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ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

Working Party on Inland Water Transport

Fiftieth session
Geneva, 11-13 October 2006
Agenda item 8(a)

ESTABLISHMENT OF COMMON PRINCIPLES AND TECHNICAL REQUIREMENTS FOR A PAN-EUROPEAN RIVER INFORMATION SERVICES (RIS)

International Standard for Tracking and Tracing on Inland Waterways (VTT)

Note by the secretariat

At its thirtieth session, the Working Party SC.3/WP.3 took note of the VTT standard received from the International Expert Group and circulated by the secretariat as document ECE/TRANS/SC.3/WP.3/2006/3 (edition of September 2005) and Informal Document No. 1 (edition of May 2006) and asked the secretariat to issue for the fiftieth session of SC.3 in cooperation with the delegation of the Netherlands the final version of the standard in all three working languages. Governments and River Commissions were invited to comment on the draft standard and transmit their proposals on its possible modification (ECE/TRANS/SC.3/WP.3/60, paras. 9-11).

Reproduced below is a draft resolution of the Working Party SC.3 with the final version of the Vessel Tracking and Tracing Standard for Inland Navigation (edition 1.0) annexed to it, as adopted by the Central Commission for the Navigation of the Rhine (CCNR).

It should be noted that by adopting this VTT Standard, the CCNR decided to refrain, for the time being, from inclusion into it of provisions concerning the «Automatic Identification via Internet Protocol» (IA-IP) developed (see chapter 3 of ECE/TRANS/SC.3/WP.3/2006/3) as an alternative to the Automatic Identification System (AIS). It is envisaged, however, at the next stage to come back to possible completion of the Standard with provisions on IA-IP system after additional checking of its functioning and reliability.

The Working Party may wish to consider the present Standard, adapt it in accordance with proposals that may be received from Governments and river commissions and request the secretariat to issue a formal UNECE publication on this matter. In doing so, the secretariat might be requested to complement the references to the instruments of CCNR, EC and of other international organizations appearing in the text of the annexed Standard, with relevant documents of UNECE and the Danube Commission.

INTERNATIONAL STANDARD FOR TRACKING AND TRACING ON INLAND WATERWAYS (VTT)

Resolution No. …

(adopted on … [date] by the Working Party on Inland Water Transport)

The Working Party on Inland Water Transport,

Recalling its resolution No. 57 on River Information Services (TRANS/SC.3/165) and desiring to promote the rapid establishment of harmonized river information services on the European inland waterway network,

Believing that the safety and efficiency of vessel traffic and the protection of the environment could be further improved through the establishment of an automatic vessel tracking and tracing systems on all navigable inland waterways of UNECE member States,

Bearing in mind the report of the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation on its thirtieth session (ECE/TRANS/SC.3/WP.3/60, paras. 9-11),

Adopts the text of a uniform Standard on vessel tracking and tracing on inland waterways annexed to this resolution,

Recommends Governments to base the development and introduction on their navigable inland waterways of systems for vessel tracking and tracing systems on the international standard reproduced in the annex to this resolution,

Requests Governments to inform the Executive Secretary of the Economic Commission for Europe whether they accept this resolution,

Requests the Executive Secretary of the Economic Commission for Europe to place the question of the application of this resolution periodically on the agenda of the Working Party on Inland Water Transport.

Annex

TRACKING AND TRACING STANDARD FOR INLAND NAVIGATION
(Edition 1.0)
31 May 2006

FOREWORD

The concept of River Information Services (RIS) has emerged from several European research projects, aiming at increasing safety and efficiency of inland waterway transport.

The European Commission, the CCNR and the Danube Commission have recognized the need for means of automatic exchange of navigational data between ships and between ship and shore for automatic identification and tracking and tracing solutions in inland navigation.

In maritime navigation, IMO has introduced the Automatic Identification System (AIS). All seagoing vessels on international voyage falling under SOLAS convention Chapter 5 have to be equipped with AIS since the end of 2004. The Guidelines and Recommendations for River Information Services (RIS Guidelines 2004) of PIANC and CCNR define Inland-AIS as important technology.

The European RIS Platform established in 2003 the expert group for tracking and tracing. The main task of this expert group is the development and maintenance of a European wide harmonised vessel tracking and tracing standard for inland navigation. Because of mixed traffic areas it is important that the standards and procedures for inland shipping are compatible with already defined standards and procedures for seagoing navigation.

To serve the specific requirements of inland navigation, AIS has been further developed to the so called Inland AIS Standard while preserving full compatibility with IMO's maritime AIS and already existing standards in inland navigation.

Future developments could lead to alternative vessel tracking and tracing systems, which however have to be compatible with maritime AIS.

In this document chapter 1 describes the functional specifications related to vessel tracking and tracing in inland navigation. In chapter 2, the inland AIS standard is described, including the standard inland tracking and tracing messages. An overview of definitions of services and players is given in ANNEX A: DEFINITIONS.

REFERENCES

The content of this document is based on:

Document title	Organization	Publication date
Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the community	EU	7.9.2005
Guidelines and Recommendations for River Information Services, edition 2.0	CCNR	5.2.2004
Guidelines and Criteria for Vessel Traffic Services on Inland Waterways, Resolution No. 58	UNECE	21.10.2004
Notices to Skippers for Inland Navigation, International Standard, edition 1.0	CCNR	28.5.2004
Standard Electronic Chart Display and Information System for Inland Navigation, Inland ECDIS, edition 1.02	CCNR	16.10.2003
Standard for Electronic Ship Reporting in Inland Navigation, edition 1.0	CCNR	28.5.2003
IMO MSC.74(69) Annex 3, “Recommendation on Performance Standards for a Ship-borne Automatic Identification System (AIS)”	IMO	1998
IMO Resolution A.915(22), “Revised Maritime Policy and Requirements for a future Global Navigation Satellite System (GNSS)”	IMO	January 2002
COMPRIS final report and underlying final Work package documents	COMPRIS	April 2006
Recommendation ITU-R M.1371-1, "Technical characteristics for a universal shipborne automatic identification system using time division multiple access in the VHF maritime mobile band"	ITU	2001
International Standard IEC 61993-2, “Maritime navigation and radio communication equipment and systems – Automatic Identification System, Part 2: Class A shipborne equipment of the universal automatic identification system (AIS)"	IEC	2002
International Standard IEC 61162-Serie, “Maritime navigation and radio communication equipment and systems - Digital interfaces" "Part 1: Single talker and multiple listeners”, 2nd edition "Part 2: Single talker and multiple listeners, high speed transmission"	IEC	 2000 1998
UNECE Location code	UNECE	
UNECE Ship type code	UNECE	

ABBREVIATIONS

AI	Application Identifier
AIS	Automatic Identification System
AI-IP	Automatic Identification via Internet Protocol
ADN/ADNR	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ASCII	American Standard Code for Information Interchange
ATIS	Automatic Transmitter Identification System
A-to-N	Aids to Navigation
CCNR	Central Commission for Navigation on the Rhine
COG	Course Over Ground
COMPRIS	Consortium Operational Management Platform River Information Services
CSTDMA	Carrier Sense Time Division Multiple Access
DAC	Designated Area Code
DC	Danube Commission
DGNSS	Differential GNSS
DSC	Digital Selective Calling
ECDIS	Electronic Chart Display and Information System
EMMA	European Multiservice Meteorological Awareness system
ENI	Unique European Vessel Identification Number
ERI	Electronic Reporting International
ETA	Estimated Time of Arrival
FI	Functional Identifier
GLONASS	(Russian) Global Navigation Satellite System
GlW	Gleichwertiger Wasserstand (reference water level in Germany)
GNSS	Global Navigation Satellite System
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communication
GUI	Graphical User Interface
HDG	Heading
IAI	International Application Identifier
IANA	Internet Assigned Numbers Authority
IALA	International Association of Lighthouse Authorities
ID	Identifier

IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IMO	International Maritime Organisation
IP	Internet Protocol
ITU	International Telecommunication Union
MKD	Minimum Keyboard and Display
MID	Maritime Identification Digits
MHz	Megahertz (Megacycles per second)
MMSI	Maritime Mobile Service Identifier
OLR	Overeen gekomen lage Rivierstand (reference water level in the Netherlands)
RAI	Regional Application Identifier
RAIM	Receiver Autonomous Integrity Monitoring
RIS	River Information Services
RNW	Regulierungs Niederwasser (water level ensured during 94% the year)
ROT	Rate Of Turn
RTA	Requested Time of Arrival
SAR	Search And Rescue
SOG	Speed Over Ground
SOLAS	Safety Of Life At Sea
SOTDMA	Self Organizing Time Division Multiple Access
SQRT	Square Root
STI	Strategic Traffic Image
TDMA	Time Division Multiple Access
TTI	Tactical Traffic Image
UDP	User Datagram Protocol
UMTS	Universal Mobile Telecommunications System
UN	United Nations
UN/LOCODE	United nations Location Code
UTC	Universal Time Coordinated
VDL	VHF Data Link
VHF	Very High Frequency
VTS	Vessel Traffic Services
WGS-84	World Geodetic System from 1984
WiFi	Wireless Fidelity (IEEE 802.11 wireless networking standard)

1. The use of vessel tracking and tracing in inland navigation

1.1 Introduction

The purpose of this chapter is to define all necessary functional requirements related to vessel tracking and tracing in inland navigation.

An overview of fields of interest and users is provided and particularly the information needs for each field of interest are described. The functional specifications are based on rules and regulations for navigation, based on discussions with experts and based on existing experiences.

Three groups of information are distinguished:

- Dynamic information, information changing very often in seconds or minutes;
- Semi-dynamic information, information changing just a few times a voyage;
- Static information, information changing less than a few times a year.

For each group of information different ways of information exchange can be identified:

- Vessel Tracking and tracing systems shall exchange particularly the dynamic information;
- Electronic reporting devices, like email, are meant to exchange the semi-dynamic information;
- Data bases are meant to provide static information which can be retrieved via Internet or other data carriers.

In the paragraphs below that information is described in detail which can be exchanged by vessel tracking and tracing systems between ships and between ships and shore. The information needs are described relating to tracking and tracing. However, for most of the tasks additional information like geographical information, detailed cargo information, address information is required. This kind of information will be provided by other systems.

1.2 Scope

The table below gives an overview of the fields of interest dealt with in this document. Each field of interest is split up into tasks and for each task the users are defined.

Table 1.1: Overview of fields of interest, task and users

Field of interest	Task	User
Navigation	Medium term: Looking minutes up to hours ahead, outside on-board radar range	Conning skipper
	Short term: Looking minutes ahead, in on board radar range	Conning skipper
	Very short term: Looking from seconds up to 1 minute ahead	Conning skipper
Vessel Traffic Management	VTS	VTS operator, conning skipper
	Lock operation	Lock operator, conning skipper
	Lock planning	Lock operator, conning skipper, shipmaster, fleet manager
	Bridge operation	Bridge operator, conning skipper
	Bridge planning	Bridge operator, conning skipper, shipmaster, fleet manager
Calamity Abatement Service		Operator in calamity centre, VTS operator, lock operator, bridge operator, conning skipper, ship master, Competent Authority
Transport Management	Voyage planning	Shipmaster, freight broker, fleet manager, terminal operator, conning skipper, VTS operator, lock operator, bridge operator, RIS operator
	Transport logistics	Fleet manager, shipmaster, consignor, consignee, supply forwarder
	Port and terminal management	Terminal operator, shipmaster, supply forwarder, port authority, Competent Authority
	Cargo and fleet management	Fleet manager, consignor, consignee, supply forwarder, freight broker, shipmaster

Field of interest	Task	User
Enforcement	Cross border	Customs, Competent Authority, shipmaster
	Traffic Safety	Competent Authority, shipmaster (police authorities)
Waterway and port infrastructure charges		Competent Authority, shipmaster, fleet manager, Waterway-authority
Fairway information services	Meteo information	Conning skipper
	Signal status	Competent Authority, shipmaster, fleet manager
	Water level	Competent Authority, shipmaster, fleet manager, Conning skipper

In the following paragraphs for each field of interest and tasks, the users and the information needs are described in detail.

