OPERATION MANUAL

VDL 6000 AIS Class A/Inland

CNSS-11-1893-J

MANUAL

DOCUMENT CHANGE RECORD

Revision	Changes	Date
A	First issue	2011-12-21
B	Added chapter about how to enter symbols in alphanumeric text. Table 1-1 is updated.	2012-03-22
C	Table 2-1 is updated.	2012-05-08
D	Added section Night mode. Added save values and added information to backlight and Rx malfunction.	2012-05-10
E	Chapter 7.3.2, presentation of Ownship data updated	2012-05-21
F	Figure 5-1 is updated. Table 2-1 is updated with antenna mechanical data.	2012-05-29
G	Added inland specific functional messages	2012-07-16
H	Added references [5] and [6]	2012-08-14
I	Moved configuration of ERI for AIS Inland to Set voyage data. Clarified that no password is required for configuration of dimensions in AIS Inland. Fixed reference to section 7.2.4.2. Configuration of ERI moved to section 7.5.1.	2012-08-15
J	Added section 7.5.9 and 7.5.10 Updated Table 8-28 with Long-range AIS broadcast channel 1 and 2 Added proprietary NMEA sentence GNSS Updated section 2 with FCC certification and GLONASS aspects	2012-12-06

MANUAL

TABLE OF CONTENTS

MANUAL

LIST OF FIGURES

MANUAL

LIST OF TABLES

MANUAL

1 SCOPE

This manual describes the procedures for configuring and using the VDL 6000 AIS Class A/Inland transponder.

1.1 Identification

This document is valid for the products specified in Table 1-1.

Table 1-1 Identification

Product name	Product identification	Comment
VDL 6000 AIS Class A/Inland Transponder	VDL 6000-4X-XX	With Built-in MKD
AIS Class A/Inland Software	SW-6000-12-XX	Software for VDL 6000 AIS Class A/ Inland transponder

The name VDL 6000 AIS Class A/Inland transponder is the name of the AIS product developed by C.N.S. Systems AB for both AIS Class A and AIS Inland purpose. In this manual the product is denoted "VDL 6000 transponder".

1.2 Purpose

The purpose of this manual is to guide the personnel performing configuration of and using the VDL 6000 AIS Class A/Inland transponder. The manual will guide the personnel to a correct and safe usage of the transponder.

For information on how to install the VDL 6000 AIS Class A/Inland transponder refer to the Installation and Maintenance manual [3].

1.3 Audience

The intended audience of this document are:

- Technical staff performing the on ship physical installation.

- Bridge personnel responsible for navigating the ship.

MANUAL

2 REGULATORY NOTICE

The VDL 6000 transponder is type approved:

- with a module B certificate issued by Bundesamt für Seeschiffahrt und Hydrographie (BSH) in Germany according to the European MED directive 96/98/EC. The MED directive refers to the IMO resolution MSC.74(69) Annex 3 requirements for SOLAS ships.
- by Fachstelle der WSV für Verkehrstechniken (FVT) in Germany according to Inland AIS standards. The VDL 6000 Inland AIS is fully compliant with the Inland AIS standard [5] and the product has been tested by BSH according to the Inland AIS test standard [6].
- by Telefication in The Netherlands with a FCC certification (FCC ID: Y83 VDL 6000-4X) in accordance with FCC requirements for radio communication equipment for the maritime service.

BSH, FVT and Telefication certificates are available here: www.cns.se

Changes or modifications not expressly approved in writing by C.N.S. Systems AB may void the user's authority to operate this equipment.

The type certification of the VDL 6000 transponder is based on a combination of the GPS receiver (inside the VDL 6000 transponder) and GPS antenna. The list of approved GPS and combined GPS/VHF antennas which have been type approved can be found below in Table 2-1.

The internal GPS of the VDL 6000 transponder is needed for UTC time synchronisation and shall only be considered as a backup positioning sensor in case the primary position sensor fails.

The VDL 6000 Transponder may also be factory configured for operation with a combination of GPS and GLONASS (the system in use is chosen by the operator). The GNSS antenna must be compatible with the requirements stated for GPS/GLONASS use, see the Installation, Maintenance and Repair Manual [3].

Table 2-1   Approved GPS and combined VHF/GPS antennas

Description	Mechanical data	CNS Part Number
GPS Antenna (Procom GPS 4)	Height = 23 cm Diameter = 33 mm Weight = approx. 150 g	CNS2500-072
GPS Antenna (BJTEK Navigation, MA-700)	Height = 108.5 mm Diameter = 90.5 mm Weight = 150 g (without cable)	CNS2500-086
Combined VHF/GPS antenna including diplexer and VHF and GPS antenna adaptor cables (AC marine GPS/VHF-1 including diplexer)	Height = 1.1 m Weight = 0.65 kg	CNS2500-105
Marine GPS/VHF Antenna (BJTEK Navigation, GVA-650P)	Height = 45 mm Diameter = 60 mm Weight = 65 g (without cable)	CNS2500-116

The VDL 6000 transponder type approval is valid only with certain combination of transponder and GPS antenna.

The VDL 6000 transponder must be installed according to the Installation, Maintenance and Repair Manual [3].

2.1   Applicable standards and regulations

[1]   Technical characteristics for a universal shipborne automatic identification system using time division multiple access in the VHF maritime mobile band, ITU-R M.1371-4: 2010

[2]   Maritime Navigation and Radio Communication Equipment and Systems – Digital Interfaces: Part 1 – Single Talker and Multiple Listeners, IEC 61162-1{ed4.0}: 2010

[3]   Installation, Maintenance and Repair Manual, CNSS-11-1601

[4]   IALA Recommendation A-124 Annex 17, Channel management by an AIS Service

[5]   CCNR Vessel Tracking and Tracing Standard for Inland Navigation edition 1.01 (2007)

[6]   CCNR Vessel Inland AIS Ship borne Equipment - According to the Vessel Tracking and Tracing Standard - Operational and Performance Requirements, Methods of Test and Required Test Results (Test Standard for Inland AIS) edition 1.01 (2008)

Date	Classification	Page
2012-12-06	Unclassified	9 (85)

Document No.	Issue
CNSS-11-1893	J

3   HOW TO USE THIS MANUAL

3.1   Manual Overview

This User's Manual provides information required to operate the VDL 6000 transponder and fully take advantage of the many features. Where there are parts of the content that are specific for only Class A or Inland, that part has a text: Class A only or Inland only.

This manual is divided into the following sections:

Section 3	How to use this manual
Section 4	About AIS
Section 5	Installation overview
Section 6	Initial configuration
Section 7	Using the transponder
Section 8	NMEA Reference manual
Appendix A	MKD Key Layout
Appendix B	IMO Type of ship and cargo type
Appendix C	ERI ship types (Inland only)
Appendix D	Alarms and status changes

This manual is intended to be used together with the Installation, Maintenance and Repair manual [3].

3.2   Icons

Throughout this manual, the following icons are used to highlight areas of special interest and importance.

Note   Caution

MANUAL

4 ABOUT AIS

4.1 Basics

The AIS concept is based on automatic data exchange between ships and between ships and shore stations. Information is sent over an advanced digital VHF data link, where each AIS station gets its own time slot(s) for transmission of data. This means that each one of the stations can receive information transmitted from the others without any transmission conflicts. The capacity of the data link can theoretically handle several thousands of AIS stations within VHF radio range from each other at the same time without overload.

The successful establishment of the network requires that all stations are synchronized, and each AIS station is therefore equipped with an embedded GNSS receiver providing a common and accurate time reference.

In terms of ship borne equipment this description mainly refers to AIS Class A, which will be required by all ships covered by the SOLAS convention and the IMO AIS carriage requirement. The standard for AIS Class B is intended for non-SOLAS vessels such as vessels for domestic traffic, smaller ships, fishing boats and pleasure craft.

The core unit for ship borne AIS operation, which is defined by international standards, is the VDL 6000 transponder. The VDL 6000 transponder consists of the following main parts:

- A VHF transceiver, for the radio communication

- An embedded computer, handling the information exchange

- A GNSS receiver, for time synchronization

An AIS Class A/Inland system also requires a Minimum Keyboard and Display (MKD) unit, providing basic control and display functions.

4.2 Information Exchange

The information distributed in the AIS network is to a large extent standardised, but AIS also offers the possibility to exchange free text messages or virtually any information that can be digitalized, provided that the corresponding functionality is available on board or at a shore station.

The information distributed between ships gives significantly improved situation awareness when the AIS information is correlated with information provided by e.g. the radar, and integrated into the ships Electronic Chart Display System.

The communication between ships and shore stations not only give a shore authority, a VTS or other ground-based parties a real-time awareness of the ship movements, but also offers services to the ships. This could e.g. include distribution of ARPA targets, weather information and aids-to-navigation data.

The remotely located shore stations can also be connected to a network of regionally and centrally placed operations or management centres, offering a great flexibility and redundancy. Dependent on the required functionality, customer specific application software can be developed.

The information distributed between the AIS stations is currently based upon a set of 26 different message types defined in the standard. The definition of message types is an on-going process, and it can be assumed that new types will be added in the future.

The overall AIS operation is divided into the following operational modes:

- Autonomous and continuous mode – automatic broadcast transmissions without any external control (although the mode as such may be set from a so called competent authority)

- Assigned mode – transmission intervals and/or allocation of time slots are controlled by a competent authority

- Polled or interrogated mode – transmission occurs in response to an interrogation from a ship or competent authority

Each message type is associated with one or more operational modes, where the message may be used.

4.3 Ship Information

The information autonomously sent from a ship can be divided into three groups:

- Static information
  Static Information is broadcast every 6 minutes, when data is amended or on request by a competent authority.

- Dynamic information
  This information is broadcasted with an update rate depending on the current speed and course alteration, from 2 seconds to 3 minutes. Normally the update rate is 10 seconds.

- Voyage related information
  This information is broadcasted every 6 minutes, when data is amended or on request by a competent authority.

4.3.1 Static Information

Static information is entered into the VDL 6000 transponder at the installation of the unit and should normally not be changed, unless the ship for example changes name.

The following information is entered, see section 6.

Initial configuration:

- MMSI

- Name

- Call sign (ATIS Callsign for AIS Inland vessels)

- IMO Number

- Dimensions of ship and location of position fixing antenna

- Blue Sign, connected or not connected (Inland only)

- Length and beam (Inland only)

- Unique European Vessel Identification Number (ENI) (Inland only)

- ERI vessel type, see Appendix C (Inland only)

- Quality of speed, course and heading information (Inland only)

4.3.2 Dynamic Information

Dynamic information is automatically updated from the ship sensors connected to the VDL 6000 transponder.

The following information is provided:

- Ship position with accuracy indication and integrity status

- Position Time stamp in UTC

- Course over ground (COG)

- Speed over ground (SOG)

- Rate of turn (ROT)

- Heading

- Navigational status

- Engaged in special manoeuvre, Blue sign set / not set (Inland only)

MANUAL

4.3.3 Voyage Related Information

Voyage related information is manually entered and updated during the voyage.

The following information is provided:

- Ship draught

- Type of ship and cargo type (Hazardous cargo)

- Destination and ETA

- Number of passengers, crew and ship board personnel on board

- Number of assisting tugs (Inland only)

- Load status, loaded/unloaded (Inland only)

- Air draught (Inland only)

Throughout this manual both the expressions GNSS and GPS are used. These should in this manual be considered the same.

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5   INSTALLATION OVERVIEW

The VDL 6000 transponder includes a built-in MKD and physical interfaces for external equipment and power supply.

An overview of a typical AIS installation is shown in the figure below.
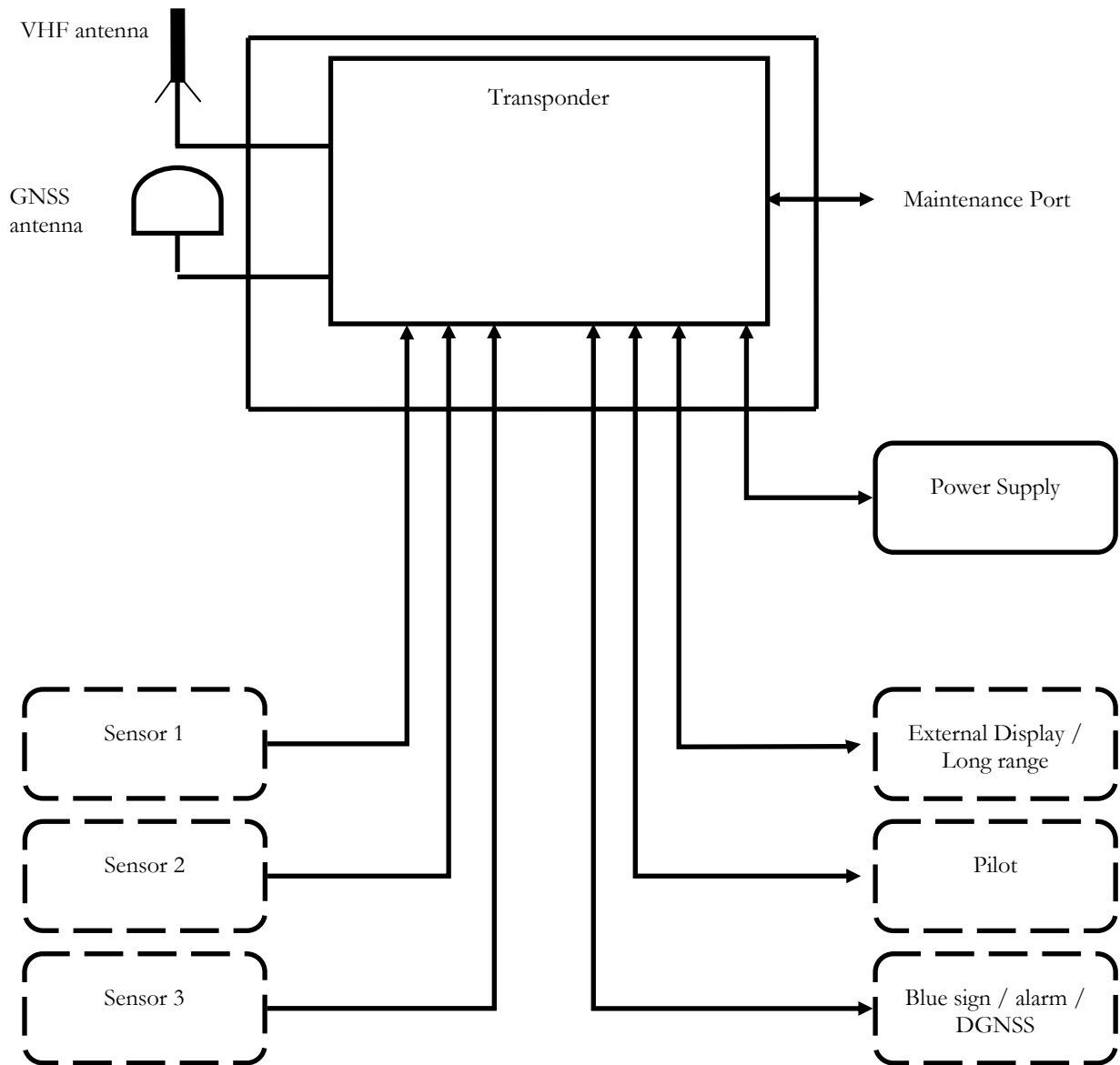
Figure 5-1   **Installation overview**

The two interfaces External Display and Pilot provide the functionality required by the Presentation Interface (PI) of an AIS system.

5.1   VDL 6000 Transponder Front Panel Description

Figure 5-1   Front panel

5.1.1   Power Indicator LED

The power indication (POW) is lit GREEN, when the VDL 6000 transponder is powered up.

