Commission Implementing Regulation (EU) 2019/838 of 20 February 2019 on technical specifications for vessel tracking and tracing systems and repealing Regulation (EC) No 415/2007

COMMISSION IMPLEMENTING REGULATION (EU) 2019/838

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THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to 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[(1)], and in particular Article 5(1)(d), thereof,

Whereas:

(1) Technical specifications for vessel tracking and tracing systems, provided for by Commission Regulation (EC) No 415/2007[(2)], should be updated and clarified, taking into account experience gained from their application, as well as the technological progress and the updates of underlying international standards.

(2) The technical specifications for vessel tracking and tracing systems should be based on the technical principles set out in Annex II to Directive 2005/44/EC.

(3) In accordance with Article 1(2) of Directive 2005/44/EC, the technical specifications are to take due account of the work carried out by international organisations. Continuity is to be ensured with other modal traffic management services, in particular maritime vessel traffic management and information services.

(4) In order to improve efficiency of transport by inland waterways, the technical specifications should be extended to include provisions related to Application Specific Messages for vessel tracking and tracing systems.

(5) In order to improve safety of navigation, the technical specifications for vessel tracking and tracing systems should be extended to include provisions related to Aids to Navigation in inland navigation.

(6) This Regulation should be without prejudice to the provisions of Directive (EU) 2016/1148 of the European Parliament and of the Council[(3)] concerning the measures for a high common level of security of network and information systems across the Union.

(7) Pursuant to Article 12(2) of Directive 2005/44/EC technical specifications should enter into force immediately after their publication and Member States should be required to apply those specifications not later than 12 months after their entry into force.

(8) Regulation (EC) No 415/2007 should therefore be repealed.

(9) The measures provided for in this Regulation are in accordance with the opinion of the Committee referred to in Article 11 of Directive 2005/44/EC,

HAS ADOPTED THIS REGULATION:

Article 1

The technical specifications for vessel tracking and tracing systems in inland waterway transport shall be as set out in the Annex to this Regulation.

Article 2

Regulation (EC) No 415/2007 is repealed. References to the repealed Regulation shall be construed as references to this Regulation.

Article 3

This Regulation shall enter into force on the day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 13 June 2020.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 20 February 2019.

For the Commission

The President

Jean-Claude JUNCKER

ANNEX

Standard Vessel Tracking and Tracing for Inland Navigation

1. GENERAL PROVISIONS

1.1. Introduction

The technical specifications for Vessel Tracking and Tracing (VTT) systems is based on the work carried out in this field by relevant international organizations, namely already existing standards and technical specifications in inland navigation, maritime or other relevant areas.

Due to the application of VTT systems in mixed traffic areas including both inland and maritime navigation environments, like sea ports and coastal areas VTT systems shall be compatible with the AIS Class A mobile stations as referred to in Chapter V of the SOLAS convention.

When VTT systems provide essential services as defined in Directive (EU) 2016/1148[(4)] concerning measures for a high common level of security of network and information systems across the Union, the provisions of that Directive apply.

1.2. References

The following international agreements, recommendations, standards and guidelines are referred to in this Annex:

Document title	Organisation	Publication date
The World Association for Waterborne Transport Infrastructure (PIANC) Guidelines and Recommendations for River Information Services	PIANC	2011
International Convention of Safety Of Life At Sea (SOLAS) by the International Maritime Organisation (IMO), Chapter V — Safety of navigation, 1974, as amended	IMO	1974
International Maritime Organisation (IMO) MSC.74(69) Annex 3, ‘Recommendation on Performance Standards for a Ship-borne Automatic Identification System (AIS)’, 1998	IMO	1998
IMO Resolution A.915(22), ‘Revised Maritime Policy and Requirements for a future Global Navigation Satellite System (GNSS)’, 2002	IMO	2002