Note: the order of the information needs within each task does not imply different importance of the information. The accuracy of the information needs is summarized in a table in the last paragraph.

1.3 Navigation

Vessel tracking and tracing can be used to support the active navigation on board.
The process navigation can be split up in 3 phases:

- Navigation, medium term ahead
- Navigation, short term ahead
- Navigation, very short term ahead

For each phase the user requirements are different.

1.3.1 Navigation, medium term ahead

Navigation, medium term ahead is the navigation phase in which the skipper observes and analyses the traffic situation looking some minutes up to an hour ahead and considers the possibilities of where to meet, pass or overhaul other vessels.

The traffic image needed is the typical ‘looking around the corner’ feature and is mainly outside the scope of the on board radar range.

Exchanged traffic information consists of:

- Identification
- Name
- Position (actual)
- Speed over ground

- Course over ground / Direction
- Destination / intended route
- Ship or combination type
- Dimensions (Length and Beam)
- Number of blue cones
- Loaded/unloaded
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

The update rate depends on the task and differs from the situation in which the ship is involved. (The maximum update rate is 2 seconds.)

1.3.2 Navigation, short term ahead

Navigation, short term ahead is the decision phase in the navigation process. In this phase, traffic information has relevance for the process of navigation, including collision avoidance measures if necessary. This function deals with the observation of other vessels in the close surroundings of the vessel. Exchanged traffic information consists of:

- Identification
- Name
- Position (actual)
- Speed over ground (accuracy 1 km/h)
- Course over ground / Direction
- Heading
- Intention (blue sign)
- Destination / intended route
- Ship / combination type
- Dimensions (Length and Beam)
- Number of blue cones
- Loaded/unloaded
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions, …)

The actual traffic information on position, identification, name, direction, speed over ground, course, heading and intention (blue sign) will be exchanged continuously at least every 10 seconds. For some routes, the Authorities will set a predefined update rate (maximum 2 seconds).

1.3.3 Navigation, very short term ahead

Navigation, very short term ahead is the operational navigation process. It consists of execution of the decisions that were made beforehand, on the spot and monitoring its effects. The traffic information needed from other vessels, especially in this situation, is related to its own vessel conditions, such as relative position, relative speed, etc.
In this phase, the following highly accurate information is needed:

- Relative Position

- Relative Heading
- Relative Speed
- Relative Drift
- Relative Rate of turn

Based on the above mentioned requirements, it becomes clear that from today's point of view, very short term navigation cannot make use of tracking and tracing information.

1.4 Vessel Traffic Management

Vessel Traffic Management comprises at least of the below defined elements:
- Vessel traffic services
- Lock planning and operation
- Bridge planning and operation

1.4.1 Vessel Traffic Services

Within Vessel Traffic Services different services can be distinguished:
- Information service
- Navigational assistance service
- Traffic organisation service

In the next paragraphs the user needs related to traffic information are described.

1.4.1.1 Information service

Information service is provided by broadcasting information at fixed times and intervals or when deemed necessary by the VTS or at the request of a vessel, and may include for example reports on the position, identity and intentions of other traffic; waterway conditions; weather; hazards; or any other factors that may influence the vessel's transit.

For information services, an overview of traffic in a network or on fairway stretch is needed. The traffic information will comprise vessel information like:
- Identification
- Name
- Position (actual)
- Course over ground / Direction
- Limitations on navigable space
- Destination / intended route
- Ship or combination type
- Dimensions (Length and Beam)
- Number of blue cones
- Loaded/unloaded
- Number of persons on board (in case of an incident)

- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

The Competent Authority will set the predefined update rate.

1.4.1.2 Navigational assistance service

Navigational assistance service informs the master on difficult navigational or meteorological circumstances or assists him in case of defects or deficiencies. This service is normally rendered at the request of a vessel or by the VTS when deemed necessary.

To provide individual information to a skipper, the VTS operator needs an actual detailed traffic image.
The contribution of vessel tracking and tracing is:

- Identification
- Name
- Position (actual)
- Speed over ground
- Course over ground / Direction
- Intention (blue sign)
- Destination / intended route
- Ship or combination type
- Dimensions (Length and Beam)
- Draught
- Air draught (in case of obstacles)
- Number of blue cones
- Loaded / unloaded
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

Any other information needed is environmental, geographic information and notices to skippers.

The actual traffic information on identification, position, direction, speed, course and intention (blue sign) has to be exchanged continuously (every 3 sec, almost real time or another predefined update rate set by the Competent Authority).

All other information had to be available on demand of the VTS operator or in special occasions (on event).

1.4.1.3 Traffic organisation service

Traffic organization service concerns the operational management of traffic and the forward planning of vessel movements to prevent congestion and dangerous situations, and is particularly relevant in times of high traffic density or when the movement of special transports may affect the flow of other traffic. The service may also include establishing and operating a system of traffic clearances or VTS sailing plans or both

in relation to priority of movements, allocation of space, mandatory reporting of movements in the VTS area, routes to be followed, speed limits to be observed or other appropriate measures which are considered necessary by the VTS authority. The requirements on the traffic image for the traffic organisation service are the same as described in paragraph 1.4.1.2 Navigational assistance service.

1.4.2 Lock planning and operation

In the next paragraphs the lock planning processes – long and medium term- and lock operation process are described.

1.4.2.1 Lock planning, long term

Lock planning, long term ahead, deals with the planning of a lock some hours up to a day ahead.

In this case the traffic information is used to improve the information on waiting and passing times at locks, which are originally based on statistical information.

Traffic information needed for long term lock planning is:

- Identification
- Name
- Position (actual)
- Course over ground / Direction
- ETA at lock
- RTA at lock
- Ship or combination type
- Dimensions (Length and Beam)
- Draught
- Air draught
- Number of blue cones
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

ETA should be available on demand or should be exchanged if a deviation from original ETA is exceeded beyond the value predefined by the Competent Authority. RTA is the response on an ETA report.

1.4.2.2 Lock planning medium term

Lock planning a medium term ahead deals with the planning of a lock up to 2 or 4 lock cycles ahead.

In this case the traffic information is used to map the arriving vessels to the available lock cycles and based on the planning to inform the skippers about the RTA (Requested Time of Arrival).

Traffic information needed for medium term lock planning is

- Identification
- Name
- Position (actual)
- Speed over ground
- Course over ground / Direction
- ETA at lock
- RTA at lock
- Ship or combination type
- Dimensions (Length and Beam)
- Number of assisting tug boats
- Draught
- Air draught
- Number of blue cones
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

ETA should be available on demand or should be exchanged if a deviation from original ETA is exceeded beyond the value predefined by the Competent Authority. All other information should be available once at the first contact or on demand. RTA is the response on an ETA report.

1.4.2.3 Lock operation

In this phase the actual locking process takes place.

To facilitate the lock operational process the following traffic information is required:

- Identification
- Name
- Position (actual)
- Speed over ground
- Course over ground / Direction
- Ship or combination type
- Number of assisting tug boats
- Dimensions (Length and Beam)
- Draught
- Air draught
- Number of blue cones
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

The actual traffic information on identification, position, direction, speed and course has to be exchanged continuously or by the Competent Authority set predefined update rate.

1.4.3 Bridge planning and operation

In the next paragraphs the bridge planning processes – medium and short term- and bridge operation process are described.

1.4.3.1 Bridge planning medium term

The bridge planning process on a medium term deals with the optimization of the traffic flow in such a way that the bridges are opened in time for passing of vessels (green wave). The time looking ahead varies between 15 minutes to 2 hours. The timeframe will depend on the local situation.

Traffic information needed for medium term bridge planning is:

- Identification
- Name
- Position (actual)
- Speed over ground
- Course over ground / Direction
- ETA at bridge
- RTA at bridge
- Ship or combination type
- Dimensions (Length and Beam)
- Air draught
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

ETA and position should be available on demand or should be exchanged if a deviation from original ETA is exceeded beyond the value predefined by the Competent Authority. All other information should be available once at the first contact or on demand. RTA is the response on an ETA report.

1.4.3.2 Bridge planning, short term

In case of short term bridge planning process, decisions are made upon the strategy for opening of the bridge.

Traffic information needed for short term bridge planning is:

- Identification
- Name
- Position (actual)
- Speed over ground
- Course over ground / Direction
- ETA at bridge
- RTA at bridge
- Ship or combination type
- Dimensions (Length and Beam)
- Air draught

- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

Actual traffic information on the position, speed and direction, should be available on demand or set at an update rate predefined by the Competent Authority, e.g. every 5 minutes. ETA and position should be available on demand or should be exchanged if a deviation from original ETA is exceeded beyond the value predefined by the Competent Authority. All other information should be available once at the first contact or on demand. RTA is the response on an ETA report.

1.4.3.3 Bridge operation

In this phase the actual opening and passing of the vessel through the bridge take place. To facilitate this process the following traffic information is required:

- Identification
- Name
- Position (actual)
- Speed over ground
- Course over ground / Direction
- Ship or combination type
- Dimensions (Length and Beam)
- Air draught

The actual traffic information on identification, position, direction, speed and course has to be exchanged continuously or by the Competent Authority set predefined update rate.

1.5 Calamity Abatement

Calamity abatement in this context focuses on repressive measures: dealing with real accidents and providing assistance during emergencies. To facilitate this process the following traffic information is required:

- Identification
- Name
- Position (actual)
- Course over ground / Direction
- Destination
- Ship or combination type
- Number of blue cones
- Loaded / unloaded
- Number of persons on board

In the case of an accident, the traffic information can be provided automatically or on the request by a calamity fighter.

1.6 Transport Management

This service is divided into four activities:

- Voyage planning
- Transport logistics
- Port and terminal management
- Cargo and fleet management

1.6.1 Voyage planning

Voyage planning in this context focuses on the planning on-trip. During the voyage the skipper will check his original planned voyage.

For this process the following traffic information is needed:
- Position (actual, own vessel)
- Speed over ground (own vessel)
- Destination / Intended route
- ETA at lock/bridge/next sector/terminal
- RTA at lock/bridge/next sector/terminal
- Dimensions (Length and Beam) (own vessel)
- Draught (own vessel)
- Air draught (own vessel)
- Loaded / unloaded

The traffic information is needed on demand or in case of a special event like a relevant change in ETA or RTA.

1.6.2 Transport Logistics

Transport logistics consist of the organization, planning, execution and control of transport.

For these processes, the following traffic information is needed:
- Identification
- Name
- Position (actual) (100 m up to 1 km)
- Course over ground / Direction
- ETA at destination

All traffic information is needed on demand of the ship owner or logistic players.

1.6.3 Intermodal port and terminal management

Intermodal port and terminal management considers the planning of resources in ports and at terminals.

The traffic information needed for these processes is described below:
- Identification
- Name
- Position (actual, with accuracy from 100m up to 1km)

- Course over ground / Direction
- ETA at port/terminal
- RTA at port/terminal
- Ship or combination type
- Dimensions (Length and Beam)
- Number of blue cones
- Loaded / unloaded
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

The terminal and port manager will request for traffic information or will agree that in predefined situations the traffic information will be sent automatically.

1.6.4 Cargo and fleet management

Cargo and fleet management considers the planning and optimizes the use of vessels, arranging cargo and transportation.

The traffic information needed for these processes is described below:
- Identification
- Name
- Position (actual)
- Course over ground / Direction (Upstream/downstream)
- Destination
- ETA at lock / bridge / destination/terminal
- RTA at lock / bridge / destination/terminal
- Dimensions (Length and Beam)
- Loaded / unloaded
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

The shipper or ship-owner will ask for the traffic information or the traffic information will be sent in predefined situations.