A flashing LED indicates that the software boot sequence is executed or that proper power is not available and the shut down sequence has been initiated.

LED off indicates that the VDL 6000 transponder is not power supplied.

5.1.2   Blue sign (Inland only)

The Blue sign indicator (BLUE) is primarily used for Inland units and is lit BLUE when the Blue sign digital input is active.

5.1.3   Tx Indicator LED

The Tx (TX) indicator flashes YELLOW when the VDL 6000 transponder transmits.

5.1.4   Rx and DSC Indicator LED's

The Rx indicator flashes YELLOW when the VDL 6000 transponder receives.

RXA (AIS Channel A) and RXB (AIS Channel B) indicate reception of AIS TDMA messages.

DSC indicates reception of DSC telecommands.

5.1.5   Alarm Indicator LED

The alarm indication (ALR) is lit RED when the built-in test has generated an alarm.

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6 INITIAL CONFIGURATION

The MKD in the front of the VDL 6000 transponder is equipped with a text display containing eight lines with 21 characters each and a 16-button keyboard. When the VDL 6000 transponder is powered up for the first time the view below will be displayed on the MKD.

```
VDL 6000 AIS
No valid time
MMSI: 000000000
Callsign: -
```
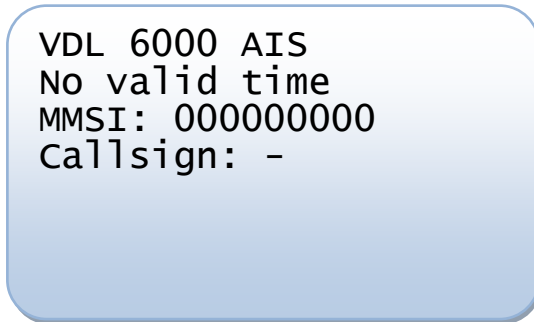
Data that should be configured when starting a transponder for the first time are:

Static data:

- MMSI (Maritime Mobile Service Identity)

- IMO number (where available),

- Name

- Call sign (ATIS Callsign for AIS Inland vessels)

- Blue Sign, connected or not connected (Inland only)

- Unique European Vessel Identification Number (ENI) (Inland only)

- ERI vessel type, see Appendix C (Inland only)

- Quality of speed, course and heading sensors (Inland only)

Ship Dimensions:

- Dimension (length and beam) (Inland only)

- Location of internal position source

- Location of external position source

See section 7.2.1 and Figure 7-1 on how to access these menu entries. Refer to section 7.5 on how to configure data.

7 USING THE VDL 6000 TRANSPONDER

The MKD is the user interface of the VDL 6000 transponder, where configuration and control is performed. The functionality provided by the MKD can to a large extent also be handled by external equipment through the Presentation Interface.

7.1 Start the VDL 6000 transponder

When the transponder is powered up and has been configured according to section 6 the MKD display shows a text similar to this.

```
VDL 6000 AIS
No valid time
MMSI: 012345678
Callsign: CNSS1
```

1 Space	2 ABC	↑3 DEF	4 GHI	5 JKL		CLR/ ALAR	SYM	MENU
6 MNO	←7 PQRS	↓8 TUV	→9 WXYZ	0		ESC	ALT	ENT
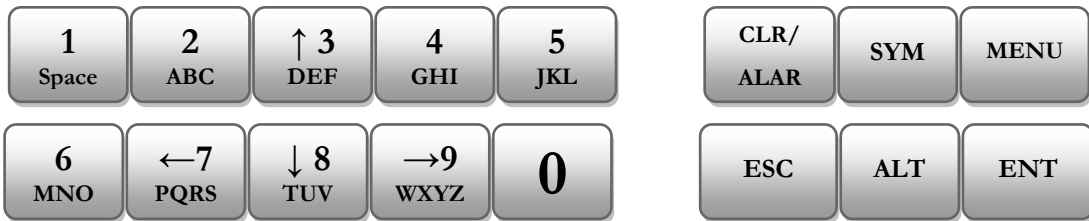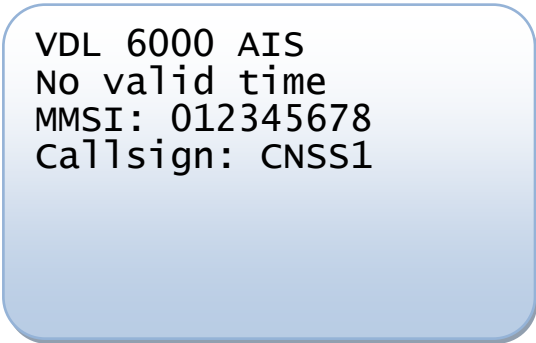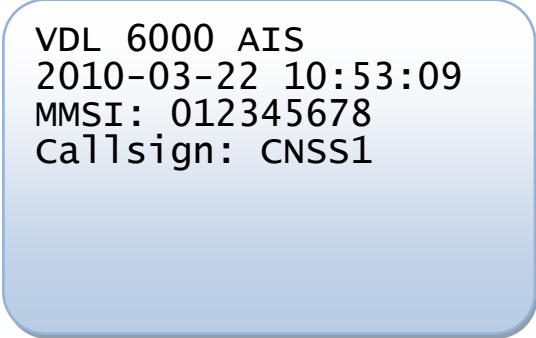
When the VDL 6000 transponder correctly receives UTC time, current date and time is displayed. With a correct GPS installation this should occur within 2 minutes. If no time has been received after 15 minutes, refer to [3] for GPS installation issues.

```
VDL 6000 AIS
2010-03-22 10:53:09
MMSI: 012345678
Callsign: CNSS1
```

BL0119C

MANUAL
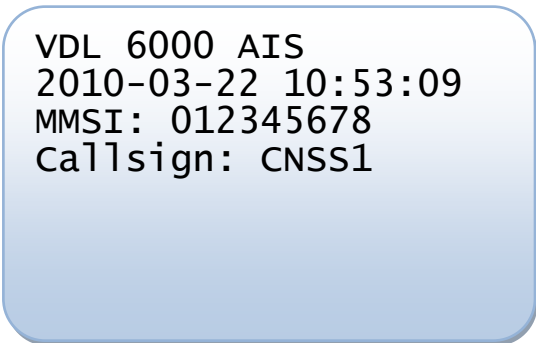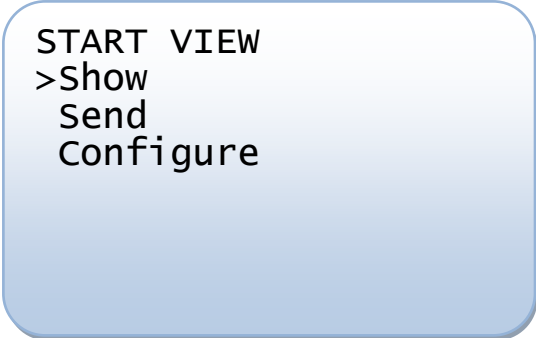
7.2   Menu Overview

When the VDL 6000 transponder is started the MKD always displays the default view presenting the current UTC time, MMSI number and Callsign (ATIS Callsign for AIS Inland vessels) for the own ship. To return to this view after operating the menu press [ALT] followed by [ESC], alternatively press [ESC] several times.

```
VDL 6000 AIS
2010-03-22 10:53:09
MMSI: 012345678
Callsign: CNSS1
```

Press [MENU] in order to enable the menu.

```
START VIEW
>Show
 Send
 Configure
```

See Figure 7-1 for an overview of the MKD menus.
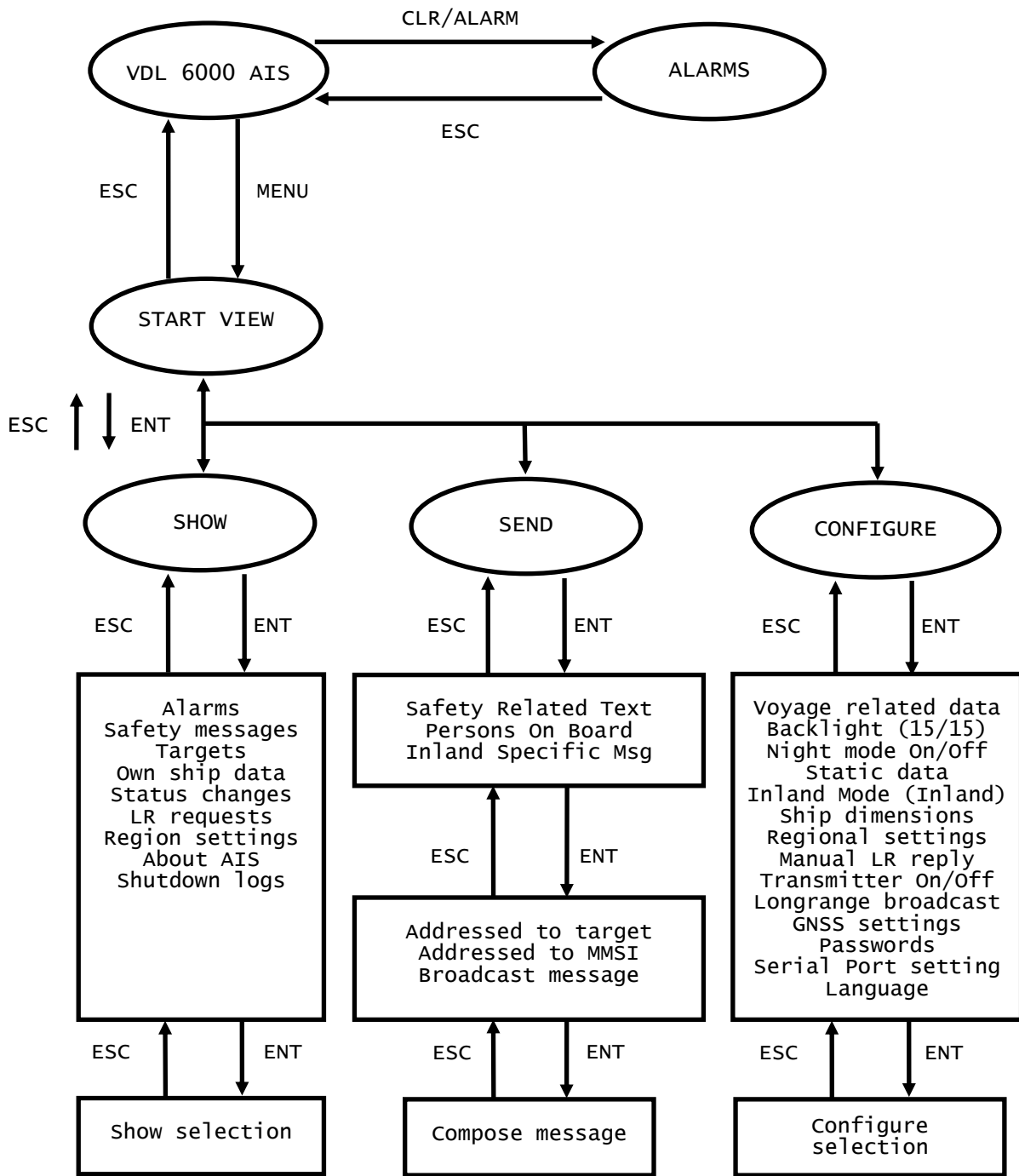
Figure 7-1   Overview of the MKD menus

MANUAL

Date	**Classification**	**Page**
2012-12-06	Unclassified	19 (85)
Document No.	**Issue**	
CNSS-11-1893	J	

7.2.1 Navigating the Menu

The display on the MKD contains one title row and seven menu rows. The menu rows are scrolled vertically by pressing the arrows ↑ and ↓, and by pressing [ENT] the currently marked (→) data or submenu is selected. In order to leave an entry or to abort press [ESC]. See Appendix A - MKD Key Layout for more details.

> Use the [ALT] button prior to the vertical arrows ↑ & ↓ to go directly to top or bottom of the current menu or submenu.

7.2.1.1 Indications on the Title Row

In addition to the name of the current menu there are up to four indications on the title row surrounded by parenthesis.

The possible indications are:

A There is (at least) one active unacknowledged alarm (see 7.3.1 for how to acknowledge alarms). This indication will be flashing to draw the attention of the indication. This indication follows the behaviour of the Alarm LED on the front panel, see 5.1.2.

M An addressed or broadcast safety related message has been received but has not yet been viewed, see 7.3.2.

S There is (at least) one not viewed status change for the VDL 6000 transponder, see 7.3.6.

L At least one long range request has been received during manual LR reply mode, see 7.3.7.

I This indication is available for Inland AIS transponders only. At least one inland specific functional message has been received and not yet viewed, see 7.3.3.

To indicate to the user that the MKD is working correctly and that the display has not frozen there is a blinking dot in addition to the indications above. However when an alarm is active the flashing alarm indication makes the additional blinking dot unnecessary. See examples below.

```
VDL 6000 AIS   (AMSL)
2010-03-22 10:53:10
MMSI: 012345678
Callsign: CNSS1
```
```
VDL 6000 AIS   ( MSL)
2010-03-22 10:53:11
MMSI: 012345678
Callsign: CNSS1
```
```
VDL 6000 AIS   (AMSL)
2010-03-22 10:53:12
MMSI: 012345678
Callsign: CNSS1
```

```
VDL 6000 AIS   .(MS)
2010-03-22 10:53:25
MMSI: 012345678
Callsign: CNSS1
```
```
VDL 6000 AIS    (MS)
2010-03-22 10:53:26
MMSI: 012345678
Callsign: CNSS1
```
```
VDL 6000 AIS   .(ML)
2010-03-22 10:53:27
MMSI: 012345678
Callsign: CNSS1
```

These indications are always shown except in some data input modes that are considered to be temporary. If the indications together with the name of the current menu does not fit entirely in the title row, (exceeds the maximum number of characters for the MKD display) two dots (..) are added before the indication parenthesis.

> For the 'M', 'S', 'L' and 'I' indication it is important that they are cleared as they appear, in order to see new indications (see 7.3.2, 7.3.6, 7.3.7 and 7.3.3).

Alarms are presented as 'popup' views when they occur (see 7.2.5) so they do not need to be cleared in order to get an indication for a new alarm. If the source of an alarm returns to a normal state the indication is removed, even though the alarm may have not been acknowledged.

MANUAL

Date	**Classification**	**Page**
2012-12-06	Unclassified	20 (85)
Document No.	**Issue**	
CNSS-11-1893	J	

7.2.2   SHOW Menu

The SHOW menu consists of nine submenus showing alarms, incoming and outgoing safety related messages, received targets, own ship data, status changes, long range requests, region settings, AIS versions and the event log.

```
SHOW
>Alarms
 Safety messages
 Targets
 Own ship data
 Status changes
 LR requests
 Region settings
 About AIS
 Event log
```
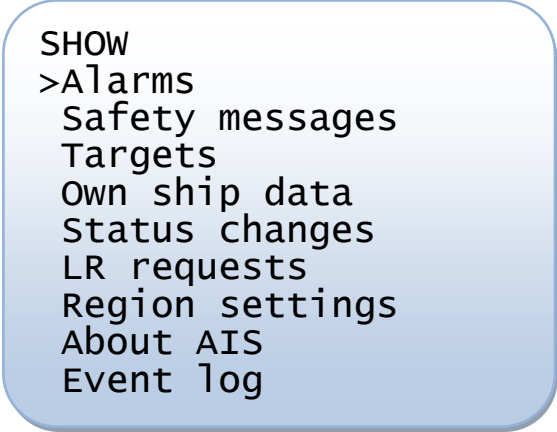
The details of each sub menu are described in 7.3.

