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Operational Use of Inland AIS for skippers

Transmitted by the Chair of the VTT Expert Group

1. The VTT Expert Group (VTT EG) has developed a document for the use of Inland AIS mobile stations on board of inland navigation vessels. The target group of the document is the skipper on board. This document is entitled "Operational use of Inland AIS". So far the leaflet is in English only and is available for translation into other languages. The costs for translations are to be borne by the requesting party.

2. For any questions regarding a possible translation of the leaflet please contact Annick Javor [annickjavor@binnenvaart.be] or Stefan Bober [Stefan.Bober@wsv.bund.de].

Please recycle

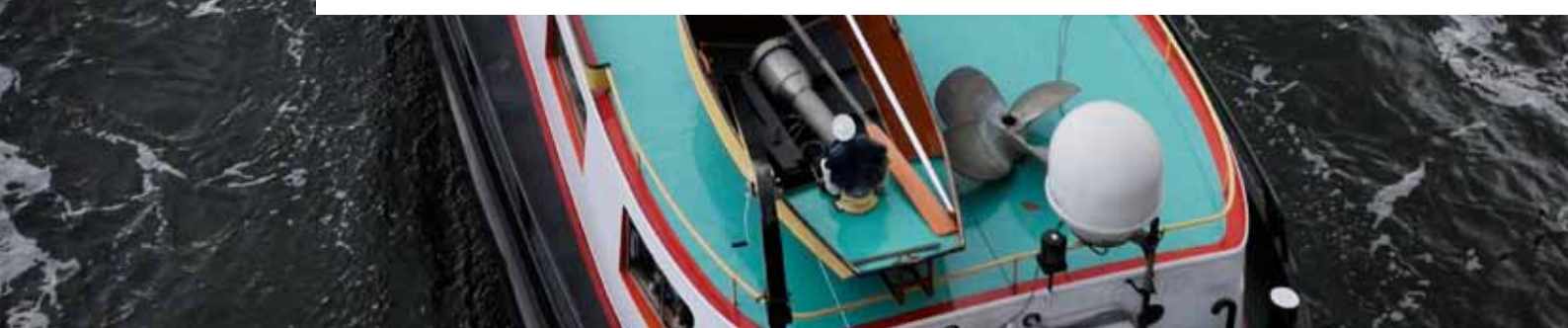
OPERATIONAL USE OF INLAND AIS

GUIDELINES FOR THE ONBOARD OPERATIONAL USE OF INLAND AUTOMATIC IDENTIFICATION SYSTEMS

General introduction

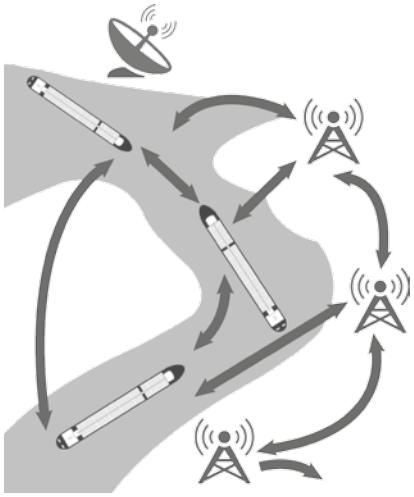
These Guidelines have been developed to promote the safe and effective use of shipborne Inland Automatic Identification Systems (Inland AIS), and in particular to inform skippers about their operation, limitations and potential uses. Consequently, Inland AIS should be operated taking into account these Guidelines.

These Guidelines will help skippers become familiar with the operational use of Inland AIS on inland waterways, including the correct interpretation of the displayed data.



1 What is AIS?

Inland AIS is based on the Maritime AIS. AIS uses radio technology. Through radio signals AIS stations, sometimes called AIS transponders, send out messages. These messages can be received by all other AIS stations, on ships and onshore, in the vicinity of the sending station within VHF radio range. This happens automatically and periodically, with shorter or longer intervals. A fast-moving ship will send out AIS messages at shorter intervals than a ship that is travelling slower or is moored. Two special VHF radio channels are reserved to exchange AIS messages.