1.7 Enforcement

The scope of the enforcement task described below is limited to the services on dangerous goods, immigration control and customs.

The contribution of vessel tracking and tracing for these processes is:
- Identification
- Name
- Position
- Course over ground / Direction
- Destination / intended route
- ETA at lock / bridge / border / terminal / destination
- Ship or combination type

- Number of blue cones
- Number of persons on board
- Navigational status of the vessel (anchoring, mooring, sailing, restricted by special conditions …)

The traffic information will be exchanged with appropriate authorities. The traffic information exchange will take place on demand or at fixed predefined points or at special described circumstances defined by the responsible authority.

1.8 Waterway and Port infrastructure charges

At different locations in Europe, one has to pay for the use of the waterway and ports.

The traffic information needed for these processes is described below:
- Identification
- Name
- Position
- Destination / Intended route
- Ship or combination type
- Dimensions (Length and Beam)
- Draught

The traffic information will be exchanged on demand or at fixed points, defined by the responsible waterway or port authority.

1.9 Fairway information services

Related to fairway information services three services are described:
- Weather warnings in case of extreme weather conditions
- Signal status
- Water levels

In the next paragraphs, the provided information is described.

1.9.1 Weather warnings (EMMA)

The European ongoing project “EMMA” (European Multiservice Meteorological Awareness System) is dealing with standardization of weather warnings. Standardized symbols for meteorological warnings have been developed within the EMMA project and can be used for the display of messages on the Inland ECDIS screen.

EMMA does not provide for continuous weather information, but only warnings in case of special meteorological situations. The warnings are provided for regions.

Only km/h (wind), °C (temperature), cm/h (snow), l/m²h (rain) and m (visibility range in fog) may be used for weather warnings.

The following information is needed:

- Start of validity period date
- End of validity date (indefinite: 99999999)
- Start time of validity
- End time of validity
- Fairway section begin and end co-ordinates (2x)
- Type of weather warning (see ANNEX B)
- Minimum value
- Maximum value
- Classification of warning
- Direction of wind (see ANNEX B)

This information is only exchanged in special events, in case of extreme weather conditions.

1.9.2 Signal status

Vessel tracking and tracing systems can be used for the transmission of status of traffic signals in inland navigation.

The information to be exchanged consists of:
- The position of the signal
- An identification of the kind of signal (single light, two lights, “Wahrschau”, etc.);
- The direction of impact
- The current status of the signal

Examples of signals are given in ANNEX C.

The distribution of the information has to be restricted to a specific area.

1.9.3 Water level

Vessel tracking and tracing systems can be used for the transmission of (actual) water level information:

The information to be exchanged consists of:
- Gauge station
- Water level value

The information will be sent regularly or on demand.

1.10 Conclusion

The functional specifications describe the user needs and the data needs for each field of interest. Tracking and tracing systems will exchange particularly the dynamic information.

In table 1.2 an overview is given of the accuracy requirements of the dynamic information related to the task described in this chapter.

Table 1.2: overview of accuracy requirements dynamic data

REQUIRED ACCURACY	POSITION	Speed over ground	Course over ground	Heading
Navigation medium term ahead	15 – 100 m	1- 5 km/h	-	-
Navigation short term ahead	10 m [1]	1 km/h	5°	5°
VTS information service	100 m – 1 km	-	-	-
VTS navigational assistance service	10 m [1]	1 km/h	5°	5°
VTS traffic organisation service	10 m [1]	1 km/h	5°	5°
Lock planning long term	100 m – 1 km	1 km/h	-	-
Lock planning medium term	100 m	0,5 km/h	-	-
Lock operation	1 m	0,5 km/h	3°	-
Bridge planning medium term	100 m – 1 km	1 km/h	-	-
Bridge planning short term	100 m	0,5 km/h	-	-
Bridge operation	1 m	0,5 km/h	3°	-
Voyage planning	15 – 100 m	-	-	-
Transport logistics	100 m – 1 km	-	-	-
Port and terminal management	100 m – 1 km	-	-	-
Cargo and fleet management	100 m – 1 km	-	-	-
Calamity abatement	100 m	-	-	-
Enforcement	100 m - 1 km	-	-	-
Waterway and port infrastructure charges	100 m – 1 km	-	-	-

[1] In addition, the requirements of the IMO Resolution A.915(22) regarding the integrity, the availability and the continuity for position accuracy on inland waterways shall be fulfilled.

2. Inland AIS Standard

2.1 Introduction

In maritime navigation, IMO has introduced the Automatic Identification System (AIS). All seagoing ships on international voyage falling under SOLAS Convention Chapter 5 must have been equipped with AIS since the end of 2004.

The European Parliament and the Council have adopted Directive 2002/59/EC establishing a community vessel traffic monitoring and information system for seagoing vessels carrying dangerous or polluting goods using AIS for Ship Reporting and Monitoring.

AIS technology is considered as a suitable way that can also be used for automatic identification and vessel tracking and tracing in inland navigation. Especially the real time performance of AIS and the availability of worldwide standards and guidelines are beneficial for safety related applications.

To serve the specific requirements of inland navigation, AIS has to be further developed to the so called Inland AIS Standard while preserving full compatibility with IMO´s maritime AIS and already existing standards in inland navigation.

Since Inland AIS is compatible with the IMO SOLAS AIS it enables a direct data exchange between seagoing and inland vessels navigating in mixed traffic areas.

Using AIS for automatic identification and vessel tracking and tracing in inland navigation provides following features.

AIS is

- an introduced maritime navigation system according IMO mandatory carriage requirement for all SOLAS vessels;
- operating in direct ship-to-ship mode as well as in a ship-to-shore, shore-to-ship mode;
- a safety system with high requirements regarding availability, continuity and reliability;
- a real time system due to the direct ship to ship data exchange;
- an autonomously operating system in a self organized manner without a master station. There is no need for a central controlling intelligence;
- based on international standards and procedures according to IMO SOLAS Chapter V regulation;
- a type approved system to enhance safety of navigation following a certification procedure;
- interoperable with maritime AIS.

The purpose of this chapter is to define all necessary functional requirements, amendments and extensions to the existing maritime AIS in order to create an Inland AIS for use in inland navigation.

2.2 Scope

The Automatic Identification System (AIS) is a ship borne radio data system, exchanging static, dynamic and voyage related vessel data between equipped vessels and between equipped vessels and shore stations. Ship borne AIS stations broadcast the vessel’s identity, position and other data in regular intervals. By receiving these transmissions, ship borne or shore based AIS stations within the radio range can automatically locate, identify and track AIS equipped vessels on an appropriate

display like radar or Inland ECDIS. AIS systems are intended to enhance safety of navigation in ship-to-ship use, surveillance (VTS), vessel tracking and tracing, and calamity abatement support.

Several types of AIS stations can be distinguished:
a) Class A mobile stations to be used by all sea going vessels falling under the IMO SOLAS chapter V carriage requirements,
b) Class B SO/CS mobile stations with limited functionality to be used by e.g. pleasure crafts,
c) Class A derivatives, having full class A functionality on VDL level, may deviate in supplementary functions and can be used by all vessels not falling under IMO carriage requirements (e.g. tugs, pilot vessels, inland vessels (to be called Inland AIS in this chapter),
d) Base stations, including shore based simplex and duplex repeater stations.

The following modes of operation can be distinguished:
a) Ship – ship operation: All AIS equipped vessels are able to receive static and dynamic information from all other AIS equipped vessels within the radio range;
b) Ship – shore operation: Data from AIS equipped vessels can also be received by AIS base stations connected to the RIS centre where a traffic image (TTI and/or STI) can be generated;
c) Shore – ship operation: safety related data from shore to vessel could be transmitted.

A characteristic of AIS is the autonomous mode, using SOTDMA without any need for an organizing master station. The radio protocol is designed in a way that vessel stations operate autonomously in a self-organized manner by exchanging link access parameters. Time is divided into 1 minute frames with 2.250 time slots per radio channel which are synchronized by GNSS UTC time. Each participant organizes its access to the radio channel by choosing free time slots considering the future use of time slots by other stations. There is no need for a central intelligence controlling the slot assignment.

An Inland AIS station consists in general of the following components:
a) VHF transceiver (1 transmitter/2 receivers);
b) GNSS receiver;
c) Data processor.

Universal ship borne AIS, as defined by IMO, ITU and IEC, and recommended for the use in inland navigation uses self-organized time division multiple access (SOTDMA) in the VHF maritime mobile band. AIS operates on the internationally designated VHF frequencies AIS 1 (161,975 MHz) and AIS 2 (162,025 MHz), and can be switched to other frequencies in the VHF maritime mobile band.

To serve the specific requirements of inland navigation, AIS has to be further developed to the so called Inland AIS while preserving compatibility with IMO´s maritime AIS.

Vessel tracking and tracing systems in inland navigation shall be compatible with maritime AIS, as defined by IMO. Therefore, AIS messages should contain:

a) Static information, such as official ship number, call sign of vessel, name of vessel, type of vessel;
b) Dynamic information, such as vessels position with accuracy indication and integrity status;
c) Voyage related information, such as length and beam of vessel combination, hazardous cargo on board;
d) Inland navigation specific information, e.g. number of blue cones/lights according to ADN/ADNR or estimated time of arrival (ETA) at lock/bridge/terminal/border.

For moving vessels an update rate for the dynamic information on tactical level can be switched between SOLAS mode and inland mode. In inland waterway mode it can be assigned between 2 seconds and 10 minutes. For vessels at anchor it is recommended to have an update rate of several minutes, or if information is amended.

AIS is an additional source for navigational information. AIS does not replace, but supports navigational services such as radar target tracking and VTS. AIS has its strength as a means of surveillance and tracking of vessels equipped with it. Due to their different characteristics, AIS and radar complement each other.

2.3 Functional requirements

2.3.1 General requirements for Inland AIS

Inland AIS is based on the maritime AIS according IMO SOLAS regulation.

Inland AIS should cover the main functionality of IMO SOLAS AIS while considering the specific requirements for inland navigation.

Inland AIS should be compatible to the IMO SOLAS AIS and should enable a direct data exchange between seagoing and inland vessels navigating in a mixed traffic area.

The following requirements are complementary or additional requirements for Inland AIS, which differs from the IMO SOLAS AIS.

2.3.2 Information Content

Generally, only tracking and tracing and safety related information shall be transmitted via Inland AIS. Taking into consideration this requirement Inland AIS messages should contain following information:

Items marked with '*' have to be handled differently as for seagoing ships.

2.3.2.1 Static ship information

The static ship information for inland vessels should have the same parameters and the same structure than in IMO AIS as far as it is applicable. Not used parameter fields should be set to "not available".

Inland specific static ship information should be added.

Static ship information is broadcast autonomously from ship or on demand.

- User Identifier (MMSI) (Standard IMO AIS)
- Name of Ship (Standard IMO AIS)
- Call Sign (Standard IMO AIS)
- IMO number * (Standard IMO AIS/not available for Inland ships)
- Type of Ship and Cargo * (Standard IMO AIS/amended for Inland AIS)
- Overall Length (decimetre Accuracy)* (Standard IMO AIS/amended for Inland AIS)
- Overall Beam (decimetre Accuracy) * (Standard IMO AIS/amended for Inland AIS)
- Unique European Vessel Identification Number (ENI) (Inland AIS extension)
- Type of ship or combination (ERI) (Inland AIS extension)
- Loaded/unloaded Vessel (Inland AIS extension)

2.3.2.2 Dynamic ship information

The dynamic ship information for inland vessels should have the same parameters and the same structure as in IMO AIS as far as it is applicable. Not used parameter fields should be set to “not available”.

Inland specific dynamic ship information should be added.