7.2.3   SEND Menu

In this menu the transmission of some types of messages can be initiated. Each menu item leads to a submenu for the corresponding message type.

For a Class A transponder the available selections are:

- Safety Related Text
- Persons On Board

For an Inland AIS transponder the available selections are:

- Safety Related Text
- Persons On Board
- Inland Specific Msg

```
SEND
>Safety Related Text
 Persons On Board
 Inland specific Msg
```
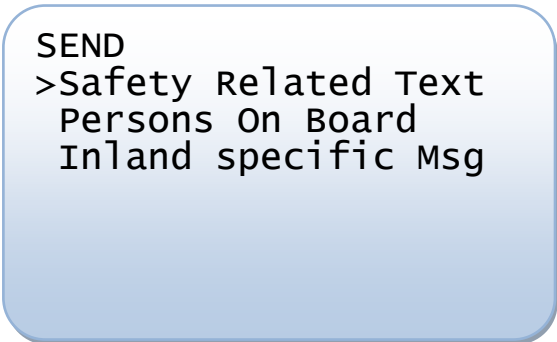
The details of each sub menu are described in 7.4.

MANUAL

7.2.4   CONFIGURE Menu

All configurable data is available under this menu and consists of ten submenus.

```
CONFIGURE
>Voyage related data
 Backlight (15/15)
 Night mode: Off
 Static data
 Ship dimensions
 Regional settings
 Manual LR reply
 Transmitter On
 Longrange broadcast
 GNSS settings
 Passwords
 Serial Port setting
 Language
```
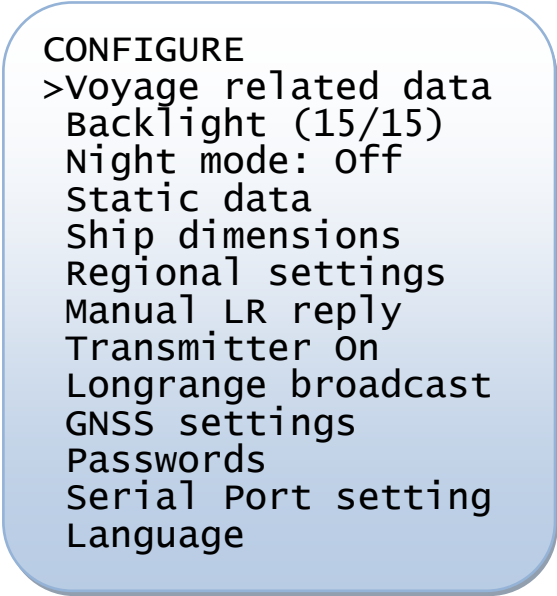
The details of each sub menu are described in 7.5.

7.2.4.1   Keyboard access to special symbols

Some configuration entries in the menu will allow you to enter both alphanumeric text and special symbols using the front panel keyboard. Enable the symbol input menu by pressing [ALT] prior to [SYM] when entering alphanumerical input. See Appendix A - MKD Key Layout for more details.

7.2.4.2   Password protection

Some configuration is password protected. There are two password levels: administrator and user, also identified as level 1 and 2. The administrator password gives access to all protected areas and the user level gives access to some protected areas. Letters, numbers and symbols can be used in a password but when a password is entered in the MKD it is case insensitive since it is only possible to enter upper case letters in the MKD.

The default passwords are:

        Administrator level (1):   **password**

        User level (2):   **password**

When entering a password protected area the user will be asked to enter a password with the lowest level needed in parenthesis. For example:

```
ENTER PASSWORD (2)
_
```

CNS Systems™
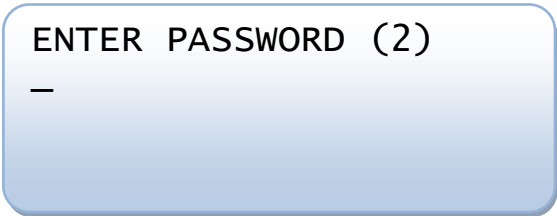
In this case both the administrator and the user password is valid to enter the protected area.

The areas protected with an administrator password are:

- Serial Port settings
- Static Data configuration
- Transmitter On/Off
- Longrange broadcast
- Ship dimensions (Class A transponder only)

The areas protected with a user password are:

- Long Range reply mode

To change the passwords see section 7.5.11.

7.2.5 Alarm Popup

When an alarm is generated the user's attention is attracted by a popup view. The MKD display is lit up to maximum and presents the alarm with the word "ALARM" flashing in the title. The alarm popup overrides all other views.

```
NEW ALARM [ESC/CLR]
Time: 18 Jan 11:46
Text: AIS: Heading l
ost/invalid
```
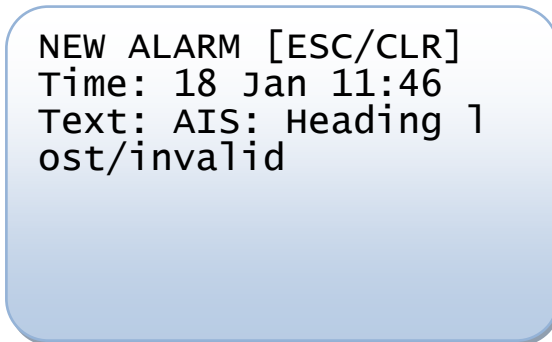
The user can choose to either acknowledge the alarm by pressing [CLR] or to abort by pressing [ESC]. When choosing to abort it is possible to acknowledge the alarm in the alarm menu later on, see 7.3.1. When the alarm is acknowledged or the view is aborted the MKD display returns to configured backlight level, see 7.5.2, and the former view returns.

7.3 SHOW

7.3.1 Alarms

All active and unacknowledged alarms are displayed in this menu and at the bottom there is a sub menu for alarm history.

The alarms in this menu and in the alarm history sub menu are presented with and indicator and the first 17 letters of the alarm description.

The indicators are:

* Unacknowledged and active

A Acknowledged and active

I Inactive

The maximum combined number of alarms displayed in the alarms and alarm history menus is 20. After that the oldest alarm in the alarm history is removed if a new alarm occurs. See Table D-52 for supported alarms.

Example of the Alarms menu:

```
ALARMS          (A)
>* No valid ROT info
 * Tx malfunction
 * Heading lost/inva
 * External EPFS los
 Alarm history
```

Select an alarm to acknowledge and/or to view alarm data. The alarm is presented with date and time of occurrence and a short description.

```
ALARM DATA      ( )
Time: 23 Mar 15:37
Text: AIS: No valid
ROT information
```

To leave the alarm data view use [CLR] to acknowledge the alarm or [ESC] to leave the state unchanged.

When there is at least one active and unacknowledged alarm it is indicated by a flashing 'A' on the title row (se 7.2.1.1).

7.3.1.1 Alarm History

The Alarm history menu contains alarms that are active but has been acknowledged and alarms that are no longer active. Note that alarms of the same character can exist more than once if the alarm occurs at different times.

```
ALARM HISTORY    ( )
 A No valid ROT info
>I No valid COG info
 I No valid SOG info
 I Heading lost/inva
 I External EPFS los
```

BL0119C

Select an alarm to view the alarm date and time of occurrence and a short description.

```
ALARM DATA        (A)
Time: 23 Mar 13:04
Text: AIS: No valid
COG information
```
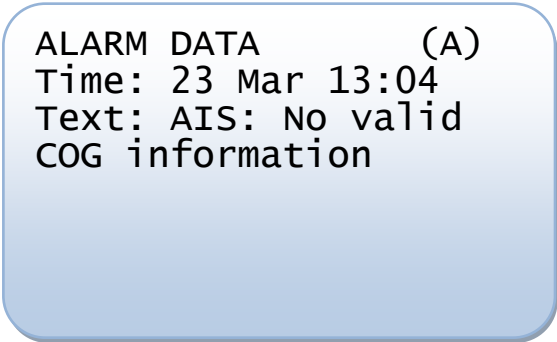
7.3.1.2   Rx malfunction

When the transponder detects Rx malfunction an ALR sentence is sent:

ID003 (RX1)

ID004 (RX2)

ID005 (DSC)

See Appendix D.

7.3.2   Safety Messages

Incoming and outgoing safety messages are stored and are available for viewing. Maximum number of stored messages is 20 for outgoing and 20 for incoming. When the number of incoming messages exceeds 20, the oldest message that has been "viewed" (see 7.3.2.1) is removed. When the number of outgoing messages exceeds 20 the oldest transmission (or attempted transmission) is removed. In the parenthesis for each type the number of messages saved is shown.

To send messages see 7.4.

```
SAFETY MESSAGES   (M)
>Incoming (3)
 Outgoing (2)
```
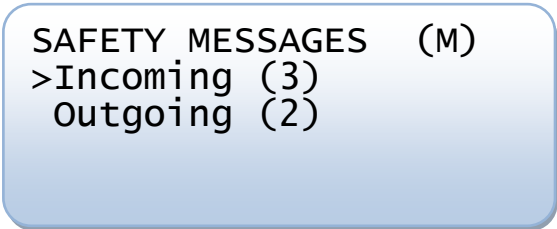
7.3.2.1   Incoming Messages

The incoming messages are presented with an indicator '*', 'A' or 'B' to the left of the message indicating the state of the message:

  *   Not viewed

  A   Viewed addressed message

  B   Viewed broadcast message

The messages are sorted by view state first and time of reception second, thus the most recently received and not viewed message is presented first.

```
INCOMING MESSAG..(M)
>* TEXT IN ADDRESSED
 A OTHER ADDRESSED M
 B TEXT IN SAFETY BR
```

Select a message in order to view the whole message text, date and time of reception, and MMSI number of sender.

Scroll the message vertically to view the whole text.

```
MESSAGE DATA      (M)
Time: 23 Mar 15:06
MMSI: 75940
Text: TEXT IN ADDRES
SED SAFETY MESSAGE
```

When leaving the message data view use [CLR] to set the message state to "viewed" and [ESC] to leave the state unchanged.

When a safety related message is received it is indicated by 'M' on the title row (see 7.2.1.1). This indication remains until the message is set to "viewed" hence it is important to keep the incoming message list updated in order to be able to see when a new message is received.

7.3.2.2   Outgoing Messages

The outgoing messages are presented with time (hh:mm) of reception and the 13 first letters of the message. The messages are listed by time of transmission (or transmission attempt).

```
OUTGOING MESSAGES
>12:52 ANYBODY OUT T
 12:51 HELP
```

Select a message in order to view time and date of transmission, address (MMSI number), transmission status (Ok, Failure or Processing) and the message text. The view needs to be scrolled vertically in order to see all the data.

```
MESSAGE DATA
Time: 23 Mar 12:52
Address: Broadcast
Sent: Ok
Text: ANYBODY OUT TH
ERE?
```

If the message was addressed it is presented whether the message has been acknowledged by the receiver (Yes or No).

7.3.3 Inland Messages (Inland only)

The latest 20 received inland specific functional messages are stored and are available for viewing in this submenu. Messages that has not yet been viewed are presented with a '*' as an indicator. The list of messages is sorted with unviewed messages on top. Select a message and press [ENT] to view the details of a message.

```
INLAND MESSAGES..(M)
>*EMMA Warning
 *Water Levels
  Signal Status
  EMMA Warning
```

BL0119C

7.3.4 Targets

The targets received by the VDL 6000 transponder are presented in a list showing range and bearing from own ship, the target nearest own ship is presented first. In addition the 12 first letters of the name is presented. Scroll the list vertically in order to see all targets.

```
 RNG BRG NAME
>2.0 095 CINDERELLA
 5.6 125 VERY LONG ..
 120 085 Base stati..
```

Use the arrows, ← and →, to scroll the list horizontally in order to view the full name.

```
 NAME
>CINDERELLA
 VERY LONG NAME
 Base station
```

By selecting a target detailed information will be presented, depending on type of target (Class A station, Class B station, Base station, Airborne SAR station, Inland AIS station or Aids to navigation station). Scroll the list vertically in order to see all the information.

BL0119C

Example of a received Class A station:

```
VERY LONG NAME
Type: Class A
MMSI: 000123456
Callsign: CNSS2
Destination:
GOTHENBURG
ETA: 27 Apr 14:47
IMO: 100037654
Lat: N 57°46.76'
Lon: E019°29.37'
PA: Low >10 m
COG: 77.6 deg
SOG: 12.1 knots
HDG: 077.8 deg
ROT: 003.2 deg/min
NAV Status: 00
Under way using engi
Type if ship: 58
Length: 32 m
Beam: 7 m
Dimension A: 21 m
Dimension B: 11 m
Dimension C: 4 m
Dimension D: 3 m
DTE: Available
Draught: 2.3 m
```

For all targets the Name is presented on the title row and in addition to that MMSI, position (latitude and longitude) and position accuracy (PA) are presented on the scrollable menu rows.

Depending of type of target additional details is presented;

Class A station	Radio callsign
	Destination
	ETA,
	IMO number
	Course over ground (COG)
	Speed over ground (SOG)
	True heading (HDG)
	Rate of turn (ROT)
	Navigational status by number and by description (see table 7-1)
	Type of ship (see Appendix B)
	Length
	Beam
	Dimensions A, B, C, D (see 7.5.5)
	Data terminal equipment (DTE)
	Draught

Class B station	Radio callsign
	Course over ground (COG)
	Speed over ground (SOG)
	True heading (HDG)
	Type of ship (see Appendix B)
	Beam
	Dimensions A, B, C, D (see 7.5.5)
	Data terminal equipment (DTE)

Base station	Radio callsign.

SAR Aircraft	Radio callsign
	Altitude
	Course over ground (COG)
	Speed over ground (SOG)
	Data terminal equipment (DTE)

Inland station	An Inland station shows all the Class A information as well as:
	Blue sign status
	Hazardous cargo (Blue Cones)
	ENI number
	ERI ship type
	Number of passengers
	Number of crew members
	Number of ship board personnel
	Load status
	Sensor qualities

Aids to navigation station	AID[1] type (aids to navigation type)
	Virtual flag
	Dimensions A, B, C, D (see 7.5.5)
	Off position indicator

SART station	In accordance with [1] an AIS Search and Rescue Transmitter transmits message 1 with user ID 970xxyyyy and Nav. Status 14. So any station with these characteristics will be presented as "Active SART" in the title row.
	No additional information to a Class A station is displayed.

---

[1] 0 = not available = default, 01-15 = fixed aid-to-navigation, 16-31= floating aid-to-navigation.

MANUAL

Table 7-1   Navigational status

Identifier No.	Description
00	Underway using engine
01	At anchor
02	Not under command
03	Restricted manoeuvrability
04	Constrained by her draught
05	Moored
06	Aground
07	Engaged in fishing trawling
08	Under way by sailing
09	Engaged in fishing other than trawling
10	Air cushion vessel in non displacement mode or WIG craft taking off, landing or in flight
11	Power driven vessel towing astern
12	Power driven vessel pushing ahead or towing alongside
13	In distress or requiring assistance
14	AIS SART, seeking to attract attention
15	Not defined, default

MANUAL

7.3.5 OwnShip Data

The ownship data and status is displayed in the three sub-screens Static data, Voyage related data and Dynamic data. Selecting one and pressing [ENT] will display one of the corresponding screens below.

Some views needs to be scrolled vertically in order to see all the data.