IMO Resolution A.1106(29) Revised Guidelines for the Onboard Operational Use of Shipborne Automatic Identification System (AIS), 2015	IMO	2015
Recommendation by the International Telecommunication Union ITU-R M.585 ‘Assignment and use of identities in the maritime mobile service’, 2015	ITU	2015
Recommendation by the International Telecommunication Union ITU-R M.1371 ‘Technical characteristics for a universal shipborne automatic identification system using time division multiple access in the VHF maritime mobile band’	ITU	2014
International Standard by International Electrotechnical Commission (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	2018
International Standard IEC 61162-Serie, ‘Maritime navigation and radio communication equipment and systems — Digital interfaces’: Part 1: Single talker and multiple listeners; Part 2: Single talker and multiple listeners, high speed transmission	IEC	Part 1: 2016 Part 2: 1998
International Standard by International Electrotechnical Commission (IEC):	IEC	2017

62287-Series, Maritime navigation and radio communication equipment and systems — Class B shipborne equipment of the automatic identification system (AIS) Part 1: Carrier-sense time division multiple access (CSTDMA) techniques; Part 2: Self-organising time division multiple access (SOTDMA) techniques		
Radio Technical Commission's for Maritime Services (RTCM) Recommended Standards for Differential GNSS (Global Navigation Satellite Systems) Service	RTCM	2010
UNECE recommendation No 28 'Codes for Types of Means of Transport'	UNECE	2010

1.3. **Definitions**

The following definitions are used in this Annex:

(a) Automatic Identification System

Automatic Identification System (AIS)

'Automatic Identification System (AIS)' means an automatic communication and identification system intended to improve the safety of navigation by assisting in the efficient operation of vessel traffic services (VTS), ship reporting, ship-to-ship and ship-to-shore operations.

Inland AIS

'Inland AIS' means AIS for the use in inland navigation and interoperable with (maritime) AIS-technically enabled by amendments and extensions to the (maritime) AIS.

Track and Trace

'Track and Trace' means the process of monitoring and recording the past and present whereabouts of a ship shipment, as it passes through different handlers on its way to its destination, through a network. Tracing refers to where the product has been, while tracking refers to where it is going next.

Track

'Track' means the path followed or to be followed between one position and another.

(b) Services

River Information Services (RIS)

'River Information Services (RIS)' means services provided in accordance with Article 3(a) of Directive 2005/44/EC of the European Parliament and of the Council[5].

Vessel Traffic Management (VTM)

'Vessel Traffic Management (VTM)' means the functional framework of harmonised measures and services to enhance the safety, security, efficiency of shipping and the protection of the marine environment in all navigable waters.

Inland Vessel Traffic Services (VTS)

'Inland Vessel Traffic Services (VTS)' means services within the meaning of point 2.5 of the Annex to Commission Regulation (EC) No 414/2007[6].

Navigational information

'Navigational information' means information provided to the skipper on board to support in on-board decision-making.

Tactical Traffic Information (TTI)

'Tactical Traffic Information' means the information affecting immediate navigation decisions in the actual traffic situation and the close geographic surroundings. Tactical Traffic Information is used to generate a Tactical Traffic Image.

Strategic Traffic Information (STI)

'Strategic Traffic Information' means the information affecting the medium and long-term decisions of RIS users. Strategic Traffic Information is used to generate a Strategic Traffic Image.

Vessel Tracking and Tracing (VTT)

'Vessel Tracking and Tracing' means a function within the meaning of point 2.12 of the Annex to Regulation (EC) No 414/2007.

Maritime Mobile Service Identity (MMSI)

'Maritime Mobile Service Identity (MMSI)' means series of nine digits which are transmitted over the radio path in order to uniquely identify ship, stations, coast stations and group calls.

Electronic Reporting International (ERI)

'Electronic Reporting International (ERI)' means the Technical guidelines and specifications established in accordance with Article 5(1)(b) of Directive 2005/44/EC.

Inland Electronic Chart Display and Information System (Inland ECDIS)

'Inland Electronic Chart Display and Information System (Inland ECDIS)' means the Technical guidelines and specifications established in accordance with Article 5(1)(a) of Directive 2005/44/EC.

Players

Shipmaster

'Shipmaster' means the person on board of the ship being in command and having the authority to take all decisions pertaining to navigation and ship management. The terms 'shipmaster', 'boatmaster' and 'skipper' shall be deemed to be equivalent.

Conning skipper

'Conning skipper (Navigating skipper)' means the person who navigates the vessel, according to the voyage plan instructions of the shipmaster.