Certain hardware and software is needed for AIS. The hardware is an AIS station with built-in GPS. For a user-friendly presentation of the content of AIS messages, additional equipment (e.g. Inland ECDIS, see chapter 3) is needed.

The information in these messages includes the identity of the ship, the position, and other ship-related information (see chapter 2 for details). Some of the information, such as ship identity and position, is automatically broadcast. Other information, such as navigation status, destination, and dangerous cargo category (blue cones), can be input manually by the skipper. All data that is input manually has to be accurate and valid.

2 Inland AIS information

Be aware that regulations regarding AIS information content might be different in every country or region according to the local legislation.

Several types of information can be transmitted by Inland AIS.

Static information, which includes:
- MMSI, name, call sign, and ENI number. Some ships also have an IMO number.
- Type of ship, dimensions (length and beam) and position of the GPS antenna is static information for single ships (not part of a convoy), while this information is voyage-related for convoys.

The static information will not change unless the ship changes owner, flag state or any other of the given parameters. The static information will be input and configured during installation and is password protected. An approved, specialised firm for installation should be contacted if one of the static information fields is incorrect.

Dynamic information is all information referring to the movements of a ship, such as po-

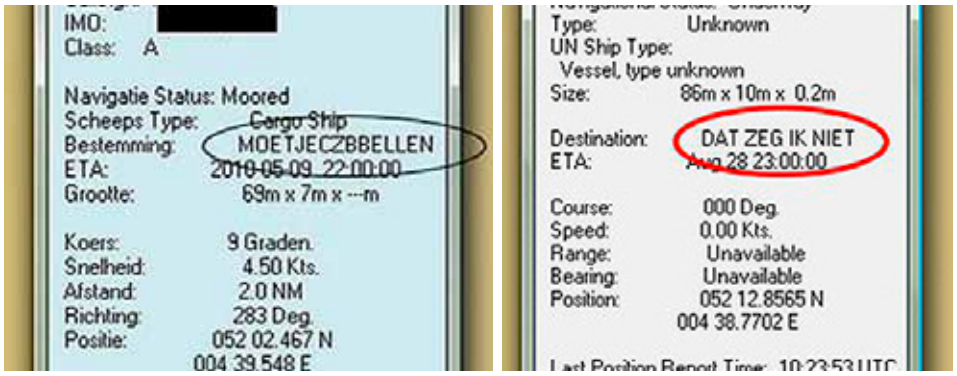
Caution!

The following points should be considered when using information conveyed by AIS:

- Always bear in mind that other ships may not be equipped with AIS; an AIS station installed on another ship might transmit incomplete, erroneous or not updated information; AIS may fail; or AIS might be switched off.
- Not all shore infrastructures are equipped with AIS base stations, e.g. locks and Vessel Traffic Service (VTS) centres.
- Users should ensure that they are able to correctly interpret the data received.
- AIS is purely an additional source of information. It does not replace navigational aids such as radar, but is intended to support them.

sition, speed, course and navigational status. Dynamic information is automatically derived from on-board sensors, and includes GPS, heading, and rate of turn indicators if available. Only the navigational status should be input manually via the Minimum Keyboard and Display (MKD) or via a connected, approved input device supporting the MKD functionality. An approved, specialised firm for installation should be contacted if one of the dynamic information fields is detected to be unreliable.

Voyage-related information is information relating to the voyage of a ship. This includes destination[1] , present draught and hazardous cargo classification (blue cones). For a ship sailing in a convoy, the following information is also required: the length and beam of the convoy (see Annex 2), the position of the GPS antenna, and the ERI ship or convoy type. All voyage-related information should be input manually on the MKD or via a connected, approved input device (e.g. Inland ECDIS supporting the MKD functionality). The proper input is the responsibility of the captain of the ship.



Examples of destination information that are not allowed.[2]

Note: not all information mentioned under voyage-related information is mandatory in all countries.