Properties with several data parameters are presented with indented lines.

```
OWN SHIP STATIC DATA
MMSI: 012345678
NAME:
MY NAME IS VERY LONG
Callsign: CNSS1
IMO: 987654321
Type of ship: 50
DTE: Not Available
Internal GNSS ANT:
   Dimension A: 12 m
   Dimension B: 109 m
   Dimension C: 7 m
   Dimension D: 34 m
External GNSS ANT:
   Dimension A: 23 m
   Dimension B: 98 m
   Dimension C: 15 m
   Dimension D: 26 m
```

```
OWN SHIP VOYAGE DATA
Destination:
THIS IS WHERE I GOTO
ETA: 24 Apr 13:45
Draught: 11.3 m
Persons: 34
```

```
OWN SHIP DYNAMIC DATA
NAV Status: 03
Restricted manoeuvra
Position:
 Lat: N 58°24.60'
 Lon: E015°37.46'
 Source: Internal
 Integrity:
  PA: High <10 m
  RAIM: Available
  DGNSS: Uncorrected
SOG: 2.3 knots
  Source: Internal
COG: 138.8 deg
  Source: Internal
HDG: 138.8 deg
ROT: 020.0 deg/min
```

7.3.6   Status Changes

The most recent status changes are presented with the 17 first letters of the description to the status change. If the status change has not been viewed there is also a '*' indicator.

See Table D-52 for supported status changes.

```
STATUS CHANGES    (S)
>* Internal GNSS in
 * Internal SOG/COG
   ROT invalid
   Heading invalid
```

Select a status change to view date and time of occurrence and a description of the change.

```
STATUS CHANGES    (S)
>* Internal GNSS in
 * Internal SOG/COG
   ROT invalid
   Heading invalid
```

To leave the status change data view use [CLR] to set the state to "viewed" or [ESC] to leave the state unchanged.

BL0119C

MANUAL

When there is at least one "not viewed" status change for the VDL 6000 transponder it is indicated by 'S' on the title row (see 7.2.1.1). This indication remains until the status change is set to "viewed" hence it is important to keep the status change list updated in order to be able to se when a new status change occurs.

7.3.7 LR requests

The 20 most recent long range requests are presented with time (hh:mm) of reception and the MMSI of the requestor. There is also an indicator '*', 'A' or 'M' to the left of the time. The indicator depends of the setting for long range reply mode (see 7.5.1) at the time the request was received.

'*' - Received in manual mode – reply needs to be confirmed

'A' - Received in automatic mode – needs no confirmation, has been replied

'M' - Received in manual mode - has been replied

Select a request to view the requested data items and/or to confirm and send a reply (if needed).

```
LR REQUESTS      (L)
>* 13:31 211004000
 A 13:38 211005000
 M 13:30 211003000
```
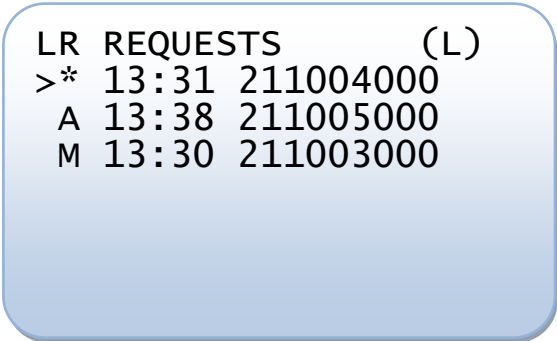
It is indicated on the title row when there is a request that needs to be manually confirmed, see 7.3.7.1. This indication remains until the reply has been confirmed hence it is important to keep the LR request list updated in order to be able to see when a new LR request occurs.

BL0119C

7.3.7.1   Confirm LR reply

The LR reply is presented with the requested data items. The default status 'Y' (yes, include information in the reply) is toggled to 'N' (no, do not include information in the reply) by pressing [ENT]. Scroll the request and set reply status for all requested data items.

```
CONFIRM LR REPLY (L)
>Y Name, CSign, IMO
 Y Data, Time
 Y Position
 Y COG
 Y SOG
 Y Destination, ETA
 Y Draught
 Y Type of ship
 Y Dimension & type
 Y Persons on board
```

```
CONFIRM LR REPLY (L)
 N Date, Time
 Y Position
>N COG
```

To send the reply and leave the reply confirmation view press [CLR], to abort press [ESC].

7.3.7.2   LR request data

The LR request is presented by time and date of reception and the MMSI number of the sender. Scroll vertically to see all the data items that were requested.

```
LR REQUEST DATA  (L)
Time: 23 Mar 13:31
MMSI: 211004000
Name, CSign, IMO
Data, Time
Position
COG
SOG
Destination, ETA
Draught
Type of ship
Dimension & type
Persons on board
```

MANUAL

7.3.8 Regional Settings

AIS primarily operate with these default global settings:

- Channel A no: 2087

- Channel B no: 2088

- Frequency bandwidth: 25kHz (A & B)

- Tx power: High (12.5W)

- Tx/Rx mode: Yes/Yes (A & B)

When entering a region where the default settings are not applicable (e.g. there are overriding national settings), the VDL 6000 transponder automatically switches to alternate regional settings.

The VDL 6000 transponder can store 8 regional settings defined either by ACA sentences, received DSC or AIS messages or manually configured via the MKD, see 7.5.6.

The stored regions are presented with the north east corner position of the area. If a region is currently in use it is indicated by a preceding '*'.

```
REGIONAL SETTINGS
> Reg: N 56° E 016°
 *Reg: N 59° E 016°
  Reg: N 60° E 015°
```

Select a region to view all its settings.

```
REGION SETTINGS
Ch A: 2081
Ch A BW: Default
Ch A Tx/Rx: Yes/Yes
Ch B: 2082
Ch B BW: Default
Ch B Tx/Rx: Yes/Yes
Tx Power level: High
Transition zone: 3
NE LAT: N 60°00.0'
NE LON: E015°50.0'
SW LAT: N 59°01.0'
SW LON: E015°01.2'
Source: MKD
```

Beside the channel settings and the corner positions (north east latitude and longitude – south west latitude and longitude), a transition zone surrounding the area is defined by size (1-8 NM).

When a stored region is either more than five weeks old or further away than 500 Nm from the current position it is automatically removed.

7.3.9 About AIS

The software and hardware versions and the unique serial number of the transponder are presented here.

```
TRANSPONDER VERSION
HW: VDL 6000-41-10
SW: SW-6000-12-3.X
SN: 1.44-6000-12345
```

This view is automatically presented when starting the VDL 6000 transponder.

7.3.10 Event Log

The transponder automatically records when the it is unable to transmit for more than 15 minutes. The reason can for example be that the transponder is not powered or the transmitter has been set to off. The 10 most recent events are presented with date, UTC time and reason for the log entry.

```
EVENT LOG
>2010-03-23 09:56:32
 2010-03-21 14:32:09
 2010-03-18 11:22:51
```

Select a log entry to view the reason for the log entry, the start time of the event and the end time.

```
LOG ENTRY
Reason:
Power off
Start time:
2010-03-23 09:39:32
End time:
2010-03-23 09:56:52
```

BL0119C

7.4 SEND

In this menu the transmission of some types of messages can be initiated. Each menu item leads to a submenu for the corresponding message type.

The submenu Inland Specific Msg is only available on Inland AIS transponders, see section 7.4.1.

Select by pressing [ENT] on any row.

```
SEND
>Safety Related Text
 Persons On Board
 Inland specific Msg
```
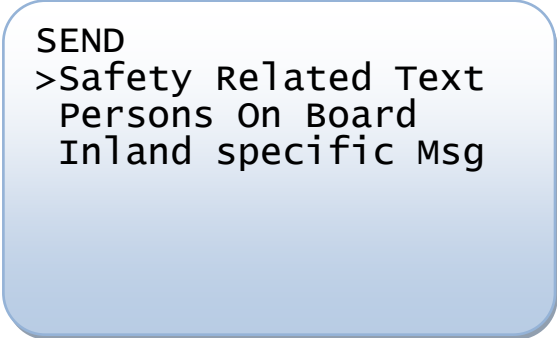
When the type of message has been selected, the operator is asked to choose if it should be sent as an addressed message or a broadcast message, see section 7.4.2.

Next, the operator will be asked to choose the channel that the message should be transmitted on, see section 7.4.5.

Then the operator will be asked to enter the data that should be sent.

Lastly the user will be asked to confirm that the message should be transmitted, see section 7.4.6.

After the user has confirmed that a message should be sent. The send status will be presented, see section 7.4.7.

7.4.1 Inland Specific Messages (Inland only)

The following two types of Inland specific functional messages can be sent from the MKD.

- ETA at lock/bridge/terminal   (RFM 21)
- Number of persons on board   (RFM 55)

Select by pressing [ENT] on any row.

```
SEND INLAND MESSAGE
>ETA Lock/Bridge/Term
 Persons On Board
```
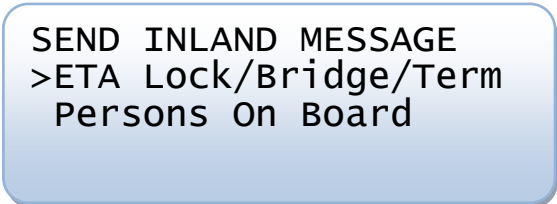
7.4.2 Addressed or Broadcast

In this submenu the operator will be asked if the message should be sent as a broadcast message or a message addressed to another unit. When sending an addressed message it is possible to choose the address from the list of targets (see section 7.4.3) or to enter the MMSI number directly (see section 7.4.4).

Note that not all messages can be transmitted as a broadcast message and the broadcast menu choice will not be available.

```
Addressed / Broadcast
>Addressed to target
 Addressed to MMSI
 Broadcast
```
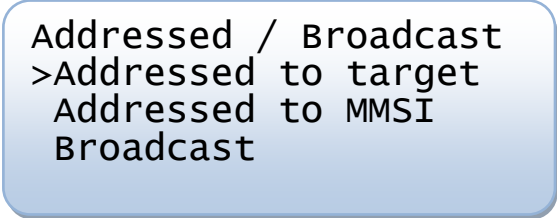
7.4.3 Send Addressed to Target

When selecting Addressed to target, the available targets are presented by name in a selectable list.

```
SEND MESSAGE TO
>CINDERELLA
 DELTA
```
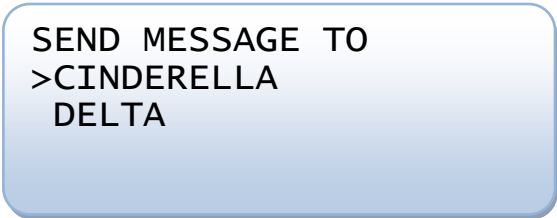
7.4.4 Send Addressed to MMSI

Addressing to MMSI will enable an input dialog for the destination. Use the numerical keys and enter the 9-digit MMSI number (fill out with zeros in the beginning if the MMSI of the destination station consists of less than nine digits).

```
MMSI (9 digits)
008721598
```

7.4.5 Select Transmission Channel

In this dialog the channel that the message will be sent on can be selected.

```
Select Tx Channel
>Channel A (2087)
 Channel B (2088)
 Select one for me
```
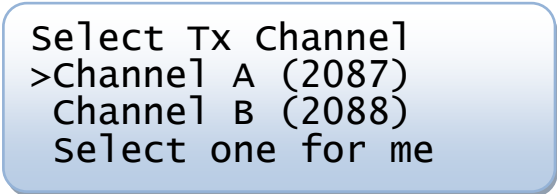
7.4.6 Confirm Transmission

When all the message data has been entered, a confirmation is needed to transmit the message.

```
CONFIRM TRANSMISSION
>Yes, send message
 No, abort
```

7.4.7 Send Status

After the transmission is confirmed information whether the message was successfully transmitted or not is presented. If the message was addressed, the status for acknowledgment by the receiver is also presented.

```
SEND STATUS
+ Sending message  +
```

If the message was transmitted successfully the view below is shown.

```
SEND STATUS
* Message sent ok  *
```

In case of any error in the transmission, a failure view is presented.

```
SEND STATUS
!  Sending failed  !
```

MANUAL

Date	**Classification**	**Page**
2012-12-06	Unclassified	40 (85)
Document No.	**Issue**	
CNSS-11-1893	J	

Assuming that the message was addressed and sent successfully, an acknowledgment by the addressed AIS station is expected.

```
SEND STATUS
* Message sent ok  *
+ Waiting for ack. +
```

If the acknowledgment is received the view below is shown.

```
SEND STATUS
* Message sent ok  *
* Ack. received    *
```

In case there is no acknowledgement received within 4 seconds the message is retransmitted. Retransmission in case of lack of acknowledgement is done 3 times and if there still is no acknowledgement received a failure view is presented.

```
SEND STATUS
* Message sent ok  *
! No ack. received !
```

When the final status has been presented for four seconds the status screen times out and the view returns to the send menu.

7.5 CONFIGURE

Static, voyage-related, and some dynamic information can be entered by means of the MKD or by means of IEC 61162-1 [2] NMEA sentences. This section describes how to configure available data with the MKD. For an overview of the Configure menu see section 7.2.4.

In all the configuration dialogs for specific values described in this section, use [ENT] to confirm the entered value or [ESC] to abort to the previous menu. If the value for some reason is not accepted a message specifying why will appear. For example:

```
NOT ACCEPTED
Number too big
```
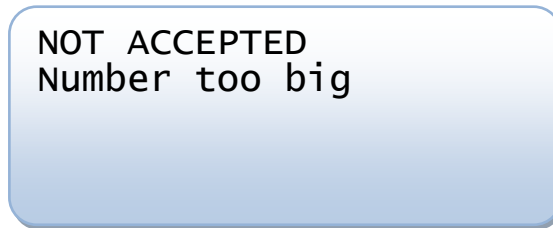
Press [ESC] to return to the configuration dialog.

BL0119C

7.5.1 Voyage Related Data

Scroll the menu vertically to see all the data.

The set of voyage related data is different in AIS Class A and AIS Inland.

AIS Class A:

```
SET VOYAGE DATA
>  - Save Values -
 NavStatus: 01
 At anchor
 Type of ship: 50
 Destination: THIS..
 ETA: 28 Mar 17:26
 Draught: 11.3 m
 Persons: 318
   - Save Values -
```

AIS Inland:

```
SET VOYAGE DATA
>  - Save Values -
 NavStatus: 01
 At anchor
 ERI: Motor tanker
 Type of ship: 50
 Destination: THIS..
 ETA: 28 Mar 17:26
 Draught: 11.32 m
 Passengers: 142
 Crew members: 12
 Ship personnel: 17
 Air draught:17.87 m
 No. ass. tugs: 2
 Load status: Yes
 Haz cargo: 1
   - Save Values -
```

The two first rows indicate the Navigational status of the vessel. The first row is the number and the second row is the first 20 letters of the resulting status, see Table 7-1. To step between statuses, on either row use → or [ENT] to step up or ← to step down. Both rows will change simultaneously.

Pressing [ENT] on the ERI selection will open a dialog where the ERI ship type can be entered. For more information and valid codes see Appendix C (Inland only).

The IMO Type of Ship and Cargo information should be in accordance with Appendix B. The type of ship can be increased or decreased by using ← or →. Pressing [ENT] will open the dialog shown below where the appropriate value can be entered.

```
TYPE OF SHIP [0-255]
_
```

Pressing [ENT] while Destination is selected will open a dialog where a maximum of 20 characters can be entered, including symbols.

Pressing [ENT] while ETA is selected will open this dialog.

```
ETA MM/DD hh:mm
__/__ __:__
```

Simply enter the numbers for month, date, hour and minute.