Competent Authority for RIS

The Competent Authority for RIS means the authority designated by the Member State in accordance with Article 8 of Directive 2005/44/EC.

RIS operator

'RIS operator' means a person performing one or more tasks related to the provision of RIS services.

RIS users

'RIS users' means all different user groups as defined in Article 3(g) of Directive 2005/44/EC.

1.4. **Vessel Tracking and Tracing services and minimum requirements of Vessel Tracking and Tracing systems**

VTT systems shall be able to support the following services:

— Navigation,
— Traffic Information,
— Traffic Management,
— Calamity Abatement,
— Transport Management,
— Enforcement,
— Waterway dues and port infrastructure charges,
— Fairway Information Services,
— Statistics.

This is without prejudice to the provisions of Regulation (EC) No 414/2007 applicable to those services.

The most important information of VTT relates to vessel identity and its position. VTT shall be capable of providing — at minimum — the following information on an automatic and periodical basis to other vessels and shore stations, provided these vessels or shore stations are appropriately equipped:

— Unique vessel ID: unique European vessel identification number (ENI)/International Maritime Organisation number (IMO number),
— Vessel name,
— Vessel call sign,
— Navigational status,
— Type of vessel or convoy,
— Dimensions of vessel or convoy,
— Draught,
— Dangerous cargo indication (number of blue cones in compliance with ADN),
— Loading status (loaded/unloaded),
— Destination,
— Estimated Time of Arrival (ETA) at destination,
— Number of persons on board,
— Position (+ quality indication),
— Speed (+ quality indication),
— Course Over Ground (COG) (+ quality indication),
— Heading (HDG) (+ quality indication),
— Rate Of Turn (ROT),
— Blue sign information,
— Timestamp of position fix.

These minimum requirements indicate the user needs and the necessary data for VTT systems in inland navigation.

A VTT system is designed to offer sufficient flexibility to accommodate future additional requirements.

2. INLAND VESSEL TRACKING AND TRACING FUNCTIONS

2.1. **Introduction**

This section sets out the requirements relating to VTT information for different RIS service categories. Requirements for each service category are listed describing the user groups and usage of the VTT information.

The overview of VTT information needs is provided in *Table 2.1* at the end of this section.

2.2. **Navigation**

Vessel tracking and tracing can be used to support the active navigation on board. Main user group are the conning skippers.

The process navigation can be divided in three phases:

(a) navigation, medium-term ahead,

(b) navigation, short-term ahead,

(c) navigation, very short-term ahead.

The user requirements are different for each phase.

2.2.1. *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 overtake 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.

The update rate is depending on the task and differs from the situation in which the vessel is involved.

2.2.2. *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 own vessel.

The actual traffic information shall be exchanged continuously at least every 10 seconds. For some routes the authorities may set a predefined update rate (maximum two seconds).

2.2.3. *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 their 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. It is necessary to follow highly accurate information in this phase.

Therefore, Tracking and Tracing information cannot be used for very short-term navigation.

2.3. **Vessel traffic management**

Vessel traffic management (VTM) comprises at least of the following elements:

(a) vessel traffic services,

(b) lock planning and operation,

(c) bridge planning and operation.

2.3.1. *Vessel traffic services*

Vessel traffic services consist of the following services:

(a) an information service,

(b) a navigational assistance service,

(c) a traffic organisation service.

The user groups of Vessel Traffic Services (VTS) are VTS operators and conning skippers.

The user needs related to traffic information are indicated in points 2.3.1.1 to 2.3.1.3.

2.3.1.1. *Information service*

An 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 reports on the position, identity and intentions of other vessels, waterway conditions, weather conditions, hazardous situations or any other factors that may influence the vessel's transit.

For the information services an overview of traffic in a network or on fairway stretch is required.

The competent authority may set a predefined update rate if needed for safe and reliable passage through the area.

2.3.1.2. *Navigational assistance service*

A navigational assistance service informs the conning skipper on difficult navigational or meteorological circumstances or assists the conning skipper 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 conning skipper, the VTS operator needs an actual detailed traffic image.

The actual traffic information has to be exchanged continuously (every three seconds, almost real time or another predefined update rate set by the competent authority).

All other information has to be made available on request of the VTS operator or in special occasions.

