quality indicator | Used, 1 -> Position with Low Accuracy 2 -> Position with High Accuracy 3 -> Position with Low Accuracy 6 -> Dead Reckoning with Low Accuracy 7 -> Manual mode with low accuracy OTHER -> No Position Used when the GPS is the internal GPS (Used in proprietary sentences) |
| 8 | xx | Satellites in use | Ignored |
| 9 | x.x | Horizontal dilution of precision | Ignored |
| 10 | x.x | Antenna altitude | Ignored |
| 11 | M | Units of antenna altitude, meter | Ignored |
| 12 | x.x | Geodial separation | Ignored |
| 13 | M | Units of geodial sep. | Ignored |
| 14 | x.x | Age of differential GPS data | Ignored |
| 15 | xxxx | Differential reference station ID | Ignored |

8.1.4 GLL – Geographic position, latitude/longitude

\$--GLL,||||.||,a,yyyy.yy,a,hmmss.ss,A,a

| Field | Format | Name | Comment |
|-------|-----------|-----------------|--|
| 1 | --GLL | Sentence Id | Used |
| 2 | . | Latitude | Used |
| 3 | a | | |
| 4 | yyyy.yy | Longitude | Used |
| 5 | a | | |
| 6 | hhmmss.ss | UTC of position | UTC Second is used to indicate Time Stamp |
| 7 | A | Status | Used |
| 8 | a | Mode indicator | NULL -> Message is ignored A -> Position with Low Accuracy D -> Position with High Accuracy E -> Dead Reckoning Mode with Low Accuracy M-> Manual Mode with Low Accuracy OTHER -> No Position |

8.1.5 GNS – GNSS fix data

If the Mode Indicator is a NULL field, the sentence is ignored.

\$--GNS,hmmss.ss,||||.||,a,yyyy.yy,a,c--c,xx,x.x,x.x,x.x,x.x,x.x

| Field | Format | Name | Comment |
|-------|-----------|-----------------------------------|--|
| 1 | --GLL | Sentence Id | Used |
| 2 | hhmmss.ss | UTC of position | UTC Second is used to indicate Time Stamp |
| 3 | . | Latitude | Used |
| 4 | a | | |
| 5 | yyyy.yy | Longitude | Used |
| 6 | a | | |
| 7 | c--c | Mode indicator | A, P -> Position with low accuracy D, R, F -> Position with high Accuracy E -> Dead Reckoning Mode with Low accuracy M -> Manual Mode with low accuracy OTHER -> No Position |
| 8 | xx | Total number of satellites | Used when the GPS source is the internal GPS (used in proprietary sentences) |
| 9 | x.x | HDOP | Ignored |
| 10 | x.x | Antenna altitude, meter | Ignored |
| 11 | x.x | Geodial separation | Ignored |
| 12 | x.x | Age of differential corrections | Ignored |
| 13 | x.x | Differential reference station ID | Ignored |

8.1.6 HDT - Heading, True

The use of this sentence is talker identifier dependent.

\$--HDT,x.x,T

| Field | Format | Name | Comment |
|-------|--------|-----------------------|---------|
| 1 | --HDG | Sentence Id | Used |
| 2 | x.x | Heading, degrees true | Used |
| 3 | T | | |

NOTE: HDT input must be sent at least every 3 seconds for the NAUTICAST A2 to calculate ROT from the HDT input.

8.1.7 OSD – Own ship data

\$--OSD,x.x,A,x.x,a,x.x,a,x.x,x.x,a

| Field | Format | Name | Comment |
|-------|--------|-----------------------------|-------------------------------|
| 1 | --OSD | Sentence Id | Used |
| 2 | x.x | Heading, degrees true | Used if heading status is 'A' |
| 3 | A | Heading status | Used |
| 4 | x.x | Vessel course, degrees true | Used as COG |
| 5 | a | Course reference | Used ¹ |
| 6 | x.x | Vessel speed | Used as SOG |
| 7 | a | Speed reference | Used ¹ |
| 8 | x.x | Vessel set | Ignored |
| 9 | x.x | Vessel drift | Ignored |
| 10 | a | Speed units | Used to convert SOG to knots |

8.1.8 RMC – Recommended minimum specific GNSS data

\$--RMC,hmmss.ss,A,ffff.ll,a,yyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a

| Field | Format | Name | Comment |
|-------|-----------|----------------------------------|---|
| 1 | --RMC | Sentence Id | Used |
| 2 | hhmmss.ss | UTC of position | UTC Second is used to indicate Time Stamp |
| 3 | A | Status | Used |
| 4 | ffff.ll | | Used |
| 5 | a | Latitude | |
| 6 | yyyy.yy | | Used |
| 7 | a | Longitude | |
| 8 | x.x | Speed over ground, knots | Used |
| 9 | x.x | Course over ground, degrees true | Used |
| 10 | xxxxxx | Date | Ignored |
| 11 | x.x | Magnetic variation | Ignored |
| 12 | a | | |
| 13 | a | Mode indicator | NULL -> Message is ignored A -> Position with low accuracy D -> Position with high accuracy E -> Dead Reckoning Mode with Low accuracy M -> Manual Mode with low accuracy OTHER -> No Position |

8.1.9 ROT – Rate of turn

The rate of turn value is only used if the talker identifier is TI. Otherwise the value will only be used to determine the direction, i.e. "Moving Right" or "Moving Left".

\$--ROT,x.x,A

| Field | Format | Name | Comment |
|-------|--------|--------------|------------------------------|
| 1 | --ROT | Sentence Id | Used |
| 2 | x.x | Rate of turn | Used if Status is set to 'A' |
| 3 | A | Status | Used |

8.1.10 VBW - Dual Ground / Water Speed

The current position source must be external GPS, and heading must be available for the transponder to accept this sentence.

\$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A,x.x,A

| Field | Format | Name | Comment |
|-------|--------|-------------------------------|----------------------------|
| 1 | --ROT | Sentence Id | Used |
| 2 | x.x | Longitudinal water speed | Ignored |
| 3 | x.x | Transverse water speed | Ignored |
| 4 | A | Status: water speed | Ignored |
| 5 | x.x | Longitudinal ground speed | Used if Status is set to A |
| 6 | x.x | Transverse ground speed | Used if Status is set to A |
| 7 | A | Status: ground speed | Used |
| 8 | x.x | Stern transverse water speed | Ignored |
| 9 | A | Status stern water speed | Ignored |
| 10 | x.x | Stern transverse ground speed | Ignored |
| 11 | A | Status stern ground speed | Ignored |

¹ SOG and COG are used if both COG reference and SOG reference are set to either: B, P, R

8.1.11 VTG – Course over ground and ground speed

\$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a

| Field | Format | Name | Comment |
|-------|--------|--------------------------------------|---------|
| 1 | --VTG | Sentence Id | Used |
| 2 | x.x | Course over ground, degrees true | Used |
| 3 | T | Course over ground, degrees magnetic | Ignored |
| 4 | x.x | Speed over ground, knots | Used |
| 5 | M | Speed over ground, km/h | Ignored |
| 6 | x.x | Mode indicator | Used |
| 7 | N | | |
| 8 | x.x | | |
| 9 | K | | |
| 10 | a | | |

8.1.12 ZDA – Time and date

This message is only interpreted if it's received from the internal GPS (the time synchronisation source).
\$--ZDA,hmmss.ss,xx,xx,xxxx,xx,xx

| Field | Format | Name | Comment |
|-------|-----------|--------------------|---------|
| 1 | --ZDA | Sentence Id | Used |
| 2 | hhmmss.ss | UTC | Used |
| 3 | xx | Day (UTC) | Used |
| 4 | xx | Month (UTC) | Used |
| 5 | xxxx | Year (UTC) | Used |
| 6 | xx | Local zone hours | Ignored |
| 7 | xx | Local zone minutes | Ignored |