Draught can be increased or decreased by using ← or →. Pressing [ENT] will open the dialog shown below where the appropriate value can be entered.
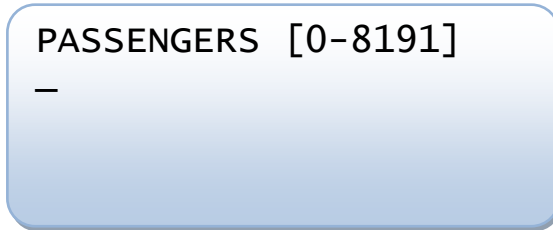
Note that for AIS Inland two decimals can be entered.

```
DRAUGHT [0-25.5]
__._ m
```

Persons is only applicable to AIS Class A units and refer to the total number of persons on board the vessel. The maximum value is 8190, the value 8191 means that there are 8191 or more persons on board. The value can be increased or decreased by using ← or →. Pressing [ENT] will open the dialog shown below where the appropriate value can be entered.

```
PERSONS [0-8191]
_
```

BL0119C

Passengers, crew members and shipboard personnel can all be increased or decreased by using ← or → (Inland only). Pressing [ENT] will open a dialog where the appropriate value can be entered. For example:
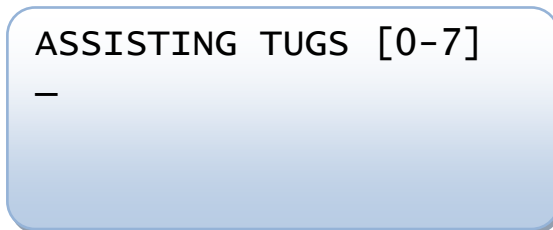
```
PASSENGERS [0-8191]
_
```

Air draught can be increased or decreased by using ← or → (Inland only). Pressing [ENT] will open the dialog shown below where the appropriate value can be entered.

```
AIR DRAUGHT[0-40.00]
__.__ m
```

Number of assisting tugboats can be increased or decreased by using ← or → (Inland only). Pressing [ENT] will open the dialog shown below where the appropriate value can be entered.

```
ASSISTING TUGS [0-7]
_
```

Load status indicates if the ship is loaded. It can be toggled between Yes, No and not available by using ← or →.

Hazardous cargo should be configured to the current number of blue cones, if any. It can be can be increased or decreased by using ← or →. Pressing [ENT] will open a dialog where the appropriate value can be entered.

Use [ESC] to apply the changes and leave the voyage related data menu.

7.5.2 Backlight Level

The backlight level can be set from 0 – 15 where 15 is the brightest. The current value is the first value within the parenthesis and the second value is the maximum. To increase or decrease the backlight level, use ← or →. Note that you can quickly go from light to dark by going from 15 to 0 by pressing →.

Pressing [CLR/ALARM] will reset the backlight level to the default value of 15.

Pressing [ENT] will open the dialog shown below where the appropriate value can be entered.

```
BACKLIGHT(12) [0-15]
_
```
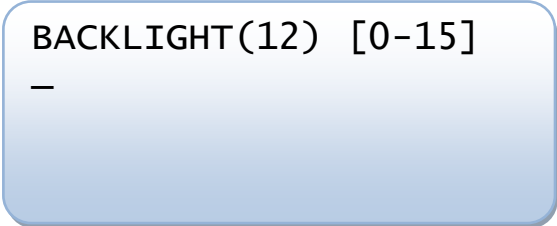
Pressing [ALT] + [ALT] will close down all lights to backlight level 0 (off), only alarms will be shown. Pressing any key after that will set the light to backlight level 1.

7.5.3 Night mode

The display has a night mode that can be turned on or off. If turned on, all text will be light on a dark background instead of the other way around. This configuration can be combined with the Backlight level to set the amount of light emitted in night mode.

7.5.4 Static Data

To configure static data the administrator password is required, see section 7.2.4.2.

If the password was entered correctly, the configuration menu is presented.

The set of static data is different in AIS Class A and AIS Inland.

AIS Class A:

```
SET STATIC DATA
>  - Save Values -
 MMSI: -
 IMO : -
 Name: -
 Callsign: -
    - Save Values -
```

BL0119C
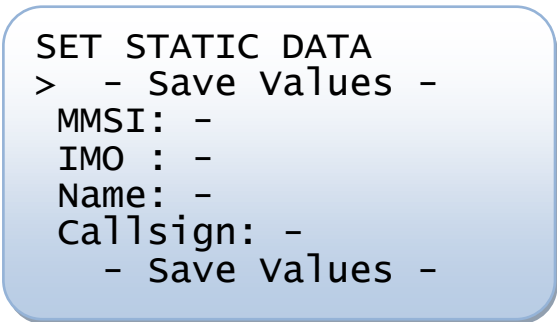
AIS Inland:

```
SET STATIC DATA
>  - Save Values -
 MMSI: -
 IMO : -
 Name: -
 Callsign: -
 Blue sign: Not conne
 ENI num:
 SOG Sens Q: low/GNSS
 COG Sens Q: low/GNSS
 HDG Sens Q: low
   - Save Values -
```

Pressing [ENT] on either selection will open a dialog where the respective value can be configured.

If the MMSI or IMO number consists of less than 9 digits, pad the input sequence with initial zeros to a total of nine digits.

For Name a maximum of 20 characters can be entered, including symbols, and for Callsign it's a maximum of 7 characters including symbols.

MMSI and IMO number example:

```
MMSI (9 digits)
201234567
```

```
IMO (9 digits)
000054321
```

The Blue sign selection refers to if an external blue sign switch has been connected or not (Inland only). The selection can be changed, using ← or →, between "Not Connected" and "Connected".

Pressing [ENT] on the ENI num selection will open a dialog where the ENI number, maximum 8 digits, can be entered (Inland only).

The last three selections refer to the quality of information from the sensors for SOG, COG and HDG. Toggle between high and low by using ←, → or [ENT] (Inland only).

BL0119C

7.5.5   Ship Dimensions

Here the reference point for the reported position and the overall dimensions of the ship is configured. The reported position is that of the currently used GNSS antenna. The location of that antenna in reference to the rest of the ship needs to be configured. Two such reference points can be configured, one for the antenna connected to the internal GNSS in the VDL 6000 unit and another for an antenna connected to an external GNSS unit, if present.

The reference points also define the overall dimensions of the ship and the four configurable values for each reference point are called Dimension A – D as defined in Figure 7-2

	Distance (m)
A	0-511, 511 = 511 m or greater
B	0-511, 511 = 511 m or greater
C	0-63, 63 = 63 m or greater
D	0-63, 63 = 63 m or greater
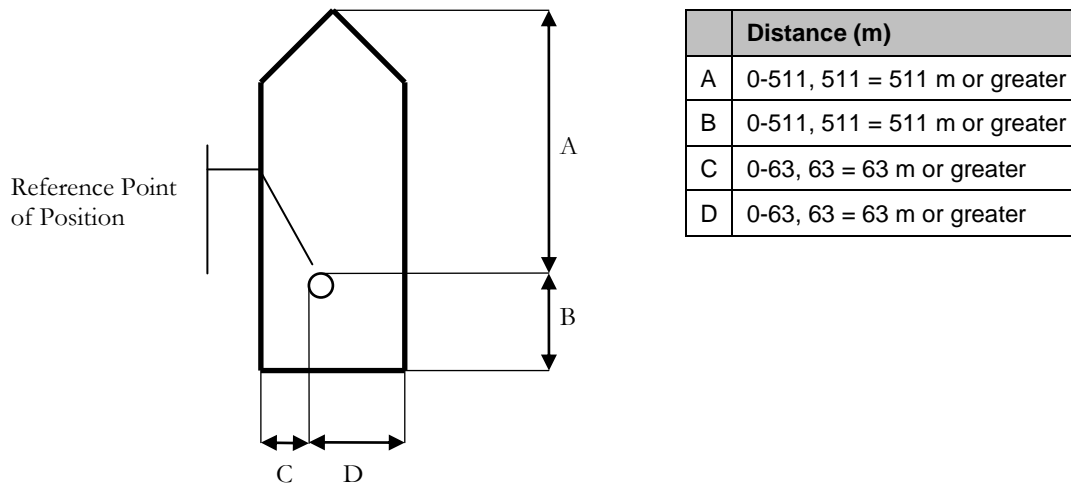
Figure 7-2   Reference point for reported position and overall dimensions of ship.

The dimension A should be in the direction of the transmitted heading information (bow).

If the dimensions of the ship is known but the reference point for an antenna is not available, set A = C = 0 and B ≠ 0 and D ≠ 0.

If neither reference point nor dimensions of ship are available, set A = B = C = D = 0 (this is the default value).

The ship dimensions (A+B and C+D) should be identical when entering values for internal and external GNSS antenna.

On an Inland AIS transponder, in addition to the reference points the length and beam can be more precisely configured, down to a tenth of a meter.

For a Class A transponder the administrator password is required to configure ship dimensions, see section 7.2.4.2.

For Inland AIS no password is required to configure ship dimensions.

If the password was entered correctly, the configuration menu is presented.

```
SET DIMENSIONS
>Internal GNSS ANT
 External GNSS ANT
   - Save Values -
```

BL0119C
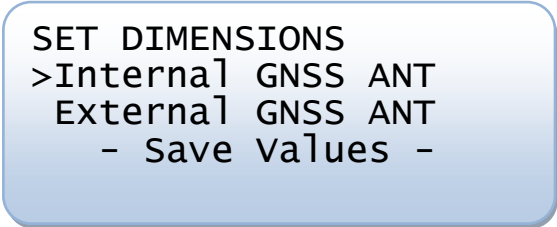
Press [ENT] on either selection to enter a sub menu where the four dimensions for the selected antenna can be configured. The view needs to be scrolled vertically in order to see all the data.

```
INTERNAL GNSS ANT
>Dimension A: 0 m
 Dimension B: 0 m
 Dimension C: 0 m
 Dimension D: 0 m
 Return to menu
```

All values can either be step up or down using → or ← or by pressing [ENT] a dialog appears where the value can be entered directly.

```
DIMENSION B [0-511]
_
```

Enter new setting using the alphanumerical input keys and press [ENT] to finish.

If the configured overall dimensions for internal and external GNSS antennas do not match, a warning will be presented.

Meaning, if dimension A+B for internal GNSS antenna does not match A+B for external there will be a Length warning and if C+D for internal does not match C+D for external there will be a Beam warning.

```
LENGTH VALUE WARNING
The sum of the extern
al and internal posit
ion references are no
t equal.
```

```
BEAM VALUE WARNING
The sum of the extern
al and internal posit
ion references are no
t equal.
```

In an AIS Inland an additional check with the more precise length and beam values are made. Warnings for both external and internal position reference can be presented. For example:

```
LENGTH VALUE WARNING
The sum of the extern
al position reference
 values is not equal
to the Length.
```

```
BEAM VALUE WARNING
The sum of the intern
al position reference
 values is not equal
to the Beam.
```

7.5.6   Regional Settings

When entering this menu the user is presented with the option to either enter a new region or edit a previously stored region.

If the user selects to enter a new region the display below is shown, with the default operating settings already entered. Note that the channel settings or power level cannot be changed without specifying a region by defining the NE and SW corner positions. See section 7.5.6.1 for more on region constraints.

The default operating settings are:

```
CONFIGURE REGION
>  - Save Values -
 Ch A: 2087
 Ch A BW: Default
 Ch A Tx/Rx: Yes/Yes
 Ch B: 2088
 Ch B BW: Default
 Ch B Tx/Rx: Yes/Yes
 Power level: High
 Transition zone: 5
 NE Lat: -
 NE Lon: -
 SW Lat: -
 SW Lon: -
    - Save Values -
```

If the user selects to edit a region, a list of previously stored regions will be displayed. Select one and press [ENT] to enter the configure region screen. The selected region is displayed and changes can be made. Note that the changed region still has to conform with the region constraints specified in section 7.5.6.1.

```
CONFIGURE REGION
>  - Save Values -
 Ch A: 2081
 Ch A BW: Default
 Ch A Tx/Rx: Yes/Yes
 Ch B: 2082
 Ch B BW: Default
 Ch B Tx/Rx: Yes/Yes
 Power level: Low
 Transition zone: 3
 NE Lat: N 60°00.0'
 NE Lon: E015°50.0'
 SW Lat: N 59°01.0'
 SW Lon: E015°01.2'
    - Save Values -
```

MANUAL

	Date	**Classification**	**Page**
	2012-12-06	Unclassified	50 (85)
	Document No.	**Issue**	
	CNSS-11-1893	J	

The possibility to change bandwidth has been removed in newer versions of the AIS standards so it is no longer possible to change it to something other then default.

Power level, transmit/receive mode and transition zone size settings are stepped or toggled when selected with [ENT] ← or →.

Channel numbers (A and B) and the four corner coordinates are configured with dialogs.
For example, the latitude of the north-eastern corner.

```
LATITUDE NE CORNER
_ __°__._'
```
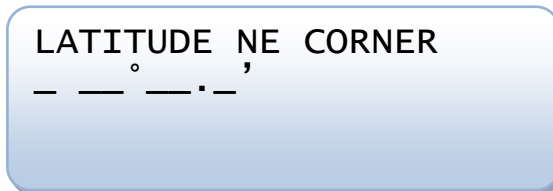
If changes have been made to the regional settings when leaving the menu (by pressing [ESC]), the user is prompted to save settings and exit regional settings, abort and exit regional settings or continue editing regional settings.

```
SAVE SETTINGS?
>Yes, save and exit
 No, abort and exit
 Continue editing
```
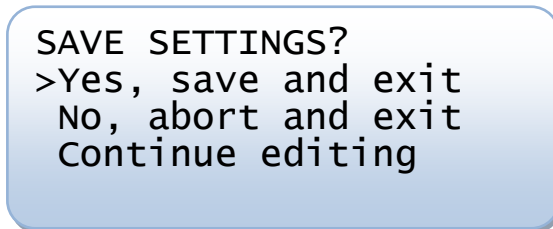
If no error message is presented when attempting to save the region, it is successfully added or changed. In case of an error a short description of the error is presented.

```
NOT ACCEPTED
Invalid size
```

To leave the error description and return to region configuration view, press [ESC].

When a stored region is either more than five weeks old or further away than 500 Nm from the current position it is automatically removed.

7.5.6.1   Region settings constraints

There are constraints specified by the AIS standards for how regional operating areas may be defined. A few of them will be briefly discussed in this section, for more information and details please refer to [1] and [4].

A regional operating area may be input by the following means: manual input, TDMA command from a base station, DSC command from a base station, NMEA commands from a shipborne system (e.g. ECDIS).

7.5.6.1.1   Transmitter power

Changes to the power level should only be by assignment by the approved channel management means. This means that the power level of the transmitter is not allowed to be changed unless inside a regional operating area entered by one of the methods mentioned above. Hence, to change the power level a regional area must be defined.

7.5.6.1.2   Regional boundaries

A boundary side should be no smaller than 20 Nm but no larger than 200 Nm. Care should be taken to avoid having more than three adjacent regions at any regional boundary intersection.

7.5.7   LR reply mode

The mode shown is the one currently in use. If set to "Manual LR reply" all replies to received long range requests must be manually confirmed, see 7.3.7.1.

By pressing [ENT], ← or → the mode is toggled, "Manual LR reply" – "Automatic LR reply". When the mode is automatic all received long range requests are answered automatically and in no need of confirmation.

```
CONFIGURE
 Voyage related data
 Backlight (15/15)
 Night mode: Off
 Static data
 Ship dimensions
 Regional settings
>Automatic LR reply
 Transmitter On
```

7.5.8   Transmitter On/Off

The transmitter can be toggle on and off by pressing [ENT], ← or →. If the transmitter is turned off there will be no transmissions of any kind, the unit will be completely silent. It will however still receive messages as usual.

When the transmitter is turned off the alarm "Tx malfunction" will become active since the transmitter is no longer in use as intended and also to notify any external applications that the unit will no longer transmit.

If the transmitter is turned off for more than 15 minutes it will be logged in the Event log, see 7.3.10.