Dynamic ship information is broadcast autonomously from ship or on demand.

- Position (WGS 84) (Standard IMO AIS)
- Speed SOG (quality information)* (Standard IMO AIS)
- Course COG (quality information)* (Standard IMO AIS)
- Heading HDG (quality information)* (Standard IMO AIS)
- Rate of turn ROT (Standard IMO AIS)
- Position accuracy (GNSS/DGNSS) (Standard IMO AIS)
- Time of el. position fixing device (Standard IMO AIS)
- Navigational status (Standard IMO AIS)
- Blue sign set (Inland AIS extension/regional bits in Standard IMO AIS)
- Quality of speed information (Inland AIS extension/derived from ship sensor or GNSS)
- Quality of course information (Inland AIS extension/derived from ship sensor or GNSS)
- Quality of heading information (Inland AIS extension/derived from certified sensor (e.g. gyro) or uncertified sensor)

2.3.2.3 Voyage related ship information

The voyage related ship information for inland vessels should have the same parameters and the same structure than in IMO AIS as far as it is applicable. Unused parameter fields should be set to “not available”.

Inland specific voyage related ship information should be added.

Voyage related ship information is broadcast autonomously from ship or on demand.

- Destination (ERI location codes) (Standard IMO AIS)
- Category of dangerous cargo (Standard IMO AIS)
- Maximum present static Draught * (Standard IMO AIS)
- ETA (Standard IMO AIS)
- Maximum present static Draught * (Standard IMO AIS/amended for Inland AIS)
- Hazardous cargo classification (Inland AIS extension)

2.3.2.4 Traffic management information

Traffic management Information is for specific use in inland navigation. This information is transmitted when required or on demand to/from inland vessels only.

2.3.2.4.1 ETA at lock/bridge/terminal

ETA at lock/bridge/terminal information is transmitted as an addressed message from ship to shore.

- Lock/bridge/terminal ID (UN/LOCODE) (Inland AIS extension)
- ETA at lock/bridge/terminal (Inland AIS extension)
- Number of assisting tugboats (Inland AIS extension)
- Air draught (Inland AIS extension)

2.3.2.4.2 RTA at lock/bridge/terminal

RTA at lock/bridge/terminal information is transmitted as an addressed message from shore to ship.

- Lock/bridge/terminal ID (UN/LOCODE) (Inland AIS extension)
- RTA at lock/bridge/terminal (Inland AIS extension)

2.3.2.4.3 Number of persons on board

The number of persons on board is transmitted preferably as an addressed message from ship to shore on demand or on event.

- Total number of persons on board (Standard IMO AIS)
- Number of crew member on board (Inland AIS extension)
- Number of passengers on board (Inland AIS extension)
- Number of shipboard personnel on board (Inland AIS extension)

2.3.2.4.4 Signal status

Signal Status information is transmitted as broadcast message from shore to ship.

- Signal Position (WGS84) (Inland AIS extension)
- Signal Form (Inland AIS extension)
- Light Status (Inland AIS extension)

2.3.2.4.5 EMMA warnings

EMMA Warning Information is transmitted as a broadcast message from shore to ship.

- local weather warnings (Inland AIS extension)

2.3.2.4.6 Water levels

Water Level Information is transmitted as a broadcast message from shore to ship.

- local water level information (Inland AIS extension)

2.3.2.4.7 Safety related messages

Safety related messages are transmitted when required as broadcast or as addressed messages.

2.3.3 Reporting interval of information transmission

The different information types of Inland AIS should be transmitted with different reporting rates.

For moving vessels in inland waterway areas, the reporting rate for the dynamic information can be switched between SOLAS mode and inland waterway mode. In inland mode it can be assigned between 2 seconds and 10 minutes. In mixed traffic areas like seaports, it should be possible to decrease the reporting rate for dynamic information by the Competent Authority to ensure a balance in reporting behaviour between inland vessels and SOLAS vessels. The reporting behaviour should be switchable by TDMA commands from a base station (automatic switching by TDMA telecommand via message 23) and by commands from ship borne systems, e.g. MKD, ECDIS or on board computer, via interface, e.g. IEC 61162 (automatic switching by ship borne system command). For static and voyage related information, it is recommended to have a reporting rate of several minutes, on demand, or if information is amended.

Following reporting rates are applicable:

Static Ship Information	Every 6 minutes or when data has been amended or on demand
Dynamic Ship Information	Depends on navigational status and ship operating mode, either inland waterway mode or SOLAS mode (default), see Table 2.1
Voyage related Ship Information	Every 6 minutes, when data has been amended or on demand
Traffic management information	As required (to be defined by Competent Authority)
Safety related messages	As required

Table 2.1: Update rate of dynamic ship information

Ship dynamic conditions	Nominal reporting interval
Ship status "at anchor" and not moving faster than 3 knots	3 minutes [1]
Ship status "at anchor" and moving faster than 3 knots	10 seconds [1]
Ship operating in SOLAS mode, moving 0 – 14 knots	10 seconds [1]
Ship operating in SOLAS mode, moving 0 – 14 knots and changing course	3 1/3 seconds [1]
Ship operating in SOLAS mode, moving 14 – 23 knots	6 seconds [1]
Ship operating in SOLAS mode, moving 14 – 23 knots and changing course	2 seconds
Ship operating in SOLAS mode, moving faster 23 knots	2 seconds
Ship operating in SOLAS mode, moving faster 23 knots and changing course	2 seconds
Ship operating in inland waterway mode [2]	assigned between 2 seconds and 10 minutes

1 When a mobile station determines that it is the semaphore (refer to ITU-R M.1371-1, Annex 2, § 3.1.1.4), the reporting rate should increase to once per 2 seconds (refer to ITU-R M.1371-1, Annex 2, § 3.1.3.3.2).

2 Shall be switched by Competent Authority using message 23, when ship enters inland waterway area.

2.3.4 Technology platform

The technical solution of Inland AIS is based on the same technical standards as IMO SOLAS AIS (Rec. ITU-R M.1371-1, IEC 61993-2).

The use of Class A mobile station derivates or Class B "SO" mobile station derivates using SOTDMA techniques are recommended as a platform for Inland AIS. The use of the Class B "CS" using CSTDMA techniques is not possible, because it does not guarantee the same performance as the Class A or Class B "SO" equipment. Neither can the successful transmission to radio link be ensured nor does it provide the capability to send the Inland AIS specific messages defined in this standard.

As long as no Class B "SO" devices are available, Inland AIS Mobile equipment is a derivative of the maritime AIS Class A mobile equipment according IMO SOLAS regulation.

2.3.5 Compatibility to IMO Class A transponders

Inland AIS transponders must be compliant to IMO Class A transponders and must therefore be capable of receiving and processing all IMO AIS messages (according to ITU-R M.1317-1and IALA technical clarifications on ITU-R M.1371-1) and in addition the messages defined in chapter 2.4 of these standards.

The DSC transmitting (tx) capability and the provision of an MKD are not required for Inland AIS transponders. The manufacturers may remove the respective hard- and software from the Class A transponders.

2.3.6 Unique identifier

In order to guarantee compatibility with maritime vessels, the Maritime Mobile Service Identifier (MMSI) number must be used as a unique station identifier (radio equipment identifier) for the Inland AIS transponders.

2.3.7 Application identifier for Inland AIS application specific messages

To serve the information requirement for inland navigation application specific messages are used.

The application specific messages consist of the Standard AIS framework (message ID, repeat indicator, source ID, destination ID), the Application Identifier (AI = DAC + FI) and the data content (variable length up to a given maximum).

The 16-bit application identifier (AI = DAC + FI) consists of 10-bit designated area code (DAC): international (DAC = 1) or regional (DAC > 1) 6-bit function identifier (FI) – allows for 64 unique application specific messages.

For Inland AIS application specific messages the DAC “200” is used.

Inland AIS application specific messages under the DAC “200” are maintained by CCNR in order to harmonise the allocation of those messages.

2.3.8 Application requirements

It is necessary to input and display Inland AIS Messages (binary coded). This should be handled by an Application (preferably with a GUI capable of interfacing the AIS transponder) at the Presentation Interface (PI), or in the transponder itself. Possible data conversions (e.g. knots into km/h) or information concerning all ERI codes (location, ship type) should be handled there.

Furthermore the transponder or the relevant application should be capable of storing also the inland specific static data in the internal memory, in order to keep the information when the unit is without power supply.

In order to program the inland specific data into the transponder the input sentences listed in ANNEX D: Proposed digital interface sentences for Inland AIS are proposed

The Inland AIS equipment shall provide as a minimum an external RTCM SC 104 interface for the input of DGNSS correction and integrity information.

2.4 Protocol amendments for Inland AIS

2.4.1 Message 1, 2, 3: position reports (ITU-R 1371-1, §3.3.8.2.1)

Table 2.2: Position report

Parameter	Number of bits	Description
Message ID	6	Identifier for this message 1, 2 or 3
Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
User ID (MMSI)	30	MMSI number
Navigational Status	4	0 = under way using engine; 1 = at anchor; 2 = not under command; 3 = restricted manoeuvrability; 4 = constrained by her draught; 5 = moored; 6 = aground; 7 = engaged in fishing; 8 = under way using engine; 9 = reserved for future amendment of Navigational Status for high-speed craft (HSC); 10 = reserved for future amendment of Navigational Status for Wing-on-ground craft (WIG); 11 - 14 = reserved for future use; 15 = not defined = default
Rate of Turn ROTAIS	8	±127 (–128 (80 hex) indicates not available, which should be the default). Coded by ROTAIS=4.733 SQRT(ROTINDICATED) degrees/min $ROT_{INDICATED}$ is the Rate of Turn (720 degrees per minute), as indicated by an external sensor. +127 = turning right at 720 degrees per minute or higher; –127 = turning left at 720 degrees per minute or higher.
Speed over Ground	10	Speed over ground in 1/10 knot steps (0-102.2 knots) 1023 = not available; 1022 = 102.2 knots or higher *1
Position Accuracy	1	1 = high (< 10 m; Differential Mode of e.g. DGNSS receiver) 0 = low (> 10 m; Autonomous Mode of e.g. GNSS receiver or of other Electronic Position Fixing Device) ; default = 0
Longitude	28	Longitude in 1/10 000 min (±180 degrees, East = positive, West = negative. 181 degrees (6791AC0 hex) = not available = default)
Latitude	27	Latitude in 1/10 000 min (±90 degrees, North = positive, South = negative, 91 degrees (3412140 hex) = not available = default)
Course over Ground	12	Course over ground in 1/10° (0-3599). 3600 (E10 hex) = not available = default; 3 601 – 4 095 should not be used.
True Heading	9	Degrees (0-359) (511 indicates not available = default).

Parameter	Number of bits	Description
Time Stamp	6	UTC second when the report was generated (0-59, or 60 if time stamp is not available, which should also be the default value, or 62 if Electronic Position Fixing System operates in estimated (dead reckoning) mode, or 61 if positioning system is in manual input mode or 63 if the positioning system is inoperative).
Blue sign	2	Indication if blue sign is set 0 = not available = default, 1 = no 2 = yes, 3 = not used *2
Regional Bits	2	Reserved for definition by a competent regional authority. Should be set to zero, if not used for any regional application. Regional applications should not use zero.
Spare	1	Not used. Should be set to zero. Reserved for future use
RAIM Flag	1	RAIM (Receiver Autonomous Integrity Monitoring) flag of Electronic Position Fixing Device; 0 = RAIM not in use = default; 1 = RAIM in use)
Communication State	19	See ITU-R M. 1371-1 table 15B
	168	Occupies 1 slot

*1 knots should be calculated in km/h by external onboard equipment.
*2 should only be evaluated if the report is coming from an Inland AIS vessel and if the information is derived by automatic means (direct connection to switch).