8.2 General Input Sentences

8.2.1 ACK – Acknowledge Alarm

\$--ACK,xxx

| Field | Format | Name | Comment |
|-------|--------|------------------------|---------|
| 1 | --ACK | Sentence Id | Used |
| 2 | xxx | ID of the alarm source | Used |

8.2.2 EPV – Command or report equipment property value

\$--EPV,a,c--c,c--c,X.X,C--C,

| Field | Format | Name | Comment |
|-------|--------|-----------------------------|-------------------|
| 1 | --EPV | Sentence Id | Used |
| 2 | a | Sentence status flag | Used |
| 3 | c--c | Destination equipment type | Used, AI or STT |
| 4 | c--c | Unique Identifier | Used, may be null |
| 5 | x.x | Property identifier | Used |
| 6 | c--c | Value of property to be set | Used |

8.2.3 SPW – Security Password Sentence

\$--SPW,ccc,c--c,X,C--C

| Field | Format | Name | Comment |
|-------|--------|-----------------------------|-------------------|
| 1 | --SPW | Sentence Id | Used |
| 2 | ccc | Password protected sentence | Used |
| 3 | c--c | Unique Identifier | Used, may be NULL |
| 4 | x | Password level | Used |
| 5 | c--c | Password | Used |

8.2.4 HBT – Heartbeat Supervision Sentence

\$--HBT,x.x,A,x

| Field | Format | Name | Comment |
|-------|--------|--------------------------------|--------------------------|
| 1 | --SPW | Sentence Id | Used |
| 2 | x.x | Configured repeat interval | Used (Limited to 60 sec) |
| 3 | A | Equipment status | Used |
| 4 | x | Sequential sentence identifier | Ignored |

8.3 AIS Specific Input Sentences

8.3.1 ABM – Addressed Binary and Safety-Related Message

!--ABM,x,x,x,xxxxxxxxx,x,x,x,S--S,X

| Field | Format | Name | Comment |
|-------|---------------|-------------------------------|---|
| 1 | --ABM | Sentence Id | Used |
| 2 | x | Total nr of sentences | Used if in interval 1..9, otherwise the sentence is ignored |
| 3 | x | Sentence number | Used if in interval 1..total sentences, otherwise the sentence is ignored |
| 4 | x | Sequential message identifier | Used if in interval 0..3, otherwise the sentence is ignored |
| 5 | xxxxxxx xx | MMSI of Destination | Used |
| 6 | X | AIS Channel | Used |
| 7 | x.x | Message Id | Used if 6 or 12, otherwise the sentence is ignored |
| 8 | s--s | Encapsulated Data | Used |
| 9 | x | Number of filled bits | Used |

8.3.2 ACA – AIS Regional Channel Assignment Message

The zone created of this sentence must be accepted by the channel management rules (size of zone, distance to own position, valid channel number etc). If the zone isn't accepted, the zone will be ignored.

\$--ACA,x,|||I.II,a,yyyy.yy,a,|||I.II,a,yyyy.yy,a,x,xxxx,x,xxxx,x,x,x,a,x,
hhmmss.ss

| Field | Format | Name | Comment |
|-------|-----------|-------------------------|---------|
| 1 | --ACA | Sentence Id | Used |
| 2 | x | Sequence number | Ignored |
| 3 | I.II | | Used |
| 4 | a | NE latitude (2 fields) | |
| 5 | yyyy.yy | NE longitude (2 fields) | Used |
| 6 | a | | |
| 7 | I.II | SW latitude (2 fields) | Used |
| 8 | a | | |
| 9 | yyyy.yy | SW longitude (2 fields) | Used |
| 10 | a | | |
| 11 | x | Transitional zone size | Used |
| 12 | xxxx | Channel A | Used |
| 13 | x | Channel A bandwidth | Used |
| 14 | xxxx | Channel B | Used |
| 15 | x | Channel B bandwidth | Used |
| 16 | x | Tx/Rx mode | Used |
| 17 | x | Power level | Used |
| 18 | a | Information source | Ignored |
| 19 | x | In use flag | Ignored |
| 20 | hhmmss.ss | Time of In use change | Ignored |

8.3.3 AIQ – Query Sentence

\$--AIQ,ccc

| Field | Format | Name | Comment |
|-------|--------|---|--|
| 1 | -- | Talker ID of requester | Used |
| 2 | AIQ | Talker ID for device | Used |
| 3 | ccc | Approved sentence formatter of data being requested | It's possible to query the following sentences: ACA, ALR, EPV, LRI, SSD, TRL, TXT and VSD |

8.3.5 AIR – AIS Interrogation Request

This sentence can also be used to do a "UTC Request".

\$--AIR,xxxxxxxxx,x.x,x,x,x,x,x,xxxxxxxxx,x.x,x,x

| Field | Format | Name | Comment |
|-------|---------|---------------------|-------------------|
| 1 | --AIR | Sentence Id | Used |
| 2 | xxxxxxx | MMSI 1 | Used |
| x | | | |
| 3 | x.x | Message ID 1.1 | Used |
| 4 | x | Message sub section | Ignored |
| 5 | x.x | Message ID 1.2 | Used, may be NULL |
| 6 | x | Message sub section | Ignored |
| 7 | xxxxxxx | MMSI 2 | Used, may be NULL |
| x | | | |
| 8 | x.x | Message ID 2.1 | Used, may be NULL |
| 9 | x | Message sub section | Ignored |
| 10 | x | Channel | Used, may be NULL |

8.3.6 BBM – Broadcast Binary Message

\$--BBM,x,x,x,x,x,x,S--S,X

| Field | Format | Name | Comment |
|-------|--------|-------------------------------|---|
| 1 | --BBM | Sentence Id | Used |
| 2 | X | Total number of sentences | Used if in interval 1..9, otherwise rejected |
| 3 | X | Sentence number | Used if in interval 1..total number of sentences, otherwise rejected. |
| 4 | X | Sequential message identifier | Used if in interval 0..9, otherwise rejected |
| 5 | X | AIS channel | Used |
| 6 | x.x | Message Id | Used if 8 or 14 |
| 7 | s—s | Encapsulated data | Used |
| 8 | X | Number of filled bits | Used |

8.3.7 SSD – Ship Static Data

\$--SSD,c--c,c--c,xxx,xxx,xx,xx,c,aa

| Field | Format | Name | Comment |
|-------|--------|-------------------|--|
| 1 | --SSD | Sentence Id | Used |
| 2 | c--c | Call sign | Used, may be NULL |
| 3 | c--c | Name | Used, may be NULL |
| 4 | xxx | Pos ref A | Used to change position reference for the position source in use. May be NULL. |
| 5 | xxx | Pos ref B | Used to change position reference for the position source in use. May be NULL. |
| 6 | xx | Pos ref C | Used to change position reference for the position source in use. May be NULL. |
| 7 | xx | Pos ref D | Used to change position reference for the position source in use. May be NULL. |
| 8 | c | DTE | Ignored |
| 9 | aa | Source identifier | Used |

8.3.8 VSD – Voyage Static Data

\$--VSD,x.x,x.x,x,x,x,c--c,hhmmss.ss,XX,XX,X.X,X.X

| Field | Format | Name | Comment |
|-------|-----------|----------------------------|---------|
| 1 | --VSD | Sentence Id | Used |
| 2 | x.x | Type of ship and cargo | Used |
| 3 | x.x | Maximum present draught | Used |
| 4 | x.x | Persons on-board | Used |
| 5 | c--c | Destination | Used |
| 6 | hhmmss.ss | Est. UTC of arrival | Used |
| | s | | |
| 7 | Xx | Est. day of arrival | Used |
| 8 | Xx | Est. month of arrival | Used |
| 9 | x.x | Navigational status | Used |
| 10 | x.x | Regional application flags | Used |

8.4 Long Range Input Sentences

8.4.1 On Long Range Port

The LR sentences can only be used with the Long Range interface port.