7.5.9   Longrange Broadcast

To enter the Longrange broadcast menu the administrator password is required, see section 7.2.4.2.

In this dialog the operator can configure the channels used by the Longrange broadcast application that is responsible for transmission of message 27.

By default transmission of message 27 is turned off. To start transmission of message 27, configure one or both of the longrange channels.

The recommended channels to use are 75 and 76. It is forbidden to use channels currently in use by the regular TDMA functions.

To turn off transmission of message 27 on one or both channels, set the channel number to 0.

```
LONGRANGE BROADCAST
 Longrange Ch 1: 75
>Longrange Ch 2: 76
   - Save values -
```

BL0119C

7.5.10 GNSS Settings

The following settings are available for the internal GNSS of the VDL 6000 transponder.

GNSS mode:
If the internal GNSS has support for GLONASS, the GNSS mode parameter commands the internal GNSS to use either GLONASS or GPS.

If the internal GNSS only has support for GPS, the GNSS mode parameter cannot be changed.

NMEA output:
If the internal GNSS has valid data and no valid external GNSS data is received, then NMEA sentences from the internal GNSS will be output on the display ports if the NMEA output parameter is set to ON.

The output NMEA sentences are RMC, VTG, GNS, GGA, GSA, GLL and GBS. The talker id will indicate if the internal GNSS currently is in GLONASS or GPS mode.

If the internal GNSS has support for GLONASS the NMEA output will be ON by default.

If the internal GNSS only has support for GPS, the NMEA output will be OFF by default.

```
GNSS SETTINGS
 GNSS mode: GPS
>NMEA output: OFF
   - Save values -
```

7.5.11 Passwords

In this menu the passwords described in section 7.2.4.2 can be changed. To change either one of them select the Passwords menu and then Admin or User in the sub menu. To be able to change a password the current password for the selected level has to be entered. If the correct password is entered, enter the new password and then re-enter the new password for verification. A password can be between 6 and 20 characters long.

7.5.12 Serial Port Settings

To configure the serial port settings for the serial interfaces, the administrator password is required, see section 7.2.4.2.

Note that parameter changes are not applied until the VDL 6000 transponder is rebooted.

Assuming that the password was correctly entered, all ports available for configuration are presented. Scroll menu vertically and select the port to configure.

```
SERIAL PORT SETTINGS
>  - Save Values -
 Sensor 1
 Sensor 2
 Sensor 3
 Long range
 External display
 Pilot/Auxiliary
 DGNSS corrections
   - Save Values -
```

When choosing a port to configure the currently used parameters will be presented. The only parameter that can be changed is the Baudrate, the other parameters are only displayed as information and cannot be changed. To change the Baudrate, select it and press [ENT], ← or → to cycle trough the available values.

```
Sensor 1
>  - Save Values -
 Baudrate: 4800
 Databits: 8
 Parity: none
 Stop bits: 1
 Flowcontrol:none
    - Save Values -
```

If changes have been made to port settings when leaving the settings view (by pressing [ESC]) the user will be prompted to apply changes after reboot, apply changes and reboot or to abort without applying changes.

```
SAVE PORT SETTINGS?
>Apply after reboot
 Apply and reboot
 No, abort
```

Selecting "apply after reboot" will return the view to port selection, hence it is possible to make changes to other ports before rebooting. If all desired changes are made select "apply and reboot" in order to restart the VDL 6000 transponder and to use the new settings.

In case the user selected apply after reboot the user will be asked again when leaving the configure ports menu to reboot the VDL 6000 transponder.

```
REBOOT?
>Yes, reboot
 No, reboot later
```

7.5.13   Language

In this dialog the language used in the MKD can be configured. When selecting "Default" the language will be the same as it was when the unit was delivered.

MANUAL

BL0119C

8   NMEA REFERENCE MANUAL

This section describes both standardized NMEA sentences and proprietary NMEA sentences.

All CNS Systems proprietary NMEA sentences have a name beginning with $PCNS. The fifth letter indicates the sentences type. There are five such types:

$PCNSC   Command sentences.

$PCNSQ   Query sentences.

$PCNSR   Response to query and command sentences.

$PCNSS   Set configuration sentences.

$PCNSI   Indication sentences.

In accordance with [2] all sentences shall be transmitted with a checksum field. The checksum field is the last field in a sentence and follows the checksum delimiter character "*". The checksum is the eight-bit exclusive OR (no start or stop bits) of all characters in the sentence, including "," and "^" delimiters, between but not including the "$" or "!" and the "*" delimiters. For more information see [2].

NMEA sentences supported on Sensor ports:

- DTM, GBS, GGA, GLL, GNS, HDT, THS, HDG, OSD, RMC, ROT, VBW and VTG

NMEA sentences supported on Display ports:

- ABM, BBM, ABK, VDM, VDO, ALR, TXT, ACA, ACK, AIR, SSD, VSD, AIQ, ACS, LRF, SPW, EPV and TRL
- PCNSS
  - TXE
  - INL (Inland only)
- PCNSR
  - TXE
  - INL (Inland only)
- PCNSQ
  - TXE
  - INL (Inland only)

NMEA sentences supported only on AIS Inland on Display ports:

- PIWWIVD, PIWWSSD, PIWWSPW and PIWWSPR

NMEA sentences supported on the Long Range port:

- LRI, LRF, LR1, LR2 and LR3

Table 8-1   DTM – Datum reference

Field nr	Message Field	Used / Not Used	Description
\$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>			
1	ccc	Used	Local datum code WGS84=W84 WGS72=W72 SGS85=S85 PE90=P90 User defined=999 IHO datum code
2	a	Not used	Local datum subdivision code
3, 4	x.x,a	Not used	Latitude offset (minutes)
5, 6	x.x,a	Not used	Longitude offset (minutes)
7	x.x	Not used	Altitude offset (meters)
8	ccc	Not used	Reference datum code WGS84=W84 WGS72=W72 SGS85=S85 PE90=P90
9	hh	Used	Checksum field
Note: Only "Local datum" supported. "Local datum" = "W84" sets the port in WGS-84 mode, other datum's are not supported.			

Table 8-2   GBS – Global Satellite Fault Detection

Field nr	Message Field	Used / Not Used	Description
\$--GBS,hhmmss.ss,x.x,x.x,x.x,xx,x.x,x.x,x.x*hh<CR><LF>			
1	hhmmss.ss	Not used	UTC time of GGA or GNS fix associated with this sentence
2	x.x	Used	Expected error in Latitude
3	x.x	Used	Expected error in Longitude
4	x.x	Not used	Expected error in Altitude
5	xx	Not used	ID number of most likely failed satellite
6	x.x	Not Used	Probability of missed detection of most likely failed satellite
7	x.x	Not Used	Estimate of bias in meters of most likely failed satellite
8	x.x	Not used	Standard deviation of bias estimate
9	hh	Used	Checksum field
Note: All fields parsed. "UTC time of the GGA or GNS fix" used to indicate RAIM in use.			

Date
2012-12-06

Classification
Unclassified

Page
57 (85)

Document No.
CNSS-11-1893

Issue
J

Table 8-3   GGA – Global Positioning System Fix data

Field nr	Message Field	Used / Not Used	Description
$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a, x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>			
1	hhmmss.ss	Used	UTC of position
2, 3	llll.ll,a	Used	Latitude
4, 5	yyyyy.yy,a	Used	Longitude
6	x	Used	GPS quality factor
7	xx	Not used	Number of satellites in use
8	x.x	Not used	Horizontal dilution of precision
9, 10	x.x,M	Not used	Altitude (meters)
11, 12	x.x,M	Not used	Geoidal separation (meters)
13	x.x	Not used	Age of differential GPS data
14	xxxx	Not used	Differential reference station ID
15	hh	Used	Checksum field
Note: All fields parsed, 6 first fields used for external GPS position.			

Table 8-4   GLL – Geographic Position - Latitude/Longitude

Field nr	Message Field	Used / Not Used	Description
$--GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>			
1, 2	llll.ll,a	Used	Latitude
3, 4	yyyyy.yy,a	Used	Longitude
5	hhmmss.ss	Used	UTC of position
6	A	Used	Status
7	a	Used	Mode
8	hh	Used	Checksum field
Note: All fields parsed and used for external GPS position			

Table 8-5   GNS – GNSS Fix Data

Field nr	Message Field	Used / Not Used	Description
$--GNS,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c,xx,x.x,x.x,x.x,x.x,x.x*hh<CR><LF>			
1	hhmmss.ss	Not used	UTC
2, 3	llll.ll,a	Used	Latitude
4, 5	yyyyy.yy,a	Used	Longitude
5	c--c	Used	Mode indicator
6	xx	Not used	Number of satellites in use
7	x.x	Not Used	HDOP
8	x.x	Not used	Antenna altitude (meters)
9	x.x	Not used	Geodial separation (meters)
10	x.x	Not used	Age of differential data
11	x.x	Not used	Diff reference station ID
12	hh	Used	Checksum field
Note: All fields parsed, 6 first fields used for external GPS position			

Table 8-6   HDT – Heading True

Field nr	Message Field	Used / Not Used	Description
$--HDT,x.x,T*hh<CR><LF>			
1, 2	x.x,T	Used	Heading, degrees true
3	hh	Used	Checksum field
Note: All fields parsed and used for external HDG			

Table 8-7   THS – True heading and status

Field nr	Message Field	Used / Not Used	Description
$--THS,x.x,a*hh<CR><LF>			
1	x.x	Used	Heading, degrees true
2	a	Used	Mode indicator. This field should not be null.
3	hh	Used	Checksum field
Note: All fields parsed and used for external Heading			

Date
2012-12-06

Classification
Unclassified

Page
59 (85)

Document No.
CNSS-11-1893

Issue
J

Table 8-8   HDG – Heading, deviation and variation

Field nr	Message Field	Used / Not Used	Description
$--HDG,x.x,x.x,a,x.x,a*hh<CR><LF>			
1	x.x	Used	Magnetic sensor heading, degrees
2, 3	x.x,a	Used	Magnetic deviation, degrees E/W
4, 5	x.x,a	Used	Magnetic variation, degrees E/W
6	hh	Used	Checksum field
Note:			
To obtain magnetic heading: add easterly deviation (E) to magnetic sensor reading; subtract westerly deviation (W) from magnetic sensor reading.			
To obtain true heading: add easterly variation (E) to magnetic heading; subtract westerly variation (W) from magnetic heading.			
Variation and deviation fields will be null fields if unknown.			

Table 8-9   OSD – Own Ship Data

Field nr	Message Field	Used / Not Used	Description
$--OSD,x.x,A,x.x,a,x.x,a,x.x,x.x,A*hh<CR><LF>			
1	x.x	Used	Heading, degrees True
2	a	Used	Heading status
3	x.x	Used	Vessel course, degrees True
4	A	Used	Course reference B/M/W/R/P
5	x.x	Used	Vessel speed
6	a	Used	Speed reference B/M/W/R/P
7	x.x	Not used	Vessel set, degrees True
8	x.x	Not used	Vessel drift (speed)
9	A	Used	Speed units, K/N/S
10	hh	Used	Checksum field
Note: All fields parsed and field 1 and 2 used for external HDG, field 3 and 4 used for external COG and field 5, 6 and 9 used for external SOG. Course and Speed references Manual and Water is not accepted			

BL0119C

MANUAL

Table 8-10   RMC – Recommended Minimum Specific GNSS Data

Field nr	Message Field	Used / Not Used	Description
$-- RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x, xxxxxx,x.x,a,a*hh<CR><LF>			
1	hhmmss.ss	Used	UTC (used to sync 1PPS time – odd even second)
2	A	Used	Status
3, 4	llll.ll,a	Used	Latitude
5, 6	yyyyy.yy,a	Used	Longitude
7	x.x	Used	Speed Over Ground
8	x.x	Used	Course Over Ground
9	xxxxxx	Used	Date ddmmyy
10, 11	x.x,a	Not used	Magnetic variation (degrees)
12	a	Used	Mode indicator
13	hh	Used	Checksum field
Note: All fields parsed and field 1-6 and 12 used for external or manual position, field 7 used for external SOG and field 8 used for external COG			

Table 8-11   ROT – Rate Of Turn

Field nr	Message Field	Used / Not Used	Description
$--ROT,x.x,A*hh<CR><LF>			
1	x.x	Used	Rate of turn
2	A	Used	Status
3	hh	Used	Checksum field
Note: All fields parsed and used for external ROT			

Table 8-12   VBW – Dual Ground/Water Speed

Field nr	Message Field	Used / Not Used	Description
$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A*hh<CR><LF>			
1	x.x	Not used	Longitudinal water speed (knots)
2	x.x	Not used	Transverse water speed (knots)
3	A	Not used	Status, water speed
4	x.x	Used	Longitudinal ground speed (knots)
5	x.x	Used	Transverse ground speed (knots)
6	A	Used	Status, ground speed
7	x.x	Not used	Stern transverse water speed (knots)
8	A	Not used	Status stern water speed
9	x.x	Not used	Stern traverse ground speed (knots)
10	A	Not used	Status stern ground speed
11	hh	Used	Checksum field
Note: All fields parsed and field 4 - 6 used for external SOG			

Table 8-13   VTG – Course over Ground and Ground Speed

Field nr	Message Field	Used / Not Used	Description
$--VTG,x.x,T,x.x,M,x.x;n,x.x,K,a*hh<CR><LF>			
1, 2	x.x,T	Used	Course over ground, degrees True
3, 4	x.x,M	Not used	Course over ground, degrees Magnetic
5, 6	x.x,N	Used	Speed over ground (knots)
7, 8	x.x,K	Used	Speed over ground (km/h)
9	a	Used	Mode indicator
10	hh	Used	Checksum field
Note: Fields 3,4,7 and 8 are ignored, field 1 and 2 used for external COG, and field 5 and 6 used for external SOG			

BL0119C

MANUAL

Table 8-14   ABM – Addressed Binary and safety related Message

Field nr	Message Field	Used / Not Used	Description
!--ABM,x,x,x,xxxxxxxxx,x,x.x,s—s,x*hh<CR><LF>			
1	x	Used	Total number of sentences needed to transfer the message
2	x	Used	Sentence number
3	x	Used	Sequential Message identifier
4	xxxxxxxxx	Used	The MMSI of destination AIS unit for the ITU-R M.1371 message
5	x	Used	AIS channel for broadcast of the radio message
6	x.x	Used	The ITU-R M.1371 message Id for the following addressed Messages: • 6 Binary addressed message • 12 Addressed safety related message • 25 Single slot binary message 25 (binary data coded using the 16-bit Application identifier) • 70 Single slot binary message 25 (unstructured binary data) • 26 Multiple slot binary message 26 with Communications State (binary data coded using the 16-bit Application identifier) • 71 Multiple slot binary message 26 with Communications State (unstructured binary data)
7	s—s	Used	Encapsulated data
8	x	Used	Number of fill-bits
9	hh	Used	Checksum field
Note: All fields parsed and used to generate VDL message			

BL0119C

MANUAL

Table 8-15   BBM – Broadcast Binary Message

Field nr	Message Field	Used / Not Used	Description
|--BBM,x,x,x,x,x.x,s—s,x*hh<CR><LF>			
1	x	Used	Total number of sentences needed to transfer the message
2	x	Used	Sentence number
3	x	Used	Sequential message identifier
4	x	Used	AIS channel for broadcast of the radio message
5	x.x	Used	The ITU-R M.1371 Message ID for the following broadcast messages: • 8 Binary broadcast message • 14 Safety related broadcast message • 25 Single slot binary message 25 (binary data coded using the 16-bit Application identifier), • 70 Single slot binary message 25 (unstructured binary data) • 26 Multiple slot binary message 26 with Communications State (binary data coded using the 16-bit Application identifier) • 71 Multiple slot binary message 26 with Communications State (unstructured binary data)
6	s—s	Used	Encapsulated data
7	x	Used	Number of fill-bits
8	hh	Used	Checksum field
Note: All fields parsed and used to generate VDL message			

Table 8-16   ACA – AIS Regional Channel Assignment Message

Field nr	Message Field	Used / Not Used	Description
$--ACA,x,llll.ll,a, yyyyy.yy, a,llll.ll,a,yyyyy.yy,a, x,xxxx,x,xxxx,x,x,x,a,x,hhmmss.ss*hh<CR><LF>			
1	x	Used	Sequence number
2, 3	llll.ll,a	Used	Region Northeast corner latitude N/S
4, 5	yyyyy.yy,a	Used	Region Northeast corner longitude E/W
6, 7	llll.ll,a	Used	Region Southwest corner latitude N/S
8, 9	yyyyy.yy,a	Used	Region Southwest corner longitude E/W
10	x	Used	Transition Zone Size
11	xxxx	Used	Channel A
12	x	Used	Channel A bandwidth
13	xxxx	Used	Channel B
14	x	Used	Channel B bandwidth
15	x	Used	Tx/Rx mode
16	x	Used	Power lewel control
17	a	Not used	Information source
18	x	Not used	In-use Flag
19	hhmmss.ss	Not used	Time of "in-use" change
20	hh	Used	Checksum field
Note: All fields except 17,18 and 19 parsed and used to add region. For outgoing all fields are used. Field 16 only supports the values 0, 1 and 2.			