All information which is input manually must be valid information. If there is no requirement for certain information in a particular country or area, remember that non-valid information is never allowed; the field should be up to date containing correct information or should be set to Not Available.

To summarise: all data transmitted should be correct, including data which is input during installation. The skipper should regularly check that the settings and transmission of his own Inland AIS information are correct.

[1] Use UN/LOCODE for preferred, standardised destination codes.

[2] These examples are real. For privacy reasons the MMSI, name, call sign and IMO number are covered in black.

3 Use of Inland Electronic Chart Display and Information System (Inland ECDIS)

Inland AIS is only useful on board a ship when information of other ships is visible on an Inland ECDIS chart. Therefore it is strongly recommended to combine Inland AIS with Inland ECDIS. This allows AIS information of other ships and from shore to be displayed on the Inland Electronic Navigational Chart (IENC).

The user can decide which chart information (all info, standard, or minimum) is visible on the screen via the settings of the Inland ECDIS. By zooming-in or zooming-out, some information will appear or disappear.

With respect to AIS information, AIS positions of other ships are always displayed. The user can decide for additional AIS information (label) of all ships or only one ship by pointing to the ship with the mouse. In case too many AIS symbols are visible on the screen, the user may zoom-in to decrease the viewing area and reduce the AIS information.

Some Inland ECDIS can support Inland AIS for the input of voyage-related AIS information such as navigational status, destination, number of persons on board, etc.

4 Privacy of data

AIS is an ***identification*** system providing information about identification of the ship and its position. No detailed information of the cargo onboard is transmitted. In general it can be said that mainly information which can be seen on the ship itself is sent in AIS messages.

(Inland) AIS is an open broadcasting system. This means that AIS is sending out messages which everyone with AIS equipment can receive and read. The reason that AIS is an open system is because AIS is designed for safety purposes so that everyone can receive the messages.

Competent Authorities are obligated to respect privacy regulations. Reception of AIS information can easily be achieved with AIS receiving stations. However, publication of AIS information on the internet without permission of the sender (owner) of the information is not allowed in most European countries. In some countries even the reception of AIS information by uninvolved parties is forbidden.

5 Limitations of AIS

Other means like VHF radiotelephony, radar and of course the traditional look-out of the window are still required because not all ships are equipped with AIS or in rare cases the AIS station on board may fail. Therefore it is not guaranteed that a complete traffic image can be displayed using AIS only.

Like every radio communication system, technical failures are possible and therefore the reception of messages can not always be guaranteed.

Positional information of a moving ship is sent out and normally received at least every 10 seconds. Static information is sent out and normally received only every 6 minutes. In some rare cases when a message gets lost it can take more time before all information of one particular ship is available.

The quality of the received data is only as good as the quality of the data input on board the transmitting ship. This includes the quality of the manual input, the configuration, and input of the connected sensor(s). The data in an Inland AIS station should therefore be kept accurate and up to date.

AIS is not a public general communication system. In addition to the main task of identifying other ships, AIS offers a means of exchanging safety-related information. Safety-related text messages and important information such as water levels or calamity information regarding dangerous situations on the waterway are examples of this kind of information.

It should be noted that AIS is, by law, dedicated to safety-related communication only. It is not intended as a means for general communication. Misuse of the AIS will be prosecuted.

6 Use of AIS information by Competent Authorities

At the moment of writing this document, Competent Authorities have or are still investing in shore-based AIS networks.

Waterway authorities are gaining experience with this rather new technology for inland waterways. The collected information sent by the Inland AIS stations is mainly used for monitoring purposes. This information gives the authorities an overview of the situation on the waterways, ships heading towards their locks and bridges, and ships leaving their network.

In the near future, Inland AIS networks will be used by some authorities to communicate important information (e.g. water levels) and information about dangerous situations (e.g. calamity information) directly and efficiently via AIS to the skippers. This information will be visible on the installed Inland ECDIS. More efficient lock/bridge planning is also possible, allowing smooth traffic with minimal delays at locks and bridges.