2.4.2 Message 5: Ship static and voyage related data (ITU-R 1371-1, §3.3.8.2.3)

Table 2.3: Ship static and dynamic data report

Parameter	Number of bits	Description
Message ID	6	Identifier for this message 5
Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
User ID (MMSI)	30	MMSI number
AIS Version Indicator	2	0 = Station compliant with AIS Edition 0; 1 - 3 = Station compliant with future AIS Editions 1, 2, and 3.
IMO Number	30	1 – 999999999 ; 0 = not available = default *1
Call Sign	42	7 × 6 bit ASCII characters, "@@@@@@@" = not available = default. *2
Name	120	Maximum 20 characters 6 bit ASCII, @@@@@@@@@@@@@@@@@@@@ = not available = default.
Type of Ship and Cargo	8	0 = not available or no ship = default; 1 - 99 = as defined in § 3.3.8.2.3.2; 100 - 199 = preserved, for regional use; 200 - 255 = preserved, for future use. *3

Parameter	Number of bits	Description
Dimensions of ship/convoy	30	Reference point for reported position; Also indicates the dimension of ship in metres (see Fig. 18 and §3.3.8.2.3.3) *[4,5,6]
Type of Electronic Positioning Fixing device	4	0 = Undefined (default); 1 = GPS, 2 = GLONASS, 3 = Combined GPS/GLONASS, 4 = Loran-C, 5 = Chayka, 6 = Integrated Navigation System, 7 = surveyed, 8 - 15 = not used.
ETA	20	Estimated Time of Arrival; MMDDHHMM UTC Bits 19 - 16: month; 1 - 12; 0 = not available = default; Bits 15 - 11: day; 1 - 31; 0 = not available = default; Bits 10 - 6: hour; 0 - 23; 24 = not available = default; Bits 5 - 0: minute; 0 - 59; 60 = not available = default
Maximum Present Static Draught	8	in 1/10 m, 255 = draught 25.5 m or greater, 0 = not available = default; *5
Destination	120	Maximum 20 characters using 6-bit ASCII; @@@@@@@@@@@@@@@@@@@@ = not available. *7
DTE	1	Data terminal ready (0 = available, 1 = not available = default)
Spare	1	Spare. Not used. Should be set to zero. Reserved for future use.
	424	Occupies 2 slots

*1 should be set to 0 for inland vessels

*2 ATIS code should be used for inland vessels

*3 best applicable ship type should be used for inland navigation

*4 the dimensions should be set to the maximum rectangle size of the convoy

*5 the decimetre accuracy of the inland information should be rounded upwards

*6 The reference point information has to be taken out of the SSD NMEA-record by distinguishing the field “source identifier”. Position reference point information with source identifier AI, has to be stored as internal one. Other source identifiers will lead to reference point information for the external reference point.

*7 the UN location codes and ERI terminal codes should be used

2.4.3 Message 23, Group Assignment Command (ITU-R M. 1371-2 [PDR)

Table 2.4: Group Assignment Command

Parameter	Number of bits	Description
Message ID	6	Identifier for message 23; always 23
Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. 0 - 3; default = 0; 3 = do not repeat any more.
Source ID	30	MMSI of assigning station.
Spare	2	Spare. Shall be set to zero. Reserved for future use.
Longitude 1	18	Longitude of area to which the group assignment applies; upper right corner (north-east) ; in 1/10 min (±180°, East=positive, West=negative).
Latitude 1	17	Latitude of area to which the group assignment applies; upper right corner (north-east); in 1/10 min (±90°, North=positive, South=negative).
Longitude 2	18	Longitude of area to which the group assignment applies; lower left corner (south-west) ; in 1/10 min (±180°, East=positive, West=negative).
Latitude 2	17	Latitude of area to which the group assignment applies; lower left corner (south-west); in 1/10 min (±90°, North=positive, South=negative).
Station type	4	0 = all types of mobiles (default); 1 = reserved for future use; 2 = all types of Class B mobile stations; 3 = SAR airborne mobile station; 4 = A to N station; 5 = Class B"CS" shipborne mobile station (IEC62287 only); 6 = inland waterways; 7 to 9 = regional use and 10 to 15 = for future use
Type of ship and cargo type	8	0= all types (default) 1...99 see Table 18 of ITU-R M.1371-1 100...199 reserved for regional use 200...255 reserved for future use
Spare	22	Reserved for future use. Not used. Shall be set to zero..
Tx/Rx mode	2	This parameter commands the respective stations to one of the following modes : 0 = TxA/TxB, RxA/RxB (default); 1 = TxA, RxA/RxB , 2 = TxB, RxA/RxB, 3 = reserved for future use
Reporting Interval	4	This parameter commands the respective stations to the reporting interval given in Table 2.5 below.
Quiet Time	4	0 = default = no quiet time commanded; 1 – 15 = quiet time of 1 to 15 min.
Spare	6	Spare. Not used. Shall be set to zero. Reserved for future use
Total	160	Occupies one time period

Table 2.5: Reporting Interval Settings for use with Message 23

Reporting Interval field setting	Reporting interval for msg18
0	As given by the autonomous mode
1	10 minutes
2	6 minutes
3	3 minutes
4	1 minute
5	30 seconds
6	15 seconds
7	10 seconds
8	5 seconds
9	2 seconds
10	Next shorter reporting interval
11	Next longer reporting interval
12 - 15	Reserved for future use

Note: When the dual channel operation is suspended by Tx/Rx mode command 1 or 2, the resulting reporting interval is twice the interval given in above table.

2.4.4 Application of specific messages (ITU-R 1371-1, §3.3.8.2.4/§3.3.8.2.6)

For the necessary data exchange in inland navigation Inland AIS application specific messages are defined.

The Regional Application Identifiers (RAI) of the Inland AIS application specific messages consist of the DAC “200” a Function Identifier (FI) as defined in this section.

2.4.4.1 Allocation of Function Identifiers (FI) within the Inland AIS branch

The FIs within the Inland AIS branch should be allocated and used as described in ITU-R M.1371-1 table 37B. Every FI within the Inland branch should be allocated to one of the following groups of application fields:

- General Usage (Gen).
- Vessel Traffic Services (VTS).
- Aids-to-Navigation (A-to-N).
- Search and Rescue (SAR).

Table 2.6: FI within the Inland AIS branch

FI	FIG	Name of International Function Message	Sent by	Broadcast	Addressed	Description
10	Gen	Inland ship static and voyage related data	Ship	X		See 2.4.4.2.1 Inland specific Message FI 10: Inland Ship Static and voyage related data
21	VTS	ETA at lock/bridge/terminal	Ship		X	See 2.4.4.2.2 Inland specific Message FI 21: ETA at lock/bridge/ Terminal
22	VTS	RTA at lock/bridge/terminal	Shore		X	See 2.4.4.2.3 Inland specific Message FI 22: RTA at lock/bridge/ Terminal
23	VTS	EMMA warning	Shore	X		See 2.4.4.2.5 Inland specific Message FI23: EMMA warning
24	VTS	Water level	Shore	X		See 2.4.4.2.6 Inland specific Message 24: water levels
40	A-to-N	Signal status	Shore	X		See 2.4.4.2.7 Inland specific Message 40: signal status
55	SAR	Inland number of persons on board	Ship	X	X (preferably)	See 2.4.4.2.4 Inland specific Message FI 55: number of persons on board

Some FI within the Inland branch should be reserved for future use.

2.4.4.2 Definition of inland specific messages

2.4.4.2.1 Inland specific message FI 10: Inland ship static and voyage related data

This message should be used by inland vessels only, to broadcast ship static and voyage related data in addition to message 5. The message should be sent with binary message 8 as soon as possible (from the AIS point of view) after message 5.

Table 2.7: Inland vessel data report

	Parameter	Number of bits	Description
	Message ID	6	Identifier for Message 8; always 8
	Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number
	Spare	2	Not used, should be set to zero. Reserved for future use.
Binary data	Application Identifier	16	As described in Table 2.6
	Unique European Vessel Identification Number	48	8*6 Bit ASCII characters
	Length of ship	13	1 - 8000 (rest not to be used) length of ship in 1/10m 0 = default
	Beam of ship	10	1 - 1000 (rest not to be used) beam of ship in 1/10m; 0 = default
	Ship or combination type	14	Numeric ERI Classification (CODES): 1 Vessel and Convoy Type as described in ANNEX E ERI ship types
	Hazardous cargo	3	Number of blue cones/lights 0 - 3; 4 = B-Flag, 5 = default = unknown
	Draught	11	1 - 2000 (rest not used) draught in 1/100m, 0 = default = unknown
	Loaded/unloaded	2	1 = loaded, 2 = unloaded, 0 = not available/default, 3 should not be used
	Quality of speed information	1	1 = high, 0 = low/GNSS = default *
	Quality of course information	1	1 = high, 0 = low/GNSS = default *
	Quality of heading information	1	1 = high, 0 = low = default *
	Spare	8	Not used, should be set to zero. Reserved for future use.
		168	Occupies 1 slot

* shall be set to 0 if no type approved sensor (e.g. gyro) is connected to the transponder

The details regarding the ERI ship type coding can be found in Annex E.

2.4.4.2.2 Inland specific message FI 21: ETA at lock/bridge/terminal

This message should be used by inland vessels only, to send an ETA report to a lock, bridge or terminal in order to apply for a time slot in resource planning. The message should be sent with binary message 6.

An acknowledgement by Inland branch function message 22 should be received within 15 minutes. Otherwise, the Inland branch function message 21 should be repeated once.

Table 2.8: ETA report

	Parameter	Bit	Description
	Message ID	6	Identifier for Message 6; always 6
	Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number of source station
	Sequence Number	2	0 – 3
	Destination ID	30	MMSI number of destination station[1]
	Retransmit Flag	1	Retransmit Flag should be set upon retransmission: 0 = no retransmission = default; 1 = retransmitted.
	Spare	1	Not used. Should be set to zero. Reserved for future use.
Binary data	Application Identifier	16	as described in Table 2.6
	UN country code	12	2*6 Bit characters
	UN location code	18	3*6 Bit characters
	Fairway section number	30	5*6 Bit characters
	Terminal code	30	5*6 Bit characters
	Fairway hectometre	30	5*6 Bit characters
	ETA at lock/bridge/terminal	20	Estimated Time of Arrival; MMDDHHMM UTC Bits 19 - 16: month; 1 - 12; 0 = not available = default; Bits 15 - 11: day; 1 - 31; 0 = not available = default; Bits 10 - 6: hour; 0 - 23; 24 = not available = default; Bits 5 - 0: minute; 0 - 59; 60 = not available = default
	Number of assisting tugboats	3	0 - 6, 7 = unknown = default
	Air draught	12	0 - 4000 (rest not used), in 1/100m, 0 = default = not used
	Spare	5	Not used, should be set to zero. Reserved for future use.
		248	Occupies 2 slots

[1] a virtual MMSI number should be used for each country, each national AIS network should route messages addressed to other countries using this virtual MMSI number

2.4.4.2.3 Inland specific message FI 22: RTA at lock/bridge/terminal

This message should be sent by base stations only, to assign a RTA at a lock, bridge or terminal to a certain vessel. The message should be sent with binary message 6 as reply on Inland branch Function Message 21.