Table 8-17   ACK – Acknowledge alarm

Field nr	Message Field	Used / Not Used	Description
$--ACK,xxx*hh<CR><LF>			
1	xxx	Used	Local alarm number
2	hh	Used	Checksum field
Note: All fields parsed and used to acknowledge alarms			

Table 8-18   AIR – AIS Interrogation Request

Field nr	Message Field	Used / Not Used	Description
$--AIR,xxxxxxxxx,x.x,x,x.x,x,xxxxxxxxx,x.x,x*hh<CR><LF>			
1	xxxxxxxxx	Used	MMSI of interrogated station 1
2	x.x	Used	ITU-R M.1371 message requested from station 1
3	x	Not used	Message sub-section (reserved for future use)
4	x.x	Used	Number of second message from station 1
5	x	Not used	Message sub-section (reserved for future use)
6	xxxxxxxxx	Used	MMSI of interrogated station 2
7	x.x	Used	Number of message requested from station 2
8	x	Not used	Message sub-section (reserved for future use)
9	hh	Used	Checksum field
Note: All fields parsed. All fields except field 3,5 and 8 are used to generate VDL message.			

Table 8-19   SSD – Ship Static Data

Field nr	Message Field	Used / Not Used	Description
$--SSD,c--c,c--c,xxx,xxx,xx,xx,c,aa*hh<CR><LF>			
1	c--c	Used	Ship's Call sign
2	c--c	Used	Ship's name
3	xxx	Used	Pos. ref., "A" distance from bow
4	xxx	Used	Pos. ref., "B" distance from stern
5	xx	Used	Pos. ref., "C" distance from port beam
6	xx	Used	Pos. ref., "D" distance from starboard beam
7	c	Used	DTE indicator flag
8	aa	Used	Source identifier (see Note)
9	hh	Used	Checksum field
Note: The source identifier field is interpreted according to draft of 61993-2 Ed.2 1) the source identifier "AI" means that the A, B, C, D values are related to the internal EPFS receiver, 2) any other source identifier means that the A, B, C, D values are related to the external EPFS.			

Table 8-20   VSD – Voyage Static data

Field nr	Message Field	Used / Not Used	Description
$--VSD,x.x,x.x,x.x,c--c,hhmmss.ss,xx,xx,x.x,x.x*hh<CR><LF>			
1	x.x	Used	Type of ship and cargo category
2	x.x	Used	Maximum present static draught
3	x.x	Used	Persons on-board
4	c--c	Used	Destination
5	hhmmss.ss	Used	Est. UTC of destination arrival
6	xx	Used	Est. day of arrival at destination
7	xx	Used	Est. month of arrival at destination
8	x.x	Used	Navigational status
9	x.x	Used	Regional application flags
10	hh	Used	Checksum field
Note: All fields parsed and used to set voyage static data			

Table 8-21   AIQ – Query Sentence

Field nr	Message Field	Used / Not Used	Description
$--AIQ,<ccc>*hh<CR><LF>			
1	ccc	Used	Queried NMEA sentence, supported sentences are: ACA VSD SSD (see note) TXT TRL
2	hh	Used	Checksum field
Note: A query for the SSD sentence will result in two SSD sentences beeing sent from the AIS unit. One sentence that contains the position reference point for the internal EPFS, indicated by "AI" as the talker ID. And one sentence that contains the position reference point for the external EPFS, indicated by "SN" as the talker ID. According to 61993-2 "SN" stands for "Electronic positioning system, other/general". The other fields are identical in the two sentences. See SSD sentence for more information.			

Table 8-22   ACS – AIS Channel management information source

Field nr	Message Field	Used / Not Used	Description
$--ACS,x,xxxxxxxxx,hhmmss.ss,xx,xx,xxxx*hh<CR><LF>			
1	x		Sequence number, 0 to 9
2	xxxxxxxxx		MMSI of originator
3	hhmmss.ss		UTC at receipt of regional operating settings
4	xx		UTC day, 01-31
5	xx		UTC month, 01-12
6	xxxx		UTC year
7	hh		Checksum field
Note: Output only			

Table 8-23   VDM – AIS VHF data-link message

Field nr	Message Field	Used / Not Used	Description
!--VDM,x,x,x,a,s—s,x*hh<CR><LF>			
1	x		Total number of sentences needed to transfer the message, 1 to 9
2	x		Sentence number, 1 to 9
3	x		Sequential message identifier, 0 to 9
4	a		AIS channel, "A" or "B"
5	s—s		Encapsulated ITU-R M.1371 radio message
6	x		Number of fill-bits, 0 to 5
7	hh		Checksum field
Note: Output only			

Table 8-24   VDO – AIS VHF data-link own-vessel report

Field nr	Message Field	Used / Not Used	Description
!--VDO,x,x,x,a,s—s,x*hh<CR><LF>			
1	x		Total number of sentences needed to transfer the message, 1 to 9
2	x		Sentence number, 1 to 9
3	x		Sequential message identifier, 0 to 9
4	a		AIS Channel, "A" or "B"
5	s—s		Encapsulated ITU-R M.1371 radio message
6	x		Number of fill-bits, 0 to 5
7	hh		Checksum field
Note: Output only			

MANUAL

Table 8-25   ALR – Set alarm state

Field nr	Message Field	Used / Not Used	Description
$--ALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>			
1	hhmmss.ss		Time of alarm condition change, UTC
2	xxx		Local alarm number (identifier) [identification number of alarm source]
3	A		Alarm condition, A = threshold exceeded V = not exceeded)
4	A		Alarm's acknowledge state, A = acknowledged V = unacknowledged
5	c--c		Alarm's description text
6	hh		Checksum field
Note: Output only			
If no alarms are currently active an empty ALR sentence will be output once a minute on the Presentation Interface. This sentence indicates that everything is OK. `$AIALR,,,V,,*hh` For list of supported alarm ID's see Table D-52			

Table 8-26   TXT – Text transmission

Field nr	Message Field	Used / Not Used	Description
$--TXT,xx,xx,xx,c--c*hh<CR><LF>			
1	xx		Total number of messages, 01 to 99
2	xx		Message number, 01 to 99
3	xx		Text identifier
4	c--c		Text message
5	hh		Checksum field
Note: Output only			
For list of supported text ID's see Table D-52			

MANUAL

Table 8-27   ABK – AIS addressed and binary broadcast acknowledgement

Field nr	Message Field	Used / Not Used	Description
\$--ABK,xxxxxxxxx,a,x.x,x,x*hh<CR><LF>			
1	xxxxxxxxx		MMSI of the addressed destination AIS unit
2	a		AIS channel of reception, "A" or "B"
3	x.x		ITU-R M.1371 message ID
4	x		Message Sequence Number
5	x		Type of acknowledgement
6	hh		Checksum field
Note: Output only			

MANUAL

Table 8-28   EPV – Command or report equipment property value

Field nr	Message Field	Used / Not Used	Description
\$--EPV,a,cc,c--c,x.x,c--c*hh<CR><LF>			
1	a		Sentence status flag C = command R = query
2	cc		Destination equipment type, i.e. "AI"
3	c—c		Unique identifier, for AIS this is the MMSI
4	x.x		Property identifier for the property to be set, see Note
5	c--c		Value of property to be set, see Note
6	hh		Checksum field

Note: The property identifier is a variable length integer field that identifies a parameter that can be set in accordance with the table below and is intended for commissioning settings. Only the following property identifiers are supported:

Property Id	Property Meaning	Value range
101	Sensor 1 baud	4800, 9600, 14400, 19200, 38400
102	Sensor 2 baud	4800, 9600, 14400, 19200, 38400
103	Sensor 3 baud	4800, 9600, 14400, 19200, 38400
104	Long Range baud	4800, 9600, 14400, 19200, 38400
105	DGNSS baud	4800, 9600, 14400, 19200, 38400
106	MMSI	000000000, 200000000 … 7999999999
107	IMO Number	000000000 … 999999999
108	Long Range configuration	"A" = automatic "M" = manual
109	Long-range AIS broadcast channel 1	Valid channel according ITU-R M.1084-4. Default value 0 indicates no transmission of message 27
110	Long-range AIS broadcast channel 2	Valid channel according ITU-R M.1084-4. Default value 0 indicates no transmission of message 27
111	Change administrator password	New administrator password
112	Change user password	New user password

MANUAL

Table 8-29   SPW – Security password sentence

Field nr	Message Field	Used / Not Used	Description
$--SPW,ccc,c--c,x,c--c*hh<CR><LF>			
1	ccc		Password protected sentence The following sentence formatter that should be protected (for example EPV)
2	c--c		Unique Identifier, for AIS this is the MMSI
3	x		Password level 1 = User level 2 = Administrator level
4	c--c		Password A password can be between 6 and 20 characters long
5	hh		Checksum field
Note: Output only			

Table 8-30   TRL – AIS transmitter non functioning log

Field nr	Message Field	Used / Not Used	Description
$--TRL,x.x,x.x,x,xxxxxxxx,hhmmss.ss,xxxxxxxx,hhmmss.ss,x*hh<CR><LF>			
1	x.x		Total number of log entries
2	x.x		Log entry number
3	x		Sequential message identifier
4	xxxxxxxx		Switch off date
5	hhmmss.ss		Switch off UTC time
6	xxxxxxxx		Switch on date
7	hhmmss.ss		Switch on UTC time
8	x		Reason for TX non-functioning 1 = power off 2 = silent mode 3 = transmission switched off by channel management 4 = equipment malfunction 5 = invalid configuration
9	hh		Checksum field
Note: Output only			

Table 8-31   PIWWIVD – Inland waterway voyage data

Field nr	Message Field	Used / Not Used	Description
$PIWWIVD,x,x,x,xx.xx,xx.xx,x,xxx,xxxx,xxx*hh<CR><LF>			
1	x	Used	Reporting rate, default=0
2	x	Used	No of blue cones: 0-3, 4=B-Flag, 5=default=unknown
3	x	Used	0=not available=default, 1=loaded, 2=unloaded
4	xx.xx	Used	Static draught of ship 0 to 20.00 meters, 0=unknown=default
5	xx.xx	Used	Air draught of ship 0 to 40.00 meters, 0=unknown=default
6	x	Used	Number of assisting tugboat 0-6, 7=default=unknown
7	xxx	Used	Number of crew members on board 0 to 254, 255=unknown=default
8	xxxx	Used	Number of passengers on board 0 to 8190, 8191=unknown=default
9	xxx	Used	Number of shipboard personnel on board 0 to 254, 255=unknown=default
10	hh	Used	Checksum field
Note:			

Table 8-32   PIWWSSD – Inland Waterway Static Ship data

Field nr	Message Field	Used / Not Used	Description
$PIWWSSD,cccccccc,xxxx,xxx.x,xxx.x,x,x,xhh<CR><LF>			
1	cccccccc	Used	ENI number
2	xxxx	Used	ERI ship type according to ERI classification Table C-49 ERI Ship types , page 83
3	xxx.x	Used	Length of ship 0 to 800.0 meter
4	xxx.x	Used	Beam of ship 0 to 100.0 meter
5	x	Used	Quality of speed information 1=high or 0=low
6	x	Used	Quality of course information 1=high or 0=low
7	x	Used	Quality of heading information 1=high or 0=low
8	hh	Used	Checksum field
Note:			

BL0119C

Table 8-33   PIWWSPW – Inland AIS security password sentence

Field nr	Message Field	Used / Not Used	Description
$PIWWSPW,a,x,c--c,x.x*hh<CR><LF>			
1	a	Used	Functional mode, E=Enter or C=Change
2	x	Used	Password level, 1=Admin or 2=Operator
3	c--c	Used	Password
4	x.x	Used	Validity time, 0 to 60 sec, 0 = "valid for only one following sentence within next 60 seconds"
5	hh	Used	Checksum field
Note:			

Table 8-34   PIWWSPR – Inland AIS security password response

Field nr	Message Field	Used / Not Used	Description
$PIWWSPR,a,x,x.x,x*hh<CR><LF>			
1	a	Used	Function mode of the PIWWSPW sentence being reported on. E = Status for enter password C = Status for change password
2	x	Used	Password level of the PIWWSPW sentence being reported on.
3	x	Used	Validity time-out of the PIWWSPW sentence being reported on.
4	x	Used	Password status. 0 = operation was successful 1 = operation failed
5	hh	Used	Checksum field
Note:			

Table 8-35   LRI – Long Range Interrogation

Field nr	Message Field	Used / Not Used	Description
$--LRI,x,a,xxxxxxxxx,xxxxxxxxx,llll.ll,a, yyyyy.yy,a,llll.ll,a,yyyyy.yy,a*hh<CR><LF>			
1	x	Used	Sequence number
2	a	Used	Control flag
3	xxxxxxxxx	Used	MMSI of "requestor"
4	xxxxxxxxx	Used	MMSI of "destination"
5	llll.ll,a	Used	Latitude – N/S (north-east co-ordinate)
6	yyyyy.yy,a	Used	Longitude – E/W (north-east co-ordinate)
7	llll.ll,a	Used	Latitude – N/S (south-west co-ordinate)
8	yyyyy.yy,a	Used	Longitude – E/W (south-west co-ordinate)
Note: All fields parsed and used for LR			

MANUAL

Table 8-36   LRF – Long Range Function

Field nr	Message Field	Used / Not Used	Description
$--LRF,x,xxxxxxxxx,c--c,c--c,c--c*hh<CR><LF>			
1	x	Used	Sequence number
2	xxxxxxxxx	Used	MMSI of requestor
3	c--c	Used	Name of requestor
4	c--c	Used	Function request
5	c--c	Used	Function reply status
Note: All fields parsed and used for LR			

Table 8-37   LR1 – Long Range Reply with destination for function request "A"

Field nr	Message Field	Used / Not Used	Description
$--LR1,x,xxxxxxxxx,xxxxxxxxx,c--c,c--c,xxxxxxxxx*hh <CR><LF>			
1	x	Used	Sequence Number
2	xxxxxxxxx	Used	MMSI of responder
3	xxxxxxxxx	Used	MMSI of requestor
4	c--c	Used	Ship's name
5	c--c	Used	Call Sign
6	xxxxxxxxx	Used	IMO Number
Note: Output only			