AIS creates many new possibilities for future services. A number of pilots for new services are ongoing.

ANNEX 1:

ERI ship or convoy types

This table should be used to input the actual vessel type or convoy type before the voyage starts (see the Inland AIS checklist).

ERI Code			SOLAS AIS Code	
code	**U**	**ship name**	**1st digit**	**2nd 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
1920	V	catamaran fast	4	9

7 AIS on Aids to Navigation (AtoN)

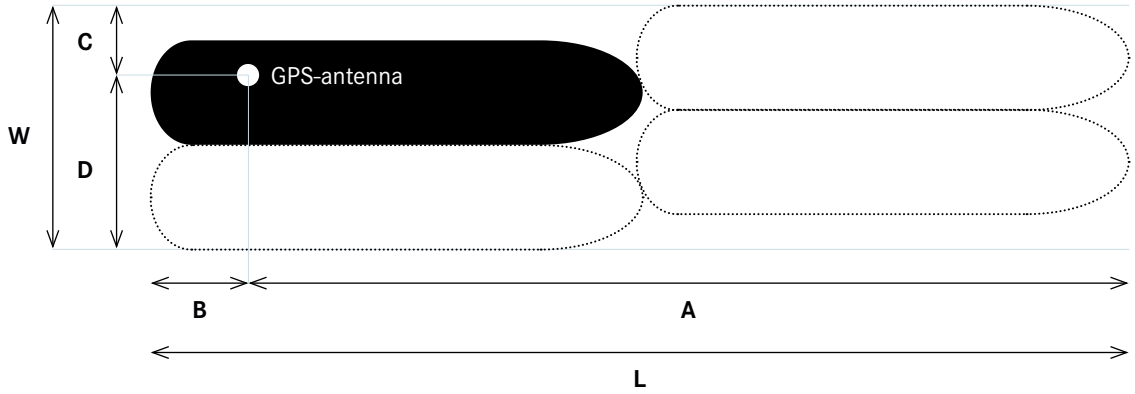
AIS provides a suitable means for emphasising classic Aids to Navigation (AtoN) for the marking of buoys, wrecks, wind farms, etc. A special AIS AtoN message transfers the position and the meaning of the Aids to Navigation as well as information if the buoy is on the required position or if it has been swept away.

This AIS AtoN message can be either transmitted by an AIS shore station or by a specific AIS AtoN station mounted on a buoy, wind farm or lighthouse.

The AIS AtoN message can represent a real buoy lying in the water or a position where no real buoy is present. In the latter case this is called a virtual AtoN. Virtual AtoN's may be displayed on an ECDIS chart and might be used to mark a wreck immediately after the accident before real buoys can be brought out, or to mark a fairway in ice conditions where buoys won't last.

ANNEX 2:
Dimensions of the ship or convoy

The picture below helps to understand the dimensions of a ship sailing alone or as part of a convoy of vessels. The outline of the ship on which the Inland AIS station is installed is indicated by a solid line. The dashed lines indicate the dimensions of a convoy.



The following values should be input for the dimensions of the ship or convoyw:
- The total length **L**.
- The total width **W**.

The following values should be input for the position of the GPS antenna:
- **A** = the distance from the GPS antenna to the bow.
- **B** = the distance from the GPS antenna to the stern.
- **C** = the distance from the GPS antenna to the port side (left side).
- **D** = the distance from the GPS antenna to the starboard side (right side).

8 Other AIS stations

Several other types of AIS station have different purposes in use. The most important are:

Inland AIS	AIS station for inland shipping (mandatory under regional regulation).	**AIS AtoN**	AIS station for Aids to Navigation, e.g. buoys, wreck marking.
Class A	AIS station for seagoing ships (mandatory under SOLAS).	**AIS SART**	AIS Search and Rescue Transmitter for lifeboats.
Class B	AIS station for recreational ships and other small ships (voluntary or mandatory for some ship types under regional regulation).	**AIS Base Station**	AIS station on shore.
		AIS Repeater	AIS station on shore for extended coverage between ships, e.g. in hilly areas.