2.3.1.3. *Traffic organisation service*

A traffic organisation service concerns the operational management of traffic and the 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 (such as berthing places, lock space, sailing routes), 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.

2.3.2. *Lock planning and operation*

The lock planning processes — long- and medium-term — and lock operation process are described in points 2.3.2.1 to 2.3.2.3. Main user groups are lock operators, conning skippers, shipmasters and fleet managers.

2.3.2.1. *Lock planning, long-term*

Long-term lock planning is dealing 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.

Estimated Time of Arrival (ETA) shall be available on demand or shall be exchanged if the deviation from the original ETA exceeds the deviation allowed by the competent authority. Requested time of arrival (RTA) is the response to an ETA report or may be sent from a lock to propose a locking time.

2.3.2.2. *Lock planning, medium-term*

Medium-term lock planning is dealing with the planning of a lock up to two or four 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 conning skippers about the RTA.

ETA shall be available on request or shall be exchanged if the deviation from the original ETA exceeds the deviation allowed by the competent authority. All other information shall be available once at the first contact or on request. RTA is the response to an ETA report or may be sent from a lock to propose a locking time.

2.3.2.3. *Lock operation*

In lock operation phase the actual locking process take place.

The actual traffic information has to be exchanged continuously or another predefined update rate set by the competent authority.

The accuracy of VTT information does not allow for high-precision applications like closing of lock gates.

2.3.3. *Bridge planning and operation*

The bridge planning processes — medium- and short-term — and bridge operation process are described in points 2.3.3.1 to 2.3.3.3. Main user groups are bridge operators, conning skippers, shipmasters and fleet managers.

2.3.3.1. *Bridge planning, medium-term*

The bridge planning process on medium term is dealing with the optimisation of the traffic flow in such a way that the bridges are opened in time for passing of vessels (green wave). The planning horizon varies between 15 minutes to two hours. The timeframe depends on the local situation.

ETA and position information shall be available on request, or such information shall be exchanged as soon as the deviation between the updated ETA and the original ETA exceeds a pre-defined value set by the competent authority. All other information shall be available once at the first contact or on request. RTA is the response on an ETA report or may be sent from a bridge to propose a passage time.

2.3.3.2. *Bridge planning, short-term*

In case of bridge planning on a short term, decisions are made on the basis of the strategy for opening of the bridge.

Actual traffic information on the position, speed and direction, shall be available on request or exchanged in accordance with predefined update rate, for example, every five minutes, set by the competent authority. ETA and position information shall be available on request, or such information shall be exchanged as soon as the deviation between the updated ETA and the original ETA exceeds a pre-defined value set by the competent authority. All other information shall be available once at the first contact or on request. RTA is the response on an ETA report or may be sent from a bridge to propose a passage time.

2.3.3.3. *Bridge operation*

In bridge operation phase the actual opening and passing of the vessel through the bridge take place.

The actual traffic information shall be exchanged continuously or at another update rate set by the competent authority.

The accuracy of VTT information does not allow for high-precision applications like opening or closing of the bridge.

2.4. **Calamity abatement**

Calamity abatement in this context focuses on repressive measures: dealing with real accidents and providing assistance during emergencies. Main user groups are operators in calamity centre, VTS operators, conning skippers, shipmasters and the competent authorities.

In the case of an accident the traffic information can be provided automatically or the responsible organisation shall ask for the respective information.

2.5. **Transport management**

Transport management (TS) is divided into the following four activities:

(a) voyage planning,

(b) transport logistics,

(c) port and terminal management,

(d) cargo and fleet management.

Main user groups are shipmasters, freight brokers, fleet managers, consignors, consignees, supply forwarders, port authorities, terminal operators, lock operators and bridge operators.

2.5.1. *Voyage planning*

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

2.5.2. *Transport logistics*

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

All traffic information is needed on request by the ship-owner or logistic stakeholders.

2.5.3. *Intermodal port and terminal management*

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

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

2.5.4. *Cargo and fleet management*

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

The shipper or ship-owner shall request the traffic information or traffic information shall be sent in predefined situations.

2.6. **Enforcement**

The scope of the enforcement task is limited to the services on dangerous goods