Table 8-38   LR2 – Long Range Reply for function requests "B, C, E and F"

Field nr	Message Field	Used / Not Used	Description
$--LR2,x,xxxxxxxxx,xxxxxxxx,hhmmss.ss,llll.ll,a, yyyyy.yy,a,x.x,T,x.x,N*hh<CR><LF>			
1	x	Used	Sequence Number
2	xxxxxxxxx	Used	MMSI of responder
3	xxxxxxxx	Used	Date: ddmmyyyy
4	hhmmss.ss	Used	UTC time of position
5,6	llll.ll,a	Used	Latitude, N/S (position co-ordinate, to 1 min)
7,8	yyyyy.yy,a	Used	Longitude, E/W (position co-ordinate, to 1 min)
9,10	x.x,T	Used	Course over ground True, value to nearest degree
11,12	x.x,N	Used	Speed over ground, value to 0.1 knot
Note: Output only			

Table 8-39   LR3 – Long-range Reply for function requests "I, O, P, U and W"

Field nr	Message Field	Used / Not Used	Description
\$--LR3,x,xxxxxxxxx,c--c,xxxxxx,hhmmss.ss,x.x,cc,x.x,x.x, x.x,x.x*hh<CR><LF>			
1	x	Used	Sequence Number
2	xxxxxxxxx	Used	MMSI of "responder"
3	c--c	Used	Voyage destination
4	xxxxxx	Used	ETA Date: ddmmyy
5	hhmmss.ss	Used	ETA Time
6	x.x	Used	Draught
7	cc	Used	Ship/cargo
8	x.x	Used	Ship length
9	x.x	Used	Ship breadth
10	x.x	Used	Ship type
11	x.x	Used	Persons
Note: Output only			

Table 8-40   PCNSS,TXE – Set transmitter enabled

Field nr	Message Field	Used / Not Used	Description
\$PCNSS,TXE,c--c,c--c*hh<CR><LF>			
1	c--c	Used	Transmitter state at startup ON Transmitter enabled at startup OFF Transmitter disabled at startup
2	c—c	Used	Change transmitter state in runtime ON Enable transmitter OFF Disable transmitter
Note: All fields parsed and used. A null field indicates no change to the current value.			

Table 8-41   PCNSS,INL – Set Inland properties (Inland only)

Field nr	Message Field	Used / Not Used	Description
\$PCNSS,INL,c--c,c--c*hh<CR><LF>			
1	c--c	Used	Inland mode ON Inland AIS mode enabled OFF Inland AIS mode disabled
2	c—c	Used	Blue sign switch presence PRESENT Blue sign switch is present and connected ABSENT Blue sign switch is not connected
Note: All fields parsed and used. A null field indicates no change to the current value.			

Table 8-42   PCNSS,GNSS – Set GNSS settings

Field nr	Message Field	Used / Not Used	Description
$PCNSS,GNSS,c--c,c--c*hh<CR><LF>			
1	c—c	Used	Internal GNSS mode GPS Set internal GNSS in GPS mode GLONASS Set internal GNSS in GLONASS mode
2	c—c	Used	Output off NMEA sentences from internal GNSS ON NMEA output enabled OFF NMEA output disabled
Note: All fields parsed and used. A null field indicates no change to the current value.			

Table 8-44   PCNSQ – CNS Systems proprietary query sentence

Field nr	Message Field	Used / Not Used	Description
$PCNSQ,ccc*hh<CR><LF>			
1	ccc	Used	Queried CNS Systems proprietary sentence. Supported sentences: • TXE • INL (Inland only) • GNSS
Note: All fields parsed and used to generate appropriate response sentence			

Table 8-45   PCNSR,TXE – Response sentence for transmitter enabled state

Field nr	Message Field	Used / Not Used	Description
$PCNSR,TXE,c--c,c--c*hh<CR><LF>			
1	c--c	Used	Transmitter state at startup ON Transmitter enabled at startup OFF Transmitter disabled at startup
2	c—c	Used	Current transmitter state ON Transmitter currently enabled OFF Transmitter currently disabled
Note: Output only			

MANUAL

Table 8-46   PCNSR,INL – Response sentence for Inland properties (Inland only)

Field nr	Message Field	Used / Not Used	Description
$PCNSR,INL,c--c,c--c*hh<CR><LF>		
1	c--c	Used	Inland mode ON Inland AIS mode enabled OFF Inland AIS mode disabled
2	c—c	Used	Blue sign switch presence PRESENT Blue sign switch is present and connected ABSENT Blue sign switch is not connected
Note: All fields parsed and used. A null field indicates no change to the current value.		

Table 8-47   PCNSR,GNSS – Response sentence for GNSS settings

Field nr	Message Field	Used / Not Used	Description
$PCNSR,GNSS,c--c,c--c*hh<CR><LF>		
1	c—c	Used	9 Internal GNSS mode 10 GPS Internal GNSS in GPS mode GLONASS Internal GNSS in GLONASS mode
2	c—c	Used	Output off NMEA sentences from internal GNSS ON NMEA output enabled OFF NMEA output disabled
Note: All fields parsed and used. A null field indicates no change to the current value.		

Date
2012-12-06

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Page
78 (85)

Document No.
CNSS-11-1893

Issue
J

Appendix A   MKD KEY LAYOUT

KEY	DESCRIPTION
1 Space	Alphanumeric input key.
2 ▲ ABC	Alphanumeric input key. Scroll menu vertically (one row). [ALT] – Scroll menu to top.
3 DEF	Alphanumeric input key.
4 ◀ GHI	Alphanumeric input key. Scroll menu horizontally (where available).
5 JKL	Alphanumeric input key.
6 ▶ MNO	Alphanumeric, numeric input key. Scroll menu horizontally (where available).
7 PQRS	Alphanumeric, numeric input key.

MANUAL

Date	**Classification**	**Page**
2012-12-06	Unclassified	79 (85)
Document No.	**Issue**	
CNSS-11-1893	J	

KEY	DESCRIPTION
8 ▼ TUV	Alphanumeric, numeric input key. Scroll menu vertically (one row). [ALT] – Scroll menu to bottom.
9 WXYZ	Alphanumeric, numeric input key.
0	Alphanumeric, numeric input key.
SYM	Symbolic input key; [ALT] – activate symbol input menu (if in alphanumerical input mode). . , ! ? & : ; ( ) " ' [ ] + - * / = % $ # < > ^ @
ALT	Enable alternative functions (for keys available), see [ALT]. Press prior to, not together with desired alternate function key.
MENU	Enable menu.
ESC	Leave an entry, abort view. [ALT] – return to default view (major escape).

MANUAL

KEY	DESCRIPTION
ENT	Make entry, confirm input.
CLR/ ALARM	Clear input, acknowledge. Go direct to alarms from default view.

Appendix B   IMO TYPE OF SHIP AND CARGO TYPE

The IMO Type of Ship and Cargo defined below represents similar type of information as the ERI ship type defined for Inland vessels.

(Table 50 from ITU-R M.1371-4).

Table B-48   IMO Type of Ship and Cargo identifiers

Identifiers to be used by ships to report their type			
Identifier No.	**Special craft**		
50	Pilot vessel		
51	Search and rescue vessels		
52	Tugs		
53	Port tenders		
54	Vessels with anti-pollution facilities or equipment		
55	Law enforcement vessels		
56	Spare - for assignments to local vessels		
57	Spare - for assignments to local vessels		
58	Medical transports (as defined in the 1949 Geneva Convention and Additional Protocols)		
59	Ships and aircraft of States not parties to an armed conflict		
Other ships			
First digit (*)	**Second digit (*)**	**First digit (*)**	**Second digit (*)**
1 - reserved for future use	0 - All ships of this type	-	0 - Fishing
2 - WIG	1 - Carrying DG, HS, or MP IMO hazard or pollutant category X	-	1 - Towing
3 - see right column	2 - Carrying DG, HS, or MP IMO hazard or pollutant category Y	3 - Vessel	2 - Towing and length of the tow exceeds 200 m or breadth exceeds 25 m
4 - HSC	3 - Carrying DG, HS, or MP IMO hazard or pollutant category Z	-	3 - Engaged in dredging or underwater operations
5 - see above	4 - Carrying DG, HS, or MP IMO hazard or pollutant category OS	-	4 - Engaged in diving operations
	5 - reserved for future use	-	5 - Engaged in military operations
6 - Passenger ships	6 - reserved for future use	-	6 - Sailing
7 - Cargo ships	7 - reserved for future use	-	7 - Pleasure Craft
8 - Tanker(s)	8 - reserved for future use	-	8 - reserved for future use
9 - Other types of ship	9 - No additional information	-	9 - reserved for future use

DG: Dangerous Goods.

HS: Harmful Substances.

MP: Marine Pollutants.

(*) NOTE. The identifier should be constructed by selecting the appropriate first and second digits.

For example, a cargo ship not carrying dangerous goods, harmful substances, or marine pollutants; would use identifier "79". Pleasure craft would use identifier "37". Note that those ships whose type identifier begins with a "3" should use the fourth column of the table.

Depending on the vessel, cargo and/or the navigational conditions, this information may be voyage related and would therefore need to be changed before beginning or at some time during the voyage.

This is defined by the "second digit" in the fourth column of the table.

MANUAL

Appendix C   ERI SHIP TYPES

This table should be used to convert the ERI (UN) ship types, which are used in Inland message RFM 10 to the IMO type of ship and cargo which are used in ITU-R M.1371 message 5 – Ship Static and Voyage related data.

(Table copied from Vessel Tracking and Tracing Standard for Inland Navigation, Edition 1.01, Annex E, CCNR, 10.10.2007).

The ERI code - full code column represents the ERI type of ship.

The AIS code – first and second digit columns, represents the IMO type of ship and cargo.

Table C-49   ERI Ship types

ERI code			AIS code	
full code	U	ship name (EN)	first digit	second digit
8000	No	Vessel, type unknown	9	9
8010	V	Motor freighter	7	9
8020	V	Motor tanker	8	9
8021	V	Motor tanker, liquid cargo, type N	8	0
8022	V	Motor tanker, liquid cargo, type C	8	0
8023	V	Motor tanker, dry cargo as if liquid (e.g. cement)	8	9
8030	V	Container vessel	7	9
8040	V	Gas tanker	8	0
8050	C	Motor freighter, tug	7	9
8060	C	Motor tanker, tug	8	9
8070	C	Motor freighter with one or more ships alongside	7	9
8080	C	Motor freighter with tanker	8	9
8090	C	Motor freighter pushing one or more freighters	7	9
8100	C	Motor freighter pushing at least one tank-ship	8	9
8110	No	Tug, freighter	7	9
8120	No	Tug, tanker	8	9
8130	C	Tug freighter, coupled	3	1
8140	C	Tug, freighter/tanker, coupled	3	1
8150	V	Freightbarge	9	9
8160	V	Tankbarge	9	9
8161	V	Tankbarge, liquid cargo, type N	9	0
8162	V	Tankbarge, liquid cargo, type C	9	0
8163	V	Tankbarge, dry cargo as if liquid (e.g. cement)	9	9
8170	V	Freightbarge with containers	8	9
8180	V	Tankbarge, gas	9	0
8210	C	Pushtow, one cargo barge	7	9
8220	C	Pushtow, two cargo barges	7	9
8230	C	Pushtow, three cargo barges	7	9
8240	C	Pushtow, four cargo barges	7	9
8250	C	Pushtow, five cargo barges	7	9
8260	C	Pushtow, six cargo barges	7	9
8270	C	Pushtow, seven cargo barges	7	9
8280	C	Pushtow, eigth cargo barges	7	9
8290	C	Pushtow, nine or more barges	7	9
8310	C	Pushtow, one tank/gas barge	8	0
8320	C	Pushtow, two barges at least one tanker or gas barge	8	0
8330	C	Pushtow, three barges at least one tanker or gas barge	8	0
8340	C	Pushtow, four barges at least one tanker or gas barge	8	0
8350	C	Pushtow, five barges at least one tanker or gas barge	8	0
8360	C	Pushtow, six barges at least one tanker or gas barge	8	0
8370	C	Pushtow, seven barges at least one tanker or gas barge	8	0
8380	C	Pushtow, eight barges at least one tanker or gas barge	8	0
8390	C	Pushtow, nine or more barges at least one tanker or gas barge	8	0
8400	V	Tug, single	5	2
8410	No	Tug, one or more tows	3	1
8420	C	Tug, assisting a vessel or linked combination	3	1
8430	V	Pushboat, single	9	9
8440	V	Passenger ship, ferry, cruise ship, red cross ship	6	9
8441	V	Ferry	6	9
8442	V	Red cross ship	5	8
8443	V	Cruise ship	6	9
8444	V	Passenger ship without accomodation	6	9
8450	V	Service vessel, police patrol, port service	9	9
8460	V	Vessel, work maintainance craft, floating derrick, cable-ship, buoy-ship, dredge	3	3
8470	C	Object, towed, not otherwise specified	9	9
8480	V	Fishing boat	3	0
8490	V	Bunkership	9	9
8500	V	Barge, tanker, chemical	8	0
8510	C	Object, not otherwise specified	9	9
1500	V	General cargo Vessel maritime	7	9
1510	V	Unit carrier maritime	7	9
1520	V	bulk carrier maritime	7	9
1530	V	tanker	8	0
1540	V	liquified gas tanker	8	0
1850	V	pleasure craft, longer than 20 metres	3	7
1900	V	fast ship	4	9
1910	V	hydrofoil	4	9

MANUAL

Appendix D   ALARMS AND STATUS CHANGES

Table D-52   Integrity alarm conditions signaled using ALR sentence formatter

Alarm's description text	Alarm condition threshold exceeded	Alarm condition not exceeded	Alarm ID or Text Identifier	Reaction of the system to the alarm condition threshold exceeded
AIS: Tx malfunction	A	V	001	Stop transmission
AIS: Antenna VSWR exceeds limit	A	V	002	Continue operation
AIS: Rx channel 1 malfunction	A	V	003	Stop transmission on affected channel
AIS: Rx channel 2 malfunction	A	V	004	Stop transmission on affected channel
AIS: Rx channel 70 malfunction	A	V	005	Stop transmission on affected channel
AIS: General failure	A	V	006	Stop transmission
AIS: MKD connection lost	A	V	008	Continue operation
AIS: External EPFS lost	A	V	025	Continue operation
AIS: No sensor position in use	A	V	026	Continue operation
AIS: No valid SOG information	A	V	029	Continue operation using default data
AIS: No valid COG information	A	V	030	Continue operation using default data
AIS: Heading lost/invalid	A	V	032	Continue operation using default data
AIS: No valid ROT information	A	V	035	Continue operation using default data

Table D-52   AIS status indications

Text Message	Text Identifier	Reaction of the system
AIS: UTC clock lost	07	Continue operation using indirect or semaphore synchronization
AIS: External DGNSS in use	21	Continue operation
AIS: External GNSS in use	22	Continue operation
AIS: Internal DGNSS in use (beacon)	23	Continue operation
AIS: Internal DGNSS in use (message 17)	24	Continue operation
AIS: Internal GNSS in use	25	Continue operation
AIS: External SOG/COG in use	27	Continue operation
AIS: Internal SOG/COG in use	28	Continue operation
AIS: Heading valid	31	Continue operation
AIS: Rate of Turn Indicator in use	33	Continue operation
AIS: Other ROT source in use	34	Continue operation
AIS: Channel management parameters changed	36	Continue operation

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