Table 2.9: RTA report

	Parameter	Bit	Description
	Message ID	6	Identifier for Message 6; always 6
	Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number of source station
	Sequence Number	2	0 - 3
	Destination ID	30	MMSI number of destination station
	Retransmit Flag	1	Retransmit Flag should be set upon retransmission: 0 = no retransmission = default; 1 = retransmitted.
	Spare	1	Not used, should be set to zero. Reserved for future use.
Binary data	Application Identifier	16	As described in Table 2.6
	UN country code	12	2*6 Bit characters
	UN location code	18	3*6 Bit characters
	Fairway section number	30	5*6 Bit characters
	Terminal code	30	5*6 Bit characters
	Fairway hectometre	30	5*6 Bit characters
	RTA at lock/bridge/terminal	20	Recommended Time of Arrival; MMDDHHMM UTC Bits 19 - 16: month; 1 - 12; 0 = not available = default; Bits 15 - 11: day; 1 - 31; 0 = not available = default; Bits 10 - 6: hour; 0 - 23; 24 = not available = default; Bits 5 - 0: minute; 0 - 59; 60 = not available = default
	Lock/bridge/terminal status	2	0 = operational 1 = limited operation (e.g. obstructed by technical conditions, only one lock chamber available, etc.) 2 = out of order 3 = not available
	Spare	2	Not used, should be set to zero. Reserved for future use.
		232	occupies 2 slots

2.4.4.2.4 Inland specific message FI 55: number of persons on board

This message should be sent by inland vessels only, to inform about the number of persons (passengers, crew, shipboard personnel) on board. The message should be sent with binary message 6 preferably on event or on demand using IAI binary functional message 2.

Alternatively the Standard IMO binary message "number of persons on board" (IAI number 16) could be used.

Table 2.10: Persons on board report

	Parameter	Bit	Description
	Message ID	6	Identifier for Message 6; always 6
	Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number of source station
	Sequence Number	2	0 – 3
	Destination ID	30	MMSI number of destination station
	Retransmit Flag	1	Retransmit Flag should be set upon retransmission: 0 = no retransmission = default; 1 = retransmitted.
	Spare	1	Not used, should be set to zero. Reserved for future use.
Binary data	Application Identifier	16	As described in Table 2.6
	Number of crew members on board	8	0 - 254 crew members, 255 = unknown = default
	Number of passengers on board	13	0 - 8190 passengers, 8191 = unknown = default
	Number of shipboard personnel on board	8	0 - 254 shipboard personnel, 255 = unknown = default
	Spare	51	Not used, should be set to zero. Reserved for future use.
		168	Occupies 1 slot

The following messages need further discussion:

2.4.4.2.5 Inland specific message FI23: EMMA warning

The EMMA warning shall be used to warn skippers using graphical symbols on the ECDIS screen of heavy weather conditions. The following message is capable of transmitting the EMMA data using the AIS channel. It will not replace the Notices to Skippers warnings.

This message should be sent by base stations only, to give weather warnings to all vessels in a certain area. The message should be sent with binary message 8 on demand.

Table 2.11: EMMA warning report

	Parameter	Bit	Description
	Message ID	6	Identifier for Message 8; always 8
	Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number
	Spare	2	Not used, should be set to zero. Reserved for future use.
Binary data	Application Identifier	16	As described in Table 2.6
	Start date	17	Start of validity period (YYYYMMDD), Bits 18-10: year since 2000 1-255; 0 = default) Bits 9-6: month (1-12; 0 = default) Bits 5-1: day (1-31; 0 = default)
	End date	17	End of validity period (YYYYMMDD), Bits 18-10: year since 2000 1-255; 0 = default) Bits 9-6: month (1-12; 0 = default) Bits 5-1: day (1-31; 0 = default)
	Start time	11	Start time of validity period (HHMM) UTC Bits 11-7: hour (0-23; 24 = default) Bits 6-1: minute (0-59; 60 = default)
	End time	11	End time of validity period (HHMM) UTC Bits 11-7: hour (0-23; 24 = default) Bits 6-1: minute (0-59; 60 = default)
	Start longitude	28	Begin of the fairway section
	Start latitude	27	Begin of the fairway section
	End longitude	28	End of the fairway section
	End latitude	27	End of the fairway section
	Type	4	type of weather warning: 0 = default/unknown, others see ANNEX B: EMMA CODES Table B.1
	Min value	9	Bit 0: 0 = positive, 1 = negative value = default Bits 1 - 8 = value (0 - 253; 254 = 254 or greater, 255 = unknown = default)
	Max value	9	Bit 0: 0 = positive, 1 = negative value = default Bits 1 - 8 = value (0 - 253; 254 = 254 or greater, 255 = unknown = default)
	Classification	2	classification of warning (0 = unknown/default, 1 = slight, 2 = medium, 3 = strong/heavy) according to ANNEX B: EMMA CODES Table B.2
	Wind direction	4	direction of wind: 0 = default/unknown, others see ANNEX B: EMMA CODES Annex B Table B.3
	Spare	6	not used, should be set to zero. Reserved for future use.
		256	occupies 2 slots

Table 2.12: Weather type code

Code	Description (EN)	AIS
WI	Wind	1
RA	Rain	2
SN	Snow and ice	3
TH	Thunderstorm	4
FO	Fog	5
LT	Low temperature	6
HT	High temperature	7
FL	Flood	8
FI	Fire in the forests	9

Table 2.13: Weather category type code

Code	Description (EN)	AIS
1	Slight	1
2	Medium	2
3	strong, heavy	3

Table 2.14: Wind direction code

Code	Description (EN)	AIS
N	North	1
NE	North east	2
E	East	3
SE	South east	4
S	South	5
SW	South west	6
W	West	7
NW	North west	8

2.4.4.2.6 Inland specific message 24: water levels

This message should be used to inform skippers about actual water levels in their area. It is additional short term information to the water levels distributed via Notices to Skippers. The update rate shall be defined by the Competent Authority. It is possible to transmit the water levels of more than 4 gauges using multiple messages.

This message should be sent by base stations only, to give water level information to all vessels in a certain area. The message should be sent with binary message 8 at regular intervals.

Table 2.15: Water level report

	Parameter	Bit	Description
	Message ID	6	Identifier for Message 8; always 8
	Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number
	Spare	2	Not used, should be set to zero. Reserved for future use.
Binary data	Application Identifier	16	As described in Table 2.6
	UN country code	12	UN country code using 2*6-Bit ASCII characters according to ERI specification
	Gauge ID	11	National unique ID of gauge *1 1-2047, 0 = default = unknown
	Water level	14	Bit 0: 0 = negative value, 1 = positive value Bits 1-11: 1-8191, in 1/100m, 0 = unknown = default *2
	Gauge ID	11	National unique ID of gauge *1 1-2047, 0 = default = unknown
	Water level	14	Bit 0: 0 = negative value, 1 = positive value Bits 1-11: 1-8191, in 1/100m, 0 = unknown = default *2
	Gauge ID	11	National unique ID of gauge *1 1-2047, 0 = default = unknown
	Water level	14	Bit 0: 0 = negative value, 1 = positive value Bits 1-11: 1-8191, in 1/100m, 0 = unknown = default *2
	Gauge ID	11	National unique ID of gauge *1 1-2047, 0 = default = unknown
	Water level	14	Bit 0: 0 = negative value, 1 = positive value Bits 1-11: 1-8191, in 1/100m, 0 = unknown = default *2
		168	occupies 1 slot

*1 should be defined by ERI for each country

*2 difference value referring to reference waterlevel (GlW in Germany, RNW on the Danube)

2.4.4.2.7 Inland specific message 40: signal status

This message should be sent by base stations only, to inform about the status of different light signals to all vessels in a certain area. The information should be displayed on an external Inland ECDIS display as dynamic symbols. The message should be sent with binary message 8 at regular intervals.

Table 2.16: Signal status report

	Parameter	Bit	Description
	Message ID	6	Identifier for Message 8; always 8
	Repeat Indicator	2	Used by the repeater to indicate how many times a message has been repeated. Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number
	Spare	2	Not used, should be set to zero. Reserved for future use.
Binary data	Application Identifier	16	As described in Table 2.6
	Signal position longitude	28	Longitude in 1/10 000 min (±180 degrees, East = positive, West = negative. 181 degrees (6791AC0 hex) = not available = default)
	Signal position latitude	27	Latitude in 1/10 000 min (±90 degrees, North = positive, South = negative, 91 degrees (3412140 hex) = not available = default)
	Signal form	4	0,15 = unknown = default, 1-14 signal form according to ANNEX C: EXAMPLE OF SIGNAL STATUS
	Orientation of signal	9	Degrees (0-359) (511 indicates not available = default).
	Direction of impact	3	1 = upstream, 2 = downstream, 3 = to the left bank, 4 = to the right bank, 0 = unknown = default, rest not used
	Light status	30	Status (1 to 7) of up to 9 lights (light 1 to light 9 from left to right, 100000000 means colour 1 at light 1) per signal according to ANNEX C: example of signal status. 000000000 = default, 777777777 maximum, rest not used
	Spare	11	Not used, should be set to zero. Reserved for future use.
		168	occupies 1 slot

An example of signal status is given in ANNEX C: EXAMPLE OF SIGNAL STATUS

ANNEX A: DEFINITIONS

A.1 Services

River Information Services (RIS)
A European concept for harmonised information services to support traffic management and transport management in inland navigation, including the interfaces to other transport modes.

Vessel Traffic Management
Vessel traffic management is providing information orally as well as electronically. It also gives directions in interaction with and response to vessels in a traffic flow to optimise the smooth (efficient) and safe transport.

Vessel traffic management should comprise at least one of the below defined elements:

- Vessel traffic services
- Information services
- Navigational assistance services
- Traffic organisation service
- Lock planning (long and medium term)
- Lock operation
- Bridge planning (medium and short term)
- Bridge operation
- Navigational information

Vessel Traffic Services (VTS)
Vessel traffic service is a service implemented by the Competent Authority, designed to improve the safety and efficiency of vessel traffic and to protect the environment.

The service should have the capability to interact with the traffic and to respond to traffic situations developing in the area.

VTS services – VTS should comprise at least an information service and may also include others, such as a navigational assistance service, or a traffic organisation service, or both, defined as below:

- An information service is a service to ensure that essential information becomes available in time for on-board navigational decision-making
- A navigational assistance service is a service to assist on-board navigational decision-making and to monitor its effects. Navigational assistance is especially of importance in reduced visibility or difficult meteorological circumstances or in case of defects or deficiencies affecting the radar, steering or propulsion. Navigational assistance is given in due form of position information at the request of the traffic participant or in special circumstances when deemed necessary by the VTS operator.

- A traffic organisation service is a service to prevent the development of dangerous vessel traffic situations by managing of traffic movements and to provide for the safe and efficient movement of vessel traffic within the VTS area.

(Source: IALA VTS guidelines)

VTS area is the delineated, formally declared service area of the VTS. A VTS area may be subdivided in sub-areas or sectors. (Source: IALA VTS guidelines)

Navigational information is information provided to the skipper on board to support in on-board decision-making. (Source: IALA VTS guidelines)

Tactical Traffic Information (TTI) is the information affecting the skipper's or the VTS operator's immediate decisions with respect to in the actual traffic situation and the close geographic surroundings. A tactical traffic image contains position information and specific vessel information of all targets detected by a radar presented on an Electronic Navigational Chart and – if available – enhanced by external Traffic Information, such as the information delivered by an AIS. TTI may be provided on board of a vessel or on shore, e.g. in a VTS Centre. (Source: PIANC RIS guidelines 2004)

Strategic Traffic Information (STI) is the information affecting the medium and long-term decisions of RIS users. A strategic traffic image contributes to the planning decision capabilities regarding a safe and efficient voyage. A strategic traffic image is produced in a RIS centre and delivered to the users on demand. A strategic traffic image contains all relevant vessels in the RIS area with their characteristics, cargoes and positions, reported by VHF voice reporting or electronic ship reporting, stored in a database and presented in a table or on an electronic map. Strategic Traffic Information may be provided by a RIS/VTS centre or by an office. (Source: PIANC RIS guidelines 2004)

(Vessel) Tracking and Tracing

- **(Vessel) Tracking** means the function of maintaining status information of the vessel, such as the current position and characteristics, and – if needed – combined with information on cargo and consignments.
- **(Vessel) Tracing** means the retrieving of information concerning the whereabouts of the vessel and – if needed - information on cargo, consignments and equipment. (Source: PIANC RIS guidelines 2004)

Vessel traffic monitoring is providing important information relating to the movements of relevant ships in a RIS area. This includes information about ships identity, position, (type of cargo) and port of destination. (new)

Logistics

The planning, execution and control of the movement and placement of people and/or goods and the supporting activities related to such movement and placement within a system organized to achieve specific objectives. (Source: COMPRIS WP8 Standardization)

A.2 Players

Shipmaster
The person responsible for the overall safety of the vessel, cargo, passengers and crew and thereby for the voyage plan of the vessel and the condition of the vessel, the cargo, respectively passengers and the quality and quantity of the crew.