8.4.1.1 LRF – AIS long-range function

\$--LRF,x,xxxxxxxxx,c—c,c—c,c—c

| Field | Format | Name | Comment |
|-------|--------------|-----------------------|---------|
| 1 | --LRF | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxx x | MMSI of requestor | Used |
| 4 | c-c | Name of requestor | Used |
| 5 | c-c | Function request | Used |
| 6 | c-c | Function reply status | Used |

8.4.1.2 LRI – AIS long-range interrogation

\$--LRI,x,a,xxxxxxxx,xxxxxxxx,|||.||,a,yyyyy.yy,a,|||.||,a,yyyyy.y,yy,a

| Field | Format | Name | Comment |
|-------|--------------|---------------------|---------|
| 1 | --LRI | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxx x | MMSI of requestor | Used |
| 4 | xxxxxxxx | MMSI of destination | Used |
| 5 | . | Latitude | Used |
| 6 | a | N / S | Used |
| 7 | yyyyy.yy | Longitude | Used |
| 8 | a | E / W | Used |

8.4.2 On Other Input Ports

LRF – AIS long-range function

\$--LRF,x,xxxxxxxxx,c—c,c—c,c—c

| Field | Format | Name | Comment |
|-------|--------------|-----------------------|---------|
| 1 | --LRF | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxx x | MMSI of requestor | Used |
| 4 | c-c | Name of requestor | Used |
| 5 | c-c | Function request | Used |
| 6 | c-c | Function reply status | Used |

8.5 Proprietary Input Sentences

All Nauticast Proprietary Sentences will have talker ID PSTT.

8.5.1 Proprietary Query message PSTT,101

\$PSTT,101,c--c,

| Field | Format | Name | Comment |
|-------|--------|--------------------------------|---------|
| 1 | PSTT | Proprietary Nauticast Sentence | Used |
| 2 | 101 | Sentence Query | Used |
| 3 | c-c | Proprietary sentence to query | Used |

9 Interpretation of Output Sentences

9.1 Proprietary Output Sentences (PSTT)

In addition to the standardized IEC sentences, the NAUTICAST A2 is able to output the proprietary sentences listed below. All Nauticast Proprietary Sentences have talker ID "PSTT".

9.1.1 \$PSTT,10A – UTC Date and Time

This sentence provides UTC Date and Time, i.e. NAUTICAST A2 system time (based on internal GNSS time). It is output approximately once every 10 seconds (± 1 s).

\$PSTT,10A,YYYYMMDD,HHMMSS

| Field | Format | Name | Comment |
|-------|----------|-------------|--|
| 1 | 10A | Sentence Id | 10A always |
| 2 | YYYYMMDD | Date | Year, month and day in decimal notation. (00000000 = Not available) |
| 3 | HHMMSS | Time | Hour, minute and second in decimal notation. (999999 = Not available) |

Example: \$PSTT,10A,20121028,135230*<CR><LF>

= Date October 28, 2012

= Time 13:52:30 UTC

9.1.2 \$PSTT,10C – Data Link Status

This sentence provides information about the traffic on the VHF data link. It is output approximately once every 60 seconds. Traffic load is calculated over the last frame (i.e. 60 seconds). Number of units is derived from the internal user list and is generally the number of received units within the last few minutes.

\$PSTT,10C,C,LLL,NNNN

| Field | Format | Name | Comment |
|-------|--------|-----------------|---|
| 1 | 10C | Sentence Id | 10C always |
| 2 | C | Channel | A = VDL Channel A B = VDL Channel B |
| 3 | LLL | Traffic Load | Data link traffic load in percent, 0-100. |
| 4 | NNNN | Number of Units | Number of units occupying the data link |

9.1.3 \$PSTT,146 – System Operational Mode Status

This sentence reports the system operational mode. This sentence is output on change, periodically every minute and on request using PSTT,101.

\$PSTT,146,x,x,x*hh<CR><LF>

| Field | Format | Name | Comment |
|-------|--------|---------------|---------------------------|
| 1 | 146 | Sentence Id | 146 always |
| 2 | X | 1 W Mode | 0 = Default 1 = 1 Watt |
| 3 | X | System Mode | 0 = Class A 1 = Inland |
| 4 | X | Transmit mode | 0 = Normal 1 = Silent |

9.1.4 \$PSTT,1F3 – Transponder Restart

This sentence will be output when the transponder has restarted.

\$PSTT,1F3,R

| Field | Format | Name | Comment |
|-------|--------|----------------|---|
| 1 | 1F3 | Sentence Id | 1F3 always |
| 2 | R | Restart Reason | 0 = Unknown 1 = Cold Start 2 = General Protection Fault 3 = Power Fail 4 = Warm Start |

9.2 Long Range Output Sentences

9.2.1 On Long Range Port

9.2.1.1 LR1 – AIS long-range reply sentence 1

\$--LR1,x,xxxxxxxxx,xxxxxxxxx,c—c,c—c,xxxxxxxxx

| Field | Format | Name | Comment |
|-------|---------------|---------------------------------------|---------|
| 1 | --LR1 | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxxx x | MMSI of responder | Used |
| 4 | xxxxxxxx x | MMSI of requestor (reply destination) | Used |
| 5 | c—c | Ship's name | Used |
| 6 | c—c | Call sign | Used |
| 7 | xxxxxxxx x | IMO Number | Used |

9.2.1.2 LR2 – AIS long-range reply sentence 2

\$--LR2,x,xxxxxxxxx,xxxxxxxxx,hhmmss.ss,ffff.ll,a,yyyyy.yy,a,x.x,T,x.x,N

| Field | Format | Name | Comment |
|-------|---------------|----------------------|---------|
| 1 | --LR2 | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxxx x | MMSI of responder | Used |
| 4 | xxxxxxxx | Date | Used |
| 5 | hhmmss.ss | UTC time of position | Used |
| 6 | ffff.ll | Latitude | Used |
| 7 | a | N / S | Used |
| 8 | yyyyy.yy | Longitude | Used |
| 9 | a | E / W | Used |
| 10 | x.x | Course over ground | Used |
| 11 | T | Validity of COG | Used |
| 12 | x.x | Speed over ground | Used |
| 13 | N | Validity of SOG | Used |

9.2.1.3 LR3 – AIS long-range reply sentence 3

\$--LR3,x,xxxxxxxx,c—c,xxxxxx,hhmmss.ss,x.x,x.x,x.x,x.x,x.x,x.x

Output rate: On event

| Field | Format | Name | Comment |
|-------|---------------|--------------------|---------|
| 1 | --LR3 | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxxx x | MMSI of responder | Used |
| 4 | c—c | Voyage destination | Used |
| 5 | xxxxxx | ETA Date | Used |
| 6 | hhmmss.ss | ETA time | Used |
| 7 | x.x | Draught | Used |
| 8 | x.x | Ship / Cargo | Used |
| 9 | x.x | Ship length | Used |
| 10 | x.x | Ship width | Used |
| 11 | x.x | Ship type | Used |
| 12 | x.x | Persons | Used |

9.2.1.4 LRF – AIS long-range function

\$--LRF,x,xxxxxxxx,c—c,c—c,c—c

Output rate: On event

| Field | Format | Name | Comment |
|-------|--------------|-----------------------|---------|
| 1 | -LRF | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxx x | MMSI of requestor | Used |
| 4 | c—c | Name of requestor | Used |
| 5 | c—c | Function request | Used |
| 6 | c—c | Function reply status | Used |

9.2.2 On All Other Output Ports

9.2.2.1 LRF – AIS long-range function

\$--LRF,x,xxxxxxxx,c—c,c—c,c—c

Output rate: On event

| Field | Format | Name | Comment |
|-------|--------------|-----------------------|---------|
| 1 | -LRF | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxx x | MMSI of requestor | Used |
| 4 | c—c | Name of requestor | Used |
| 5 | c—c | Function request | Used |
| 6 | c—c | Function reply status | Used |