9 Who should carry Inland AIS?

As mentioned above, there are several types of AIS stations. For mobile (on board) use, Class A, Class B and Inland AIS stations can be distinguished.

Commercial inland shipping should carry **Inland AIS**, taking national regulations into account with respect to mandatory carriage requirements. Non-propelled ships which normally sail in convoy with a tow or push ship do not require their own Inland AIS station on board. AIS information of a convoy will be sent by the tow or push ship taking the new dimensions of the convoy into account. In a tow convoy with two or more propelled ships, each of the ships should send its own information, including its own dimensions and with the appropriate ERI ship and convoy type.

Maritime ships carry (mandatory) Class A stations. Inland AIS stations are almost equal to Class A stations. The difference is that Inland AIS has some inland-specific additional information such as ENI number, blue sign, blue cones, etc. Inland ships can see all AIS information from maritime ships. Maritime ships can see all 'standard' AIS information of all inland ships but the specific inland information will not be presented. In sea port areas and sea river areas, mixed traffic with both Class A and Inland AIS stations can be expected.

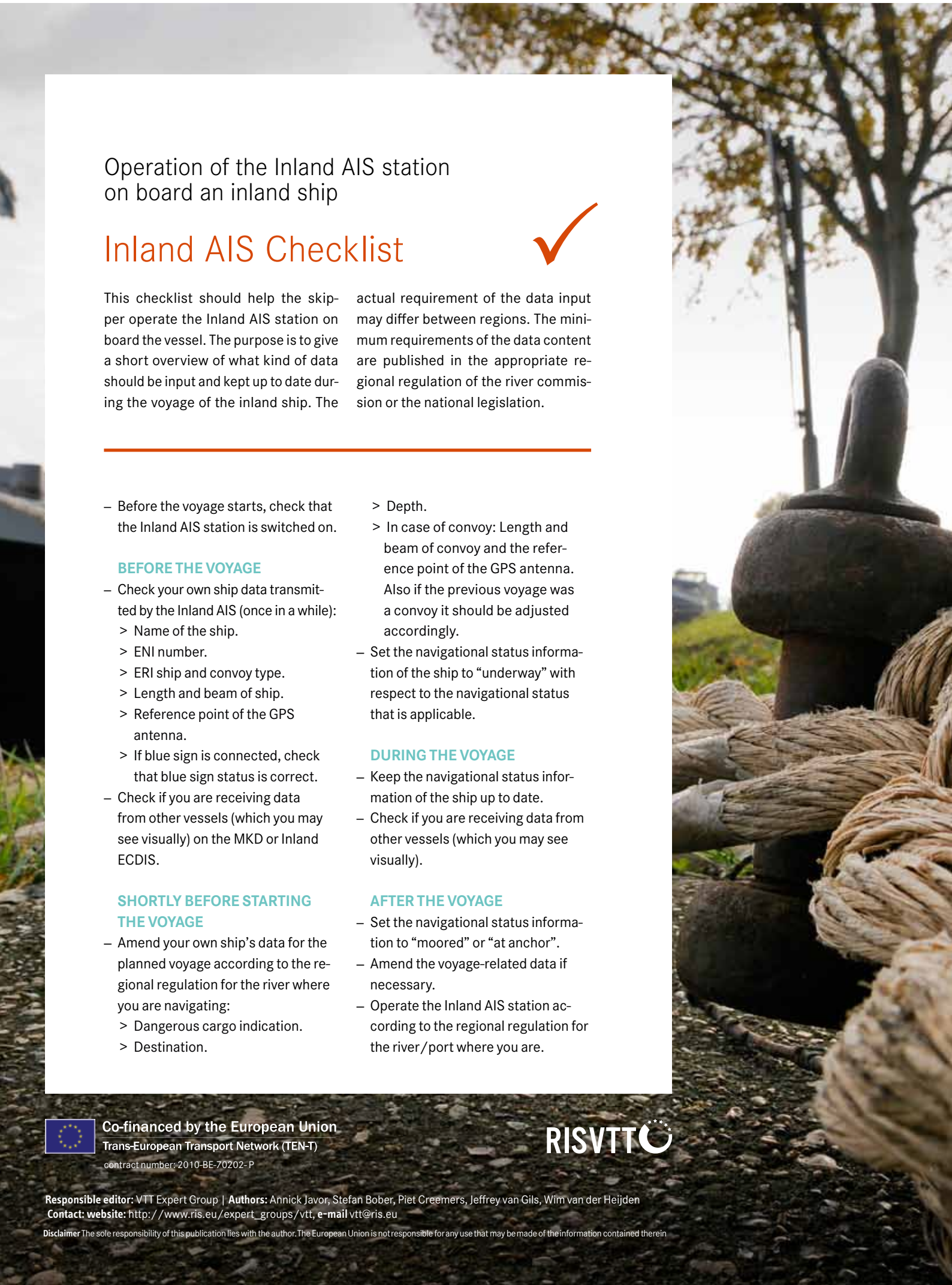
For recreational ships, Class B stations are allowed in all areas. They do not have the full functionality of Class A or Inland AIS stations but the most relevant messages like position and identity will be received by all Class A and Inland AIS stations and vice versa. Class B stations are not allowed on commercial maritime ships and on commercial inland ships as described in this chapter. When AIS symbols are displayed on (Inland) ECDIS or radar, the difference between the described types of mobile AIS stations is not always visible (same symbol).

10 AIS antennas

VHF antennas, including AIS antennas, work properly only when positioned in an upright position (vertically). On inland ships in particular, antennas are sometimes mounted on a swivelling antenna bridge to solve height problems with bridges. Attention should be given to keep the VHF antennas in the vertical position as much as practically possible because the antennas in horizontal position will cause loss of VHF communication and AIS information from other vessels in the area.

11 Blue sign

Some ships have the blue sign connected to the Inland AIS station; others do not have this connection. Skippers should be aware of this situation. Not all AIS symbols on the ECDIS will represent the real situation with respect to the connection of the blue sign. So, if the blue sign is not shown, it will not necessarily indicate that the blue sign is not set, because of the possible missing connection!



Operation of the Inland AIS station on board an inland ship

Inland AIS Checklist

This checklist should help the skipper operate the Inland AIS station on board the vessel. The purpose is to give a short overview of what kind of data should be input and kept up to date during the voyage of the inland ship. The actual requirement of the data input may differ between regions. The minimum requirements of the data content are published in the appropriate regional regulation of the river commission or the national legislation.

– Before the voyage starts, check that the Inland AIS station is switched on.

BEFORE THE VOYAGE

– Check your own ship data transmitted by the Inland AIS (once in a while):
  > Name of the ship.
  > ENI number.
  > ERI ship and convoy type.
  > Length and beam of ship.
  > Reference point of the GPS antenna.
  > If blue sign is connected, check that blue sign status is correct.
– Check if you are receiving data from other vessels (which you may see visually) on the MKD or Inland ECDIS.

SHORTLY BEFORE STARTING THE VOYAGE

– Amend your own ship's data for the planned voyage according to the regional regulation for the river where you are navigating:
  > Dangerous cargo indication.
  > Destination.
  > Depth.
  > In case of convoy: Length and beam of convoy and the reference point of the GPS antenna. Also if the previous voyage was a convoy it should be adjusted accordingly.
– Set the navigational status information of the ship to "underway" with respect to the navigational status that is applicable.

DURING THE VOYAGE

– Keep the navigational status information of the ship up to date.
– Check if you are receiving data from other vessels (which you may see visually).

AFTER THE VOYAGE

– Set the navigational status information to "moored" or "at anchor".
– Amend the voyage-related data if necessary.
– Operate the Inland AIS station according to the regional regulation for the river/port where you are.

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RISVTT

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