Conning skipper
The person who navigates the vessel according to voyage plan instructions of the shipmaster. (Source: COMPRIS WP2, Architecture)

VTS operator
A person, appropriately qualified by the Competent Authority, performing one or more tasks contributing to the services of the VTS (Source: IALA VTS guidelines for Inland Waters).
The person who monitors and controls the fluent and safe progress of traffic within the area around the VTS Centre. (Source: COMPRIS WP2, Architecture)

Competent Authority
The Competent Authority is the authority made responsible for safety, in whole or in part, by the government, including environmental friendliness and efficiency of vessel traffic. The Competent Authority usually has the tasks of planning, arranging funding and of commissioning of RIS. (Source: PIANC RIS guidelines 2004)

RIS authority
The RIS authority is the authority with the responsibility for the management, operation and co-ordination of the RIS, the interaction with participating vessels and safe and effective provision of the service. (Source: RIS guidelines, PIANC 2004)

RIS operator
A person performing one or more tasks contributing to the services of RIS (new)

Lock operator
The person who monitors and controls the fluent and safe progress of traffic around and through a lock and who is responsible for the locking process in itself. (Source: COMPRIS WP2, Architecture)

Bridge operator
The person who monitors and controls the fluent and safe progress of traffic around a moveable bridge and who is responsible for the operation of a movable bridge. (Source: COMPRIS WP2, Architecture)

Terminal operator (Synonym: stevedore)
A party responsible for the execution of loading, stowing and discharging (unloading) of vessels. (Source: COMPRIS WP8 Standardization)

Fleet manager
A person planning and observing the actual (navigational) status of a number of vessels moving or working under one command or ownership.

Operator in calamity centres of emergency services
The person who monitors, controls and organizes the safe and smooth fighting of accidents, incidents and calamities.

Consignor (Synonym: cargo shipper or sender)
The merchant (person) by whom, in whose name or on whose behalf a contract of carriage of goods has been concluded with a carrier or any party by whom, in whose name or on whose behalf the goods are actually delivered to the carrier in relation to the contract of carriage. (Source: COMPRIS WP8 Standardisation)

Consignee
The party such as mentioned in the transport document by whom goods, cargo or containers are to be received. (Source: Transport and Logistics Glossary (P&O Nedlloyd) and COMPRIS WP8 Standardization)

Freight broker (Synonym: freight forwarder)
The person responsible on behalf of the transport supplier for the physical transport of the goods to be executed. The freight broker offers transport capacity to shippers on behalf of the transport supplier and is this way mediator between supply forwarder and shipmaster. (Source: COMPRIS WP2, Architecture)

Supply forwarder
The person who is responsible on behalf of the shipper for the organization of the physical transport of the goods that should be exchanged. The supply forwarder offers cargo to transporters on behalf of the shipper. (Source: COMPRIS WP2, Architecture)

Customs
The department of the Civil Service that deals with the levying of duties and taxes on imported goods from foreign countries and the control over the export and import of goods, e.g. allowed quota prohibited goods. (Source: Transport and Logistics Glossary (P&O Nedlloyd)

ANNEX B: EMMA CODES

Table B.1 Weather_type_code

Code	Description
WI	Wind
RA	Rain
SN	Snow and ice
TH	Thunderstorm
FO	Fog
LT	Low temperature
HT	High temperature
FL	Flood
FI	Fire in the forests

Table B.2 Weather_category_code

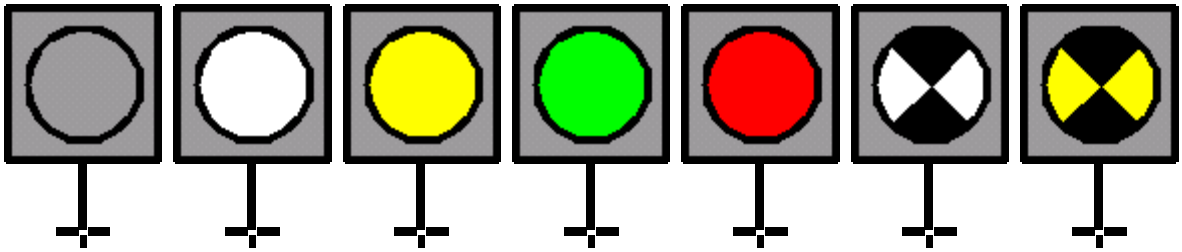
Code	Description
1	Slight
2	medium
3	strong, heavy

Table B.3 Wind_direction_code

Code	Description
N	north
NE	north east
E	east
SE	south east
S	south
SW	south west
W	west
NW	north west

ANNEX C: EXAMPLES OF SIGNAL STATUS

C.1 Light status

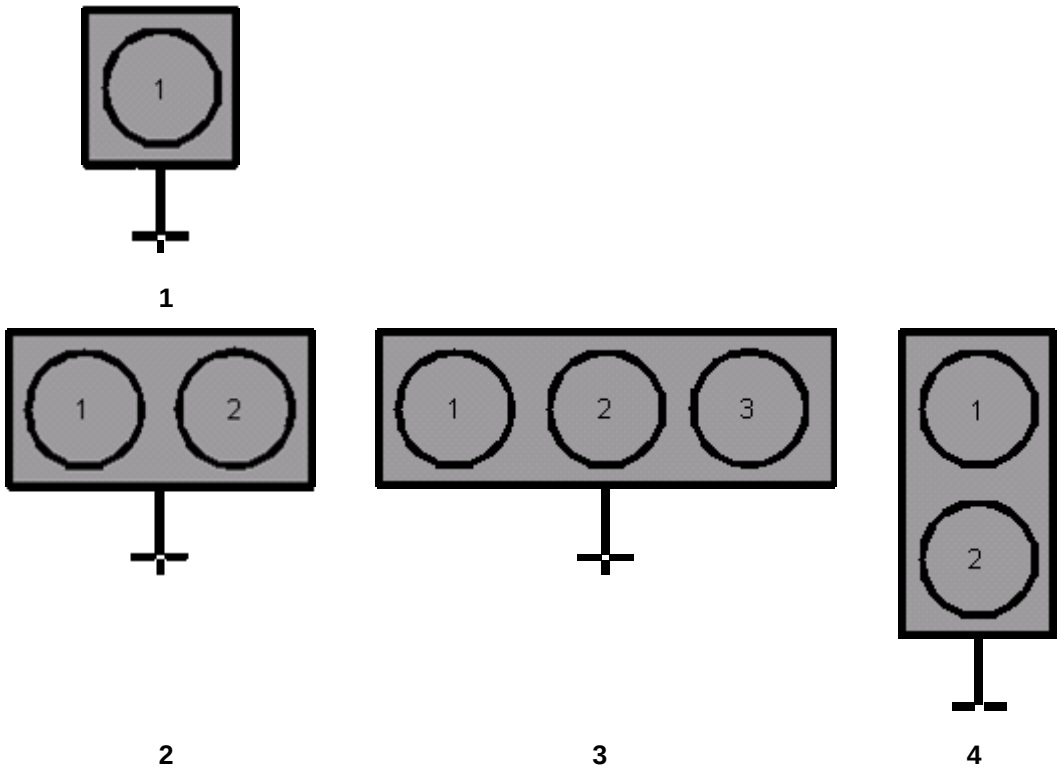


1 2 3 4 5 6 7

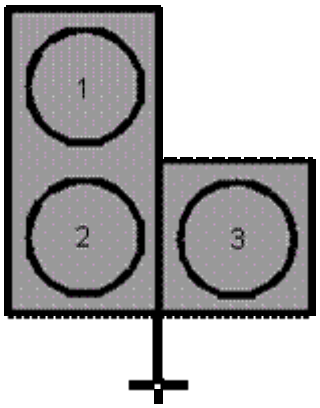
The examples show a grey background in a square of a fixed size of about 3 mm x 3 mm at all display scales with a "post" like it is used for the present static signal in the presentation library. The white point in the centre of the post indicates the position and the post itself allows the user to read the direction of impact. (At a lock, for example, there are often signals for vessels leaving the lock chamber and vessels entering the lock chamber on the inner and the outer side of the door construction) However, the manufacturer of the display software can design the shape of the symbol and the background colour.

The status of a signal can be "No light", "white", "yellow", "green", "red", "white flashing" and "yellow flashing" according to CEVNI.

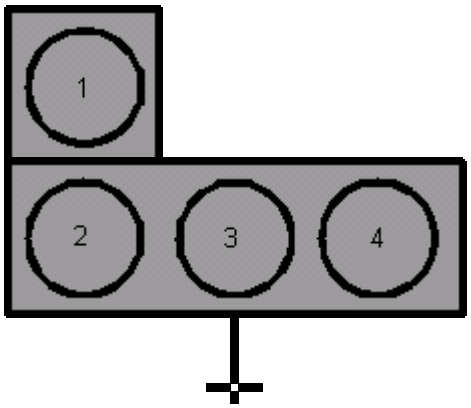
C.2 Signal forms



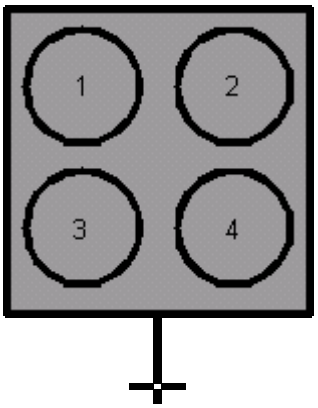
1 2 3 4



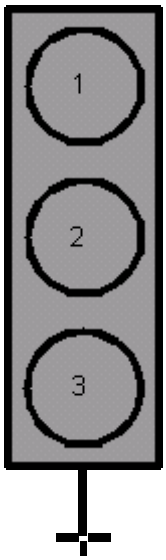
5



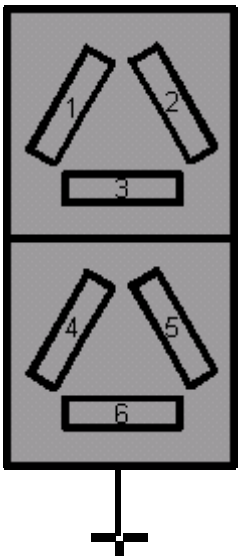
6



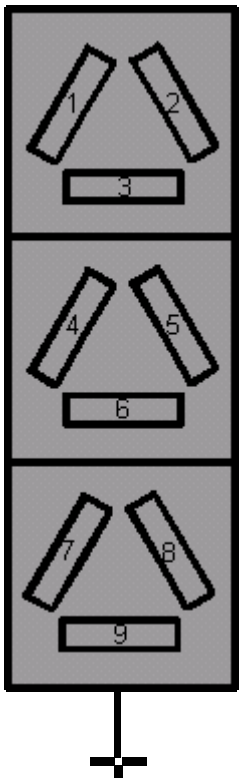
7



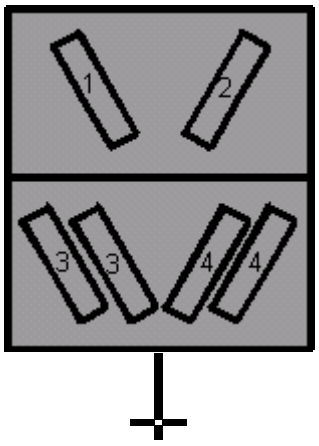
8



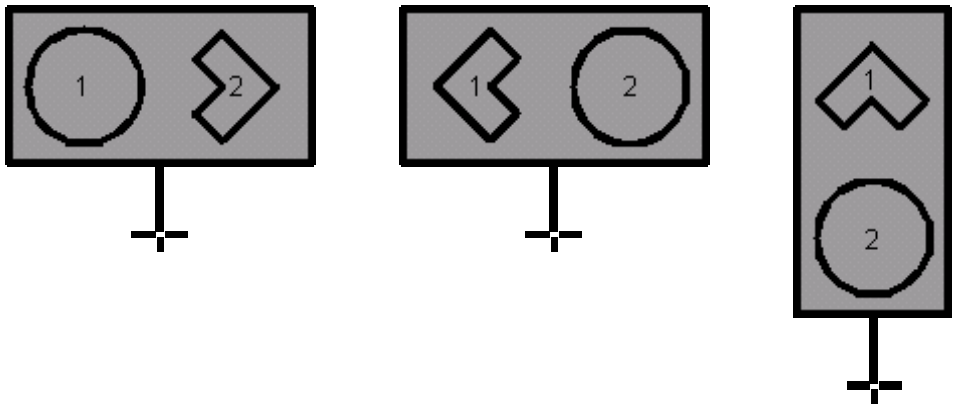
9



10



11



12 **13** **14**

For each of these signals there are many possible combinations of lights. It is required to use