9.2.2.2 LRI – AIS long-range interrogation

\$--LRI,x,a,xxxxxxxx,xxxxxxxx,||||.ll,a,yyyyy.yy,a,||||.ll,a,yyyyy.yy,a

Output rate: On event

| Field | Format | Name | Comment |
|-------|---------------|---------------------|---------|
| 1 | -LRI | Sentence Id | Used |
| 2 | x | Sequence number | Used |
| 3 | xxxxxxxx x | MMSI of requestor | Used |
| 4 | xxxxxxxx | MMSI of destination | Used |
| 5 | .ll | Latitude | Used |
| 6 | a | N / S | Used |
| 7 | yyyyy.yy | Longitude | Used |
| 8 | a | E / W | Used |

9.3 AIS Output Sentences

9.3.1 ABK – AIS Addressed and binary broadcast acknowledgement

\$ -- ABK,xxxxxxxx,x,x.x,x,x

Output rate: On event.

| Field | Format | Name | Comment |
|-------|----------|--------------------------------|---------|
| 1 | --ABK | Sentence Id | Used |
| 2 | xxxxxxxx | MMSI of the addressed AIS unit | Used |
| 3 | x | AIS channel of reception | Used |
| 4 | x.x | ITU - R M.1371 Message ID | Used |
| 5 | x | Message sequence number | Used |
| 6 | x | Type of acknowledgement | Used |

9.3.2 ACA – AIS Regional Channel Assignment Message

\$--ACA,x,|||.ll,a,yyyy.yy,a,|||.ll,a,yyyy.yy,a,x,xxxx,x,xxxx,x,x,a,x,
hhmmss.ss

Output rate: On event. On request.

| Field | Format | Name | Comment |
|-------|-----------|-------------------------|---------|
| 1 | --ACA | Sentence Id | Used |
| 2 | x | Sequence number | Ignored |
| 3 | .ll | NE latitude (2 fields) | Used |
| 4 | a | | |
| 5 | yyyy.yy | NE longitude (2 fields) | Used |
| 6 | a | | |
| 7 | .ll | SW latitude (2 fields) | Used |
| 8 | a | | |
| 9 | yyyy.yy | SW longitude (2 fields) | Used |
| 10 | a | | |
| 11 | x | Transitional zone size | Used |
| 12 | xxxx | Channel A | Used |
| 13 | x | Channel A bandwidth | Used |
| 14 | xxxx | Channel B | Used |
| 15 | x | Channel B bandwidth | Used |
| 16 | x | Tx/Rx mode | Used |
| 17 | x | Power level | Used |
| 18 | a | Information source | Ignored |
| 19 | x | In use flag | Ignored |
| 20 | hhmmss.ss | Time of In use change | Ignored |

9.3.3 ALR – Set alarm state

\$--ALR, hhmmss.ss,xxx,A, A,c--c

Output rate: On event, on request, and automatically. Output every 30s for active alarms and every 60s when no active alarms.

| Field | Format | Name | Comment |
|-------|-----------|--|---------|
| 1 | --ALR | Sentence Id | Used |
| 2 | hhmmss.ss | Time of alarm condition change, UTC | Used |
| 3 | Xxx | Unique alarm number (identifier) at alarm source | Used |
| 4 | A | Alarm condition A = threshold exceeded V = not exceeded | Used |
| 5 | A | Alarm's acknowledge state A = acknowledged V = unacknowledged | Used |
| 6 | c-c | Alarm's description text | Used |

9.3.4 EPV – Command or report equipment property value

\$--EPV,a,c--c,c--c,x.x,c--c

Output rate: On request.

| Field | Format | Name | Comment |
|-------|--------|----------------------------|---------|
| 1 | --EPV | Sentence Id | Used |
| 2 | a | Sentence status flag | Used |
| 3 | c-c | Destination equipment type | Used |
| 4 | c-c | Unique Identifier | Used |
| 5 | x.x | Property identifier | Used |
| 6 | c-c | Value of property | Used |

9.3.5 NAK – Negative acknowledgement

\$--NAK,cc,ccc,c--c,x.x,c--c

Output rate: On event

| Field | Format | Name | Comment |
|-------|--------|---|---------|
| 1 | --NAK | Sentence Id | Used |
| 2 | cc | Talker identifier | Used |
| 3 | ccc | Affected sentence formatter | Used |
| 4 | c-c | Unique Identifier | Used |
| 5 | x.x | Reason code for negative acknowledgement | Used |
| 6 | c-c | Negative acknowledgement's descriptive text | Used |

9.3.6 SSD – Ship Static Data

\$--SSD,c--c,c--c,xxx,xxx,xx,xx,c,aa

Output rate: On request.

| Field | Format | Name | Comment |
|-------|--------|-------------------|--|
| 1 | --SSD | Sentence Id | Used |
| 2 | c--c | Call sign | Used, may be NULL |
| 3 | c--c | Name | Used, may be NULL |
| 4 | xxx | Pos ref A | Used to change position reference for the position source in use. May be NULL. |
| 5 | xxx | Pos ref B | Used to change position reference for the position source in use. May be NULL. |
| 6 | xx | Pos ref C | Used to change position reference for the position source in use. May be NULL. |
| 7 | xx | Pos ref D | Used to change position reference for the position source in use. May be NULL. |
| 8 | c | DTE | Ignored |
| 9 | aa | Source identifier | Ignored |

9.3.7 TRL – AIS transmitter non functioning log

\$--TRL,x.x,x.x,x,xxxxxxxx,hhmmss.ss,xxxxxxxx,hhmmss.ss,x

Output rate: On request. Up to 10 sentences in a burst.

| Field | Format | Name | Comment |
|-------|-----------|-------------------------------|---------|
| 1 | --TRL | Sentence Id | Used |
| 2 | x.x | Total number of log entries | Used |
| 3 | x.x | Log entry number | Used |
| 4 | x | Sequential message identifier | Used |
| 5 | xxxxxxxx | Switch off date | Used |
| 6 | hhmmss.ss | Switch off UTC time | Used |
| 7 | xxxxxxxx | Switch on date | Used |
| 8 | hhmmss.ss | Switch on UTC time | Used |
| 9 | X | Reason code1 | Used |

9.3.8 TXT – Text transmission

\$--TXT,xx,xx,xx,c--c

Output rate: On request, on event.

| Field | Format | Name | Comment |
|-------|--------|---------------------------|---------|
| 1 | --TXT | Sentence Id | Used |
| 2 | xx | Total number of sentences | Used |
| 3 | xx | Sentence number | Used |
| 4 | xx | Text identifier | Used |
| 5 | c--c | Text message | Used |

9.3.9 VDM – AIS VHF data-link message

!--VDM,x,x,x,a,s—s,x

Only output on serial port when baudrate is 38400 bps or higher.

Output rate: On VHF message receive event.

| Field | Format | Name | Comment |
|-------|--------|--|---------|
| 1 | --VDM | Sentence Id | Used |
| 2 | X | Total number of sentences needed to transfer the message | Used |
| 3 | X | Sentence number | Used |
| 4 | X | Sequential message identifier | Used |
| 5 | A | AIS channel | Used |
| 6 | s—s | Encapsulated ITU-R M.1371 radio message | Used |
| 7 | X | Number of fill bits | Used |

9.3.10 VDO – AIS VHF data-link own-vessel report

!--VDO,x,x,x,a,s—s,x

Only output on serial port when baudrate is 38400 bps or higher.

Output rate: On VHF transmission event. "Dummy" messages once per second.

| Field | Format | Name | Comment |
|-------|--------|--|--|
| 1 | --VDO | Sentence Id | Used |
| 2 | X | Total number of sentences needed to transfer the message | Used |
| 3 | X | Sentence number | Used |
| 4 | X | Sequential message identifier | Used |
| 5 | A | AIS channel | Used for transmission event. Not used for "dummy" position messages. |
| 6 | s—s | Encapsulated ITU-R M.1371 radio message | Used |
| 7 | X | Number of fill bits | Used |

9.3.11 VER – Version

\$--VER,x,x,aa,c--c,C--C,C--c,C--c,C--c,X

Output rate: On request.

| Field | Format | Name | Comment |
|-------|--------|-------------------------------|-------------|
| 1 | --VER | Sentence Id | Used |
| 2 | x | Total number of sentences | Always 1 |
| 3 | x | Sentence number | Always 1 |
| 4 | aa | Device Type | Used |
| 5 | c--c | Vendor ID | Used |
| 6 | c--c | Unique Identifier | Used |
| 7 | c--c | Manufacturer serial number | Used |
| 8 | c--c | Model code | Used |
| 9 | c--c | Software revision | Used |
| 10 | c--c | Hardware revision | Used |
| 11 | x | Sequential message identifier | Always NULL |

9.3.12 VSD – Voyage Static Data

\$--VSD,x.x,x.x,x.x,c--c,hhmmss.ss,xx,xx,x.x,x.x

Output rate: On request.

| Field | Format | Name | Comment |
|-------|---------------|----------------------------|---------|
| 1 | --VSD | Sentence Id | Used |
| 2 | x.x | Type of ship and cargo | Used |
| 3 | x.x | Maximum present draught | Used |
| 4 | x.x | Persons on-board | Used |
| 5 | c--c | Destination | Used |
| 6 | hhmmss.s s | Est. UTC of arrival | Used |
| 7 | Xx | Est. day of arrival | Used |
| 8 | Xx | Est. month of arrival | Used |
| 9 | x.x | Navigational status | Used |
| 10 | x.x | Regional application flags | Used |

10 Glossary

| | |
|---------|---|
| ACK | Acknowledgement |
| AFSK | Audio Frequency Shift Keying |
| AIS | Automatic Identification System |
| Ant | Antenna |
| App | Application |
| ARPA | Automatic Radar Plotting Aid |
| BRG | Bearing |
| BS | Base Station |
| Ch | Channel |
| COG | Course Over Ground |
| Comm | Communication |
| DGNSS | Differential Global Navigational Satellite System |
| Disp | Display |
| DTE | Data Terminal Equipment |
| DSC | Digital Selective Calling |
| ECDIS | Electronic Chart Display and Information System |
| EGNOS | European Geostationary Navigation Overlay Service |
| EPFS | Electronic Position Fixing System |
| ETA | Estimated Time of Arrival |
| Ext | External |
| GALILEO | European GNSS |
| GLONASS | Russian GNSS |
| GMSK | Gaussian Minimum Shift Keying |
| GNSS | Global Navigational Satellite System |
| GPS | Global Positioning System |
| HDG | Heading |
| HDOP | Horizontal Dilution Of Precision |
| Hecto | Hectometre |
| H/W | Hardware |
| IALA | International Association of Lighthouse Authorities |
| ID | Identifier |
| IEC | International Electrotechnical Commission |
| IMO | International Maritime Organization |
| Int | Internal |
| ITU | International Telecommunications Union |
| LAT | Latitude |
| LED | Light Emitting Diode |
| LOC | Local |
| LON | Longitude |
| LR | Long Range |
| Msg | Message |
| MKD | Minimum Keyboard and Display |
| MSAS | MTSAT Satellite Augmentation System (Japan) |
| NMEA | National Marine Electronics Association |
| MMSI | Maritime Mobile Service Identity |
| N/A | Not available |
| NE | North East |

| | |
|--------|---|
| No | Number |
| NVM | Non-Volatile Memory |
| PoB | Persons on board |
| Pos | Position |
| RAIM | Receiver Autonomous Integrity Monitoring |
| RNG | Range |
| RATDMA | Random Access Time Division Multiple Access |
| ROT | Rate Of Turn |
| RTA | Recommended Time of Arrival |
| Rx | Receive |
| SAR | Search And Rescue |
| SART | Search And Rescue Transmitter |
| SBAS | Satellite Based Augmentation System |
| SNR | Signal to Noise Ratio |
| SOG | Speed Over Ground |
| SRM | Safety Related Message |
| Sync | Synchronization |
| SW | South West |
| S/W | Software |
| TDMA | Time Division Multiple Access |
| Transp | Transponder |
| Tx | Transmit |
| UN | United Nations |
| UTC | Universal Time Coordinated |
| VHF | Very High Frequency |
| VSWR | Voltage Standing Wave Ratio. (A low value indicates a problem with the antenna or connections/cables to the antenna.) |
| WAAS | Wide Area Augmentation System (United States) |

10.1 Inland ERI Ship Types

| ERI Ship Type | Description | IMO Ship Type |
|----------------------|-----------------------------------|----------------------|
| 8000 | Vessel Type Unknown | 99 |
| 8010 | Motor Freighter | 79 |
| 8020 | Motor Tanker | 89 |
| 8021 | Motor Tanker Liquid (N) | 80 |
| 8022 | Motor Tanker Liquid (C) | 80 |
| 8023 | Motor Tanker Dry Cargo | 89 |
| 8030 | Container Vessel | 79 |
| 8040 | Gas Tanker | 80 |
| 8050 | Motor Freighter Tug | 79 |
| 8060 | Motor Tanker Tug | 89 |
| 8070 | Motor Freighter (Ships Alongs.) | 79 |
| 8080 | Motor Freighter With Tanker | 89 |
| 8090 | Motor Freighter Push Freighter(s) | 79 |
| 8100 | Motor Freighter Push Tank-Ship(s) | 89 |
| 8110 | Tug Freighter | 79 |
| 8120 | Tug Tanker | 89 |
| 8130 | Tug Freighter Coupled | 31 |
| 8140 | Tug Freighter/Tanker Coupled | 31 |
| 8150 | Freightbarge | 99 |
| 8160 | Tankbarge | 99 |
| 8161 | Tankbarge Liquid cargo (N) | 90 |
| 8162 | Tankbarge Liquid cargo (C) | 90 |
| 8163 | Tankbarge Dry Cargo | 99 |
| 8170 | Freightbarge Containers | 89 |
| 8180 | Tankbarge Gas | 90 |
| 8210 | Pushtow One Cargo Barge | 79 |
| 8220 | Pushtow 2 Cargo Barges | 79 |
| 8230 | Pushtow 3 Cargo Barges | 79 |
| 8240 | Pushtow 4 Cargo Barges | 79 |
| 8250 | Pushtow 5 Cargo Barges | 79 |
| 8260 | Pushtow 6 Cargo Barges | 79 |
| 8270 | Pushtow 7 Cargo Barges | 79 |
| 8280 | Pushtow 8 Cargo Barges | 79 |
| 8290 | Pushtow >=9 Cargo Barges | 79 |
| 8310 | Pushtow one Tank/Gas barge | 80 |
| 8320 | Pushtow 2 Barges (>= 1 T/G) | 80 |
| 8330 | Pushtow 3 Barges (>= 1 T/G) | 80 |
| 8340 | Pushtow 4 Barges (>= 1 T/G) | 80 |
| 8350 | Pushtow 5 Barges (>= 1 T/G) | 80 |
| 8360 | Pushtow 6 Barges (>= 1 T/G) | 80 |
| 8370 | Pushtow 7 Barges (>= 1 T/G) | 80 |
| 8380 | Pushtow 8 Barges (>= 1 T/G) | 80 |
| 8390 | Pushtow >=9 Barges (>= 1 T/G) | 80 |
| 8400 | Tug Single | 52 |
| 8410 | Tug One or More Tows | 31 |
| 8420 | Tug Assisting a Vessel or Linked. | 31 |
| 8430 | Pushboat Single | 99 |
| 8440 | Passenger Ship Ferry Cruise | 69 |
| 8441 | Ferry | 69 |
| 8442 | Red Cross Ship | 58 |
| 8443 | Cruise Ship | 69 |
| 8444 | Passenger Ship No Accommodation | 69 |
| 8450 | Service Vessel Police etc. | 99 |
| 8460 | Vessel Maint. Derric etc. | 33 |
| 8470 | Object Towed | 99 |
| 8480 | Fishing Boat | 30 |
| 8490 | Bunkership | 99 |
| 8500 | Barge Tanker Chemical | 80 |
| 8510 | Object Not Specified | 99 |
| 1500 | General Cargo Vessel | 79 |
| 1510 | Unit Carrier Maritime | 79 |
| 1520 | Bulk Carrier Maritime | 79 |
| 1530 | Tanker | 80 |
| 1540 | Liquified Gas Tanker | 80 |
| 1850 | Pleasure Craft >= 20m | 37 |
| 1900 | Fast Ship | 49 |
| 1910 | Hydrofoil | 49 |

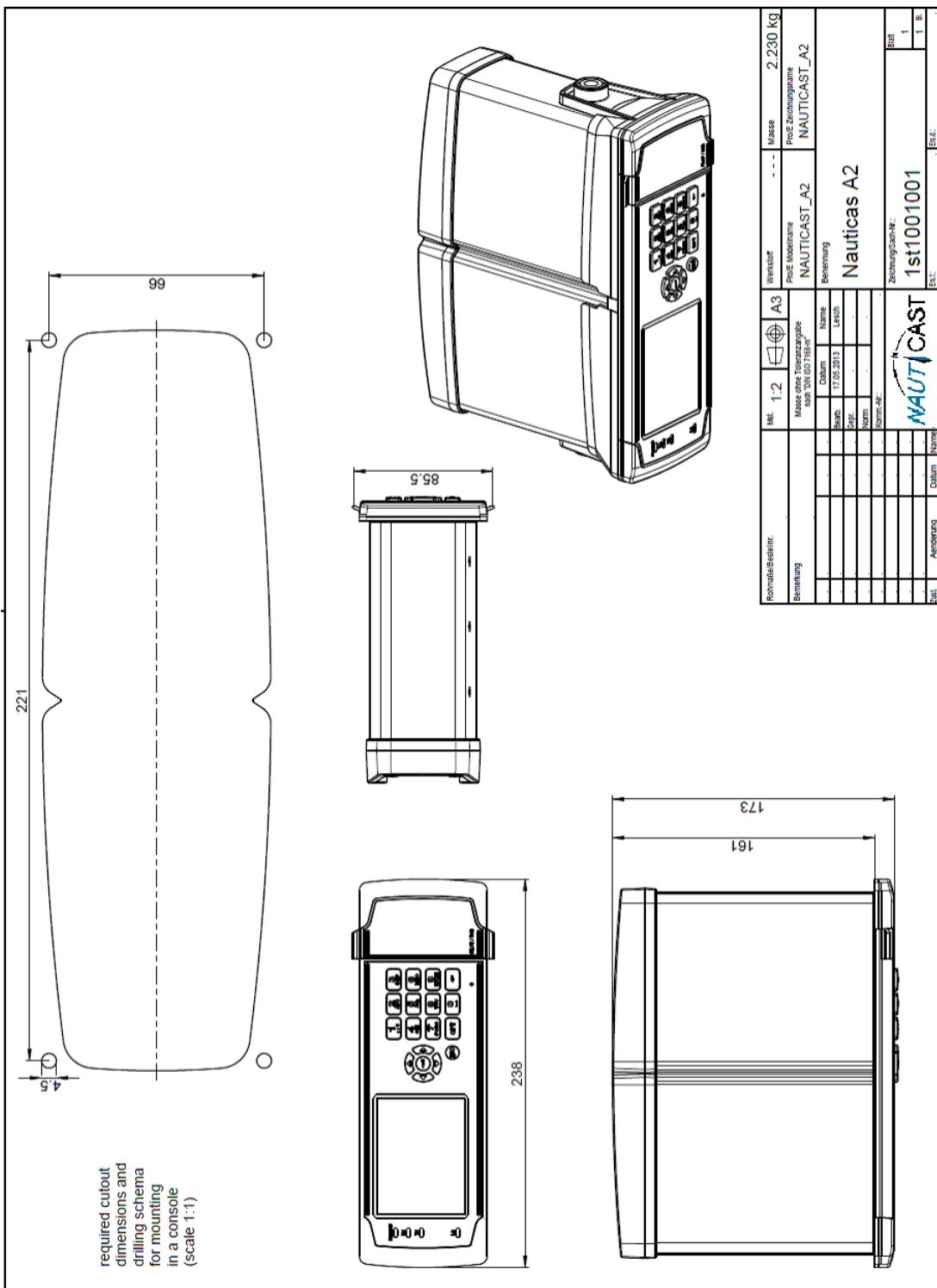
10.2 Units

| | |
|-------------|-----------------------|
| bps | Bits per second |
| W | Watt |
| m | Meter |
| kHz | Kilo Hertz |
| dB-Hz | Decibel-Hertz |
| NM | Nautical Mile |
| km | Kilometer |
| Sm | Statute Mile |
| kn | Knots |
| km/h | Kilometer per Hour |
| mph | Miles per Hour |
| mm-dd hh:mm | month-day hour:minute |
| h:m:s | hours:minutes:seconds |

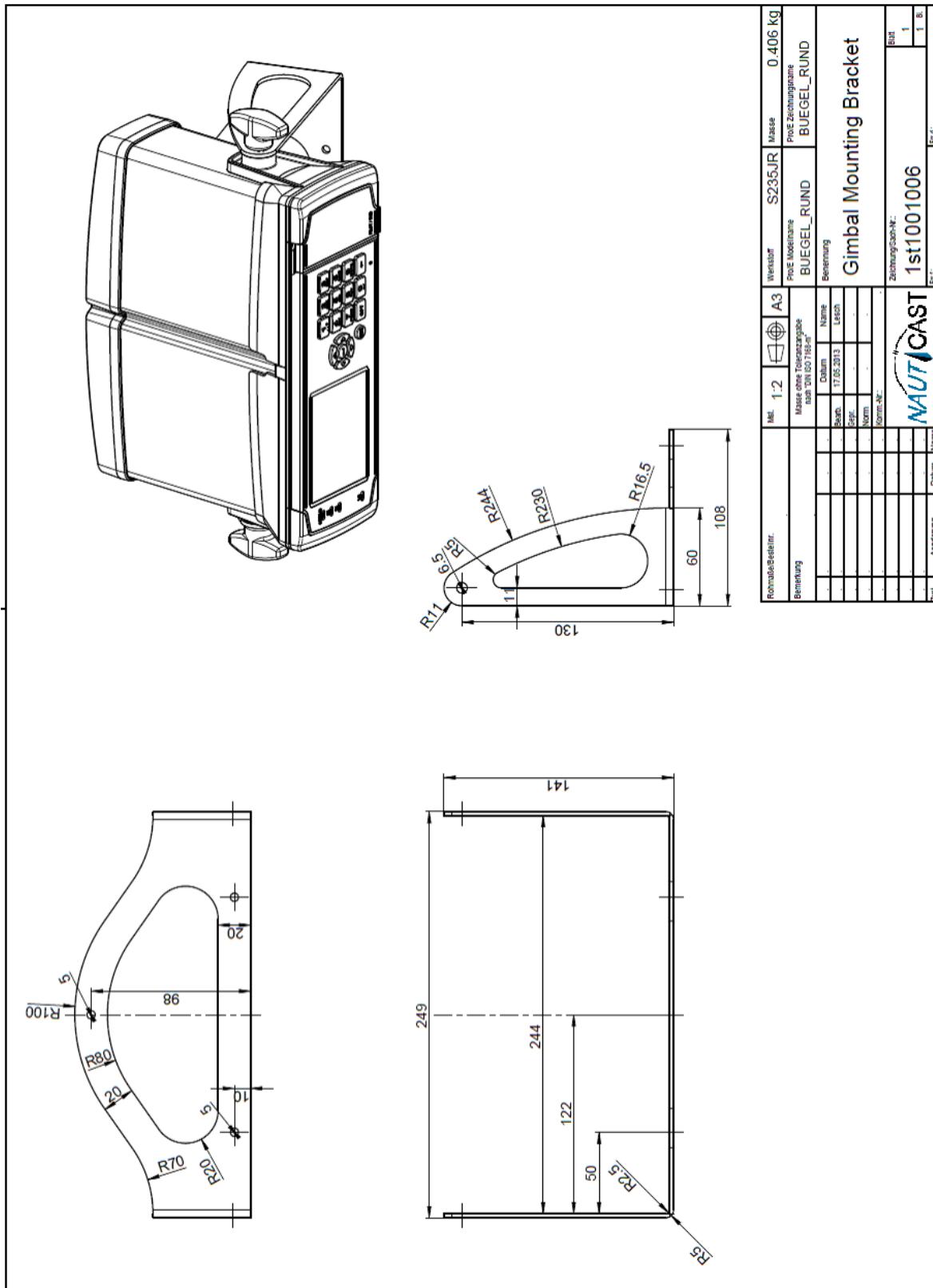
11 Appendix

11.1 Appendix A – Drawings

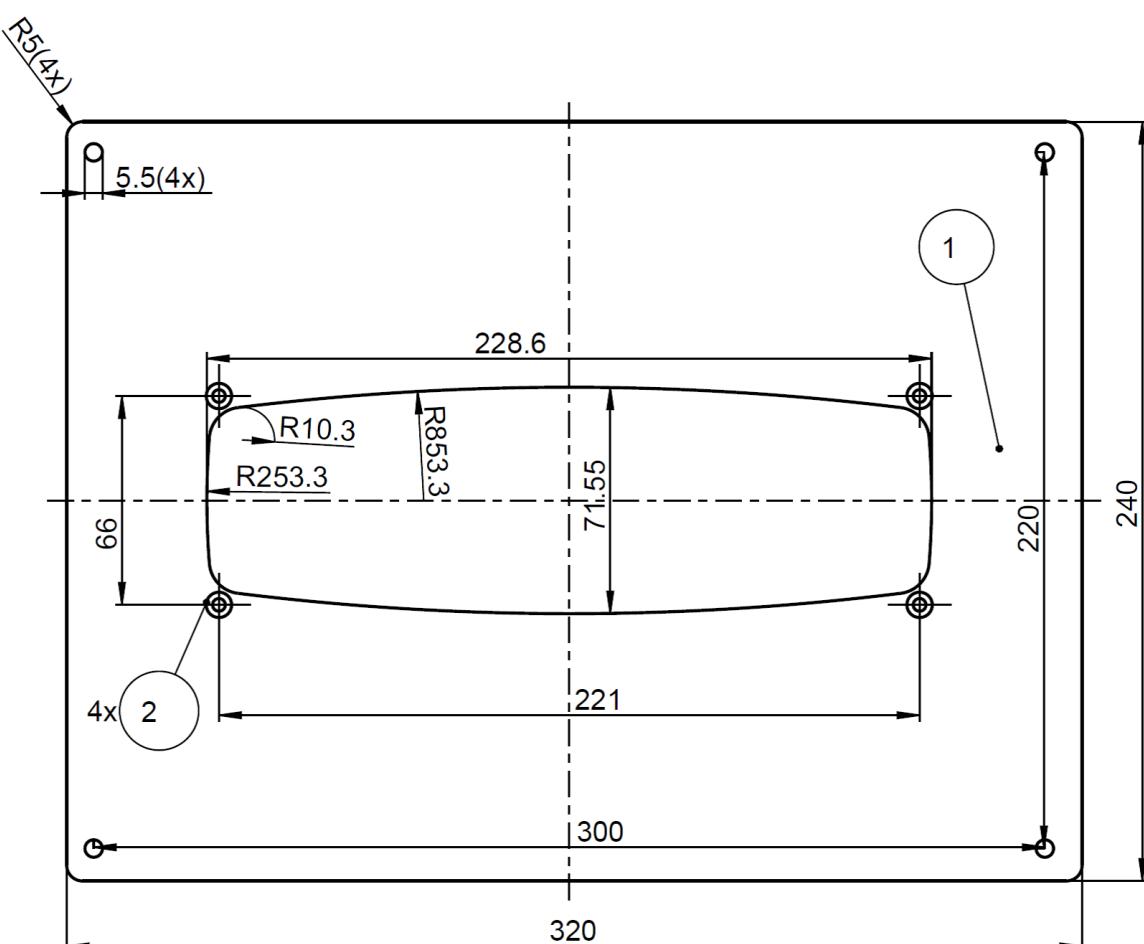
11.1.1 Panel Mounting:



11.1.2 Gimbal Mount:



11.1.3 Upgrade Retrofit Frame

| Pos. | Benennung | Sachnr./Normbez. | Werkstoff | Masse | Anz. |
|--|---|------------------|---------------------------------------|------------------------------------|------------------|
| 1 | Upgrade Retro Fit Frame Drop In Mount | 1st1001052 | Blech 2.5 | 1.208 | 1 |
| 2 | M4 Gewindegummibuchse | | S235JR | 0.003 | 4 |
|  | | | | | |
| <p>Es sind Bohrungen entsprechend der verwendeten M4 Gewindegummibuchsen vorzunehmen</p> | | | | | |
| Rohmaße/Bestellnr. | Mst. 1:1 | A4 | Werkstoff Blech 2.5 | Masse 1.219 kg | |
| Bemerkung | Masze ohne Toleranzangabe nach "DIN ISO 2768-m" | | Pro/E Modellname MONTAGERAHMEN | Pro/E Zeichnungsname MONTAGERAHMEN | |
| | Datum | Name | Benennung | | |
| | Bearb. | 03.07.2013 | Upgrade Retro Fit Frame Drop In Mount | | |
| | Gepr. | | | | |
| | Norm | | | | |
| | Komm.-Nr.: | | | | |
| Zust. | Aenderung | Datum | Name | Zeichnung/Sach-Nr.: 1st1001052 | Blatt 1 1 Bl. |
| | | | | Ers.f.: | Ers.d.: |

11.2 Appendix B – License

The NAUTICAST A2 Transponder System runs on a Linux operating system which is licensed with GNU General Public License. The source code of the Linux kernel can be obtained by contacting Nauticast GmbH:

Email: support@nauticast.com

Copy of the GNU General Public License:

GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc. 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA; Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things. To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
- b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
- c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

- a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

- b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the program's name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

**This program is free software; you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation; either version 2 of the License, or
(at your option) any later version.**

**This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
GNU General Public License for more details.**

**You should have received a copy of the GNU General Public License
along with this program; if not, write to the Free Software
Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA**

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author

Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.

**This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.**

**The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License.
Of course, the commands you use may be called something other than `show w' and `show c'; they could even be
mouse-clicks or menu items--whatever suits your program.**

**You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright
disclaimer" for the program, if necessary. Here is a sample; alter the names:**

**Yoyodyne, Inc., hereby disclaims all copyright interest in the program
'Gnomovision' (which makes passes at compilers) written by James Hacker.**

<signature of Ty Coon>, 1 April 1989

Ty Coon, President of Vice

**This General Public License does not permit incorporating your program into proprietary programs. If your program is a
subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is
what you want to do, use the GNU Library General Public License instead of this License.**

11.3 Appendix C – Declaration of Conformity

EG – Konformitätserklärung
 EC – Declaration of Conformity
 Déclaration CE de Conformité



Diese Konformitätserklärung bestätigt, dass das unten benannte Produkt den Auflagen der Direktive 96/98/EU für maritime Ausrüstung, geändert durch EC Council Directive 2012/32/EU und 2013/52/EU entspricht, und von der benannten Stelle Nr. 0735 (BSH) typengeprüft wurde.

We hereby declare that the following product is in compliance with the Requirements of the Marine Equipment Directive (MED) 96/98/EC and the last modification by Directive 2012/32/EC and 2012/52/EC, and has been type examined by the Notified Body No. 0735 (BSH).

Cette déclaration de conformité déclare que le produit est conforme à Directive 96/98/CE à l'équipement maritime, telle que modifiée par la directive 2012/32/CE et 2013/52/CE, et a été testé par l'organisme notifié no. 0735 (BSH).

| | |
|--|---|
| Produktbezeichnung: Product Name / Nom du produit | NAUTICAST™ A2 |
| Zertifikate der benannten Stellen: Certificates from the notified Body / Certificats des Organismes Notifiés | <p>EC Type Examination (Module B) Certificate.: 4581/001/4322644/14 USCG-Module B No.: 165.155/EC0735</p> <p>Bundesamt für Seeschifffahrt und Hydrographie (BSH-Cert) Notified Body 0735: BSH-Cert, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany</p> |

| | |
|--|--|
| Spezifizierte Standards: Specified Standard(s) / Standard(s) Spécifié(s) | IMO A.694(17) IMO MSC.74(69) Annex 3 IMO MSC.191(79) ITU-R M.1371-4 (Class A), 2010 ITU-R M.825-3, 1998 ITU-R M.1084-5, 2012 IEC 61993-2 Ed.2.0, 2012 IEC 61108-1 Ed.2.0, 2003 IEC 60945 Ed.4.0 (2002) incl. Corr. 1 (2008) IEC 61162-1 Ed.4.0, 2010 IEC 61162-2 Ed.1.0, 1998 IEC 62288 Ed.1.0 (2008) |
|--|--|

| | |
|---|--|
| Dokumentennummer: Document number / Num. du document | 2014-09 |
| Anschrift: Address / Adresse | Nauticast GmbH Lützowgasse 12-14 / 3. OG, AT-1140 Vienna, Austria |
| Hersteller: Manufacturer / Fabricant | Saab TransponderTech AB Lützowgasse 12-14 / 3. OG, AT-1140 Vienna, Austria |
| Ort, Datum: place, date / Lieu, Date | Wien / Vienna / Vienne, 2014-09-30 |
| Unterschrift: Signature / Signature |  Wolfgang Ogrisek Managing Director |

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies the compliance with the indicated directives but implies no warranty of properties. The safety instructions of the accompanying product documentation shall be observed.

Cette déclaration certifie la conformité avec les directives indiquées mais n'implique aucune garantie des propriétés. Les instructions de sécurité de la documentation accompagnant le produit doivent être suivies.

ISO 9001:2008 Zertifizierung / ISO 9001:2008 Certification / ISO 9001:2008 Certification

Nauticast GmbH hat ein Qualitätsmanagement System nach ISO 9001:2008 implementiert, ist ISO-zertifiziert und wurde zuletzt am 22. August 2014 zertifiziert.

Nauticast GmbH maintains a Quality Management System according to ISO 9001:2008, is ISO and received the latest ISO certification 22nd August 2014.

Nauticast GmbH dispose d'un système de gestion de la qualité selon la norme ISO 9001: 2008, et a reçu dernièrement la certification ISO en 22 Août 2014.

11.4 Appendix D – Certification



Bundesrepublik Deutschland

Federal Republic of Germany

BSH-Cert

Benannte Stelle – Navigations- und Funkausrüstung
beim Bundesamt für Seeschifffahrt und Hydrographie

Notified Body – Navigation and Radiocommunication Equipment
at the Federal Maritime and Hydrographic Agency



NOTIFIED
BODY
0735

EC TYPE EXAMINATION (MODULE B) CERTIFICATE

This is to certify that:

BSH-Cert, specified as a "notified body" under the terms of „Schiffssicherheitsgesetz“ of 09 September 1998 (BGBl. I, p. 2860) modified last 23 January 2014 (BGBl. I, p. 78), did undertake the relevant type approval procedures for the equipment identified below which was found to be in compliance with the Navigation requirements of Marine Equipment Directive (MED) 96/98/EC and the last modification by Directive 2013/52/EU.

| | |
|---|--|
| Manufacturer | Saab TransponderTech AB |
| Address | Låsblecksgatan 3, 58941 Linköping, SWEDEN |
| Applicant | Nauticast GmbH |
| Address | Lützowgasse 12-14, 1140 Vienna, AUSTRIA |
| Annex A.1 Item (No & item designation) | 4.32 Universal automatic identification system equipment (AIS) |
| Product Name | Saab R5 SOLID AIS SYSTEM |
| Trade Name(s) | Nauticast A2 |

Specified Standard(s)

| | |
|-----------------------------------|--|
| IMO Resolution A.694(17) | IEC 61993-2 Ed.2.0, 2012 |
| IMO Resolution MSC.74(69) Annex 3 | IEC 61108-1 Ed.2.0, 2003 |
| IMO Resolution MSC.191(79) | IEC 60945 Ed.4.0, 2002 incl. Corr. 1, 2008 |
| ITU-R M.1371-4 (Class A), 2010 | IEC 61162-1 Ed.4.0, 2010 |
| ITU-R M.825-3, 1998 | IEC 61162-2 Ed.1.0, 1998 |
| ITU-R M.1084-5, 2012 | IEC 62288 Ed.1.0, 2008 |

Based on the Directive 2012/32/EU, additional applied version: Directive 2013/52/EU
This certificate remains valid unless cancelled, expired or revoked.

Date of issue: 11 July 2014

Issued by: BSH-Cert

Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany

Expiry date: 10 July 2019

Notified body 0735

Certificate No.: 4581/001/4322644/14

USCG-Module-B No.: 165.155/EC0735 Unique Identifier: 4322644

This certificate consists of 2 pages.



Kai-Jens Schulz-Reifer



This certificate is issued under the authority of the „Bundesministerium für Verkehr und digitale Infrastruktur“. V 2014-02-03



Bundesrepublik Deutschland

Federal Republic of Germany

Fachstelle der WSV für Verkehrstechniken FVT

Traffic Technologies Centre



WSV.de

Wasser- und
Schifffahrtsverwaltung
des Bundes

Zulassungsurkunde (rev. 1)

Type Approval Certificate

Nr.: R - 4 - 222

Gemäß dem von der Zentralkommission für die Rheinschifffahrt (ZKR) beschlossenen
*In accordance with the regulation adopted by the Central Commission for the Navigation on the River Rhine
(CCNR)*

**Standard Schiffsverfolgung und Aufspürung in der Binnenschifffahrt,
Edition 1.01 vom 10.10.2007**

und den
and the

**Betriebs- und Leistungsanforderungen, Prüfmethoden und geforderten
Prüfergebnissen gemäß Test Standard für Inland AIS, Edition 1.01 vom
22.10.2008**

wird das Inland AIS Bordgerät
the Inland AIS equipment

Nauticast A2 Inland AIS

des Herstellers
of the manufacturer

Saab TransponderTech AB, Låsblecksgatan 3, 58941 Linköping, Sweden

bestehend aus
components necessary for operation

Nauticast A2 Inland AIS Transponder unit;

Part No.: 7000 118-130; SW Version No.: R5 Solid 1.x.x

GPS antenna; Part No.: 7000 000-485 (MA 700) or 7000 000-135 (AT575-68) or
7000 000-435 (VHF/GPS)

VHF antenna; Part No.: 7000 000-077 or equivalent

als Inland AIS Gerät für die Binnenschifffahrt zugelassen.
has been approved as Inland AIS equipment for Inland Navigation.

Die Zulassung wird dem Antragsteller:

The type approval has been issued for the applicant:

Nauticast GmbH, Lützowgasse 12-14 / 3 OG, 1140 Vienna, Austria

erteilt.

Die Zulassungsinhaberin hat jede Änderung dieses Gerätetyps der Fachstelle der WSV für Verkehrstechniken mitzuteilen.

The manufacturer shall inform Fachstelle der WSV für Verkehrstechniken of any modification to the type tested products.

Fachstelle der WSV für Verkehrstechniken

Im Auftrag / by order

(Bober)

Koblenz, den 10.07.2014



For more information
and the latest updates visit us at

www.nauticast.com



Nauticast GmbH
Lützowgasse 12-14 / 3.OG
1140 Vienna, Austria
T: +43 (1) 5 237 237-0
F: +43 (1) 5 237 237-150
office@nauticast.com