A number to indicate the kind of signal and

A number for each light on a signal to indicate its status

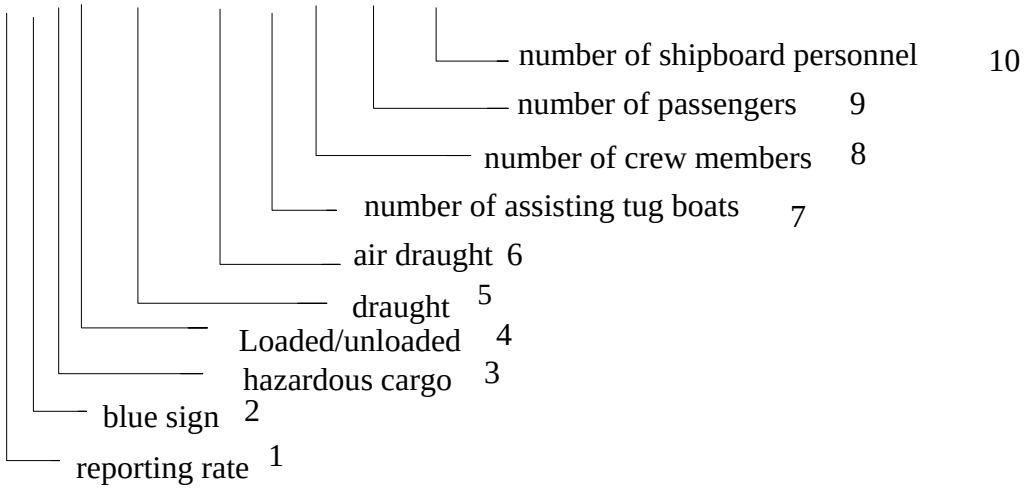
1 = no light,
2 = white,
3 = yellow,
4 = green,
5 = red,
6 = white flashing and
7 = yellow flashing.

ANNEX D: PROPOSED DIGITAL INTERFACE SENTENCES FOR INLAND AIS

D.1 Input sentences

The serial digital interface of the AIS is supported by existing IEC 61162-1 sentences and new IEC 61162-1 like sentences. The detailed descriptions for the digital interface sentences are found in either IEC 61162-1 edition 2, or in "Publicly Available Specification" IEC PAS 61162-100.

$PIWWVSD,x,x,x,x,xx.xx,xx.xx,x,xxx,xxxx,xxx*hh<CR><LF>



This annex contains draft information used during the development of Inland AIS in order to input the inland specific data (see 2.4 Protocol Amendments for Inland AIS) into the Inland AIS shipboard unit. New IEC 61162-1 sentences have to be specified. Prior to an adoption of approved sentences for Inland AIS by IEC 61162-1, proprietary sentence should be used.

D.2 Inland Waterway Static Ship data

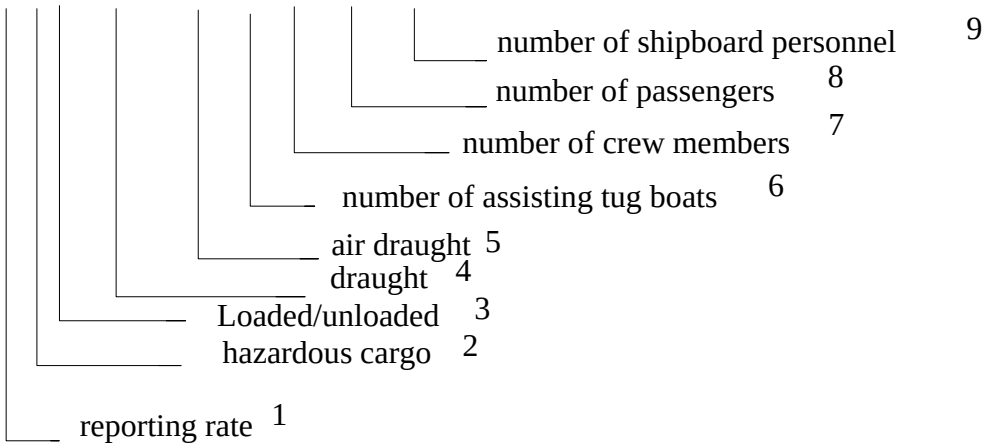
This sentence is used to enter inland navigation static ship data into an Inland AIS unit. For setting the inland static ship data the sentence $PIWWSSD with the following content is proposed:

NOTE 1 ERI ship type according to ERI classification (see Annex E)
NOTE 2 length of ship 0 to 800,0 meter
NOTE 3 beam of ship 0 to 100,0 meter
NOTE 4 quality of speed information 1 = high or 0 = low
NOTE 5 quality of course information 1 = high or 0 = low
NOTE 6 quality of heading information 1 = high or 0 = low

D.3 Inland Waterway voyage data

This sentence is used to enter inland navigation voyage ship data into an Inland AIS unit. For setting the inland voyage related data, the sentence $PIWWIVD with the following content is proposed:

$PIWWIVD,x,x,x,xx.xx,xx.xx,x,xxx,xxxx,xxx*hh<CR><LF>

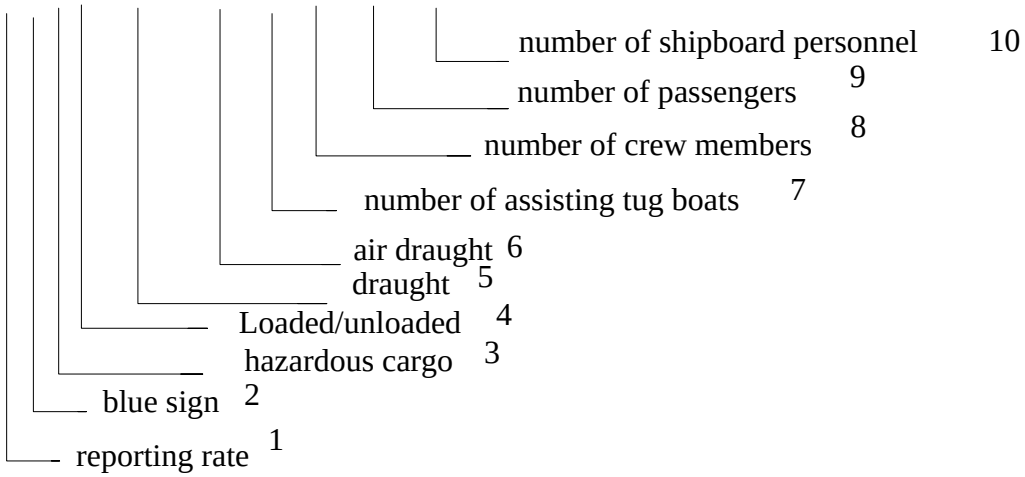


NOTE 1 See Table 2.5: Reporting rate settings, default setting: 0
NOTE 2 number of blue cones: 0-3, 4 = B-Flag, 5 = default = unknown
NOTE 3 0 = not available = default, 1 = loaded, 2 = unloaded, rest not used
NOTE 4 static draught of ship 0 to 20,00 meters, 0 = unknown = default, rest not used
NOTE 5 air draught of ship 0 to 40,00 meters, 0 = unknown = default, rest not used
NOTE 6 number of assisting tugboat 0-6, 7 = default = unknown, rest not used
NOTE 7 number of crew members on board 0 to 254, 255 = unknown = default, rest not used
NOTE 8 number of passengers on board 0 to 8190, 8191 = unknown = default, rest not used
NOTE 9 number of shipboard personnel on board 0 to 254, 255 = unknown = default, rest not used

Remark: The former proposed input sentence $PIWWVSD, used in Inland AIS units developed prior this standard, contains the parameter field “blue sign” which may raise conflicts with the parameter field “regional application flags” in the $--VSD sentence according IEC 61162-1:VSD-AIS Voyage static data.

It should no longer be implemented in new AIS transponders. However, for compatibility reasons, it should be supported by external applications.

$PIWWVSD,x,x,x,x,xx.xx,xx.xx,x,xxx,xxxx,xxx*hh<CR><LF>



NOTE 1 0 = not available = default = factory settings, 1 = SOLAS settings, 2 = Inland Waterway settings (2 sec), rest not used
NOTE 2 0 = not available = default, 1 = not set, 2 = set, rest not used
NOTE 3 number of blue cones: 0-3, 4 = B-Flag, 5 = default = unknown
NOTE 4 0 = not available = default, 1 = loaded, 2 = unloaded, rest not used
NOTE 5 static draught of ship 0 to 20,00 metres, 0 = unknown = default, rest not used
NOTE 6 air draught of ship 0 to 40,00 metres, 0 = unknown = default, rest not used
NOTE 7 number of assisting tugboat 0-6, 7 = default = unknown, rest not used
NOTE 8 number of crew members on board 0 to 254, 255 = unknown = default, rest not used
NOTE 9 number of passengers on board 0 to 8190, 8191 = unknown = default, rest not used
NOTE 10 number of shipboard personnel on board 0 to 254, 255 = unknown = default, rest not used

ANNEX E: ERI SHIP TYPES

This table should be used to convert the UN ship types, which are used in Inland message 10 to the IMO types which are used in IMO message 5.

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

ANNEX F: OVERVIEW OF INFORMATION REQUIRED BY THE USER AND THE DATA FIELDS, WHICH ARE AVAILABLE IN THE DEFINED INLAND AIS MESSAGES

Required information by users	Data field in Inland AIS message Yes or No
Identification	Yes
Name	Yes
Position	Yes
Speed over ground	Yes
Course over ground	Yes
Intention blue sign	Yes
Direction	Could be derived from course over ground
Destination	Yes
Intended route	Could partly be derived from destination
ETA	Yes
RTA	Yes
Ship or combination type	Yes
Number of assisting tug boats	Yes, could be identified separately
Dimensions (length and beam)	Yes
Draught	Yes
Air draught	Yes
Number of blue cones	Yes
Loaded / unloaded	Yes
Number of persons on board	Yes
Navigational status	Yes
Limitations on navigational space	Free text. Is not available
Relative position	Could be calculated based on position information of vessels
Relative speed	Could be calculated based on speed information of vessels
Relative heading	Could be calculated based on heading information of vessels
Relative drift	Is not available
Rate of turn	Is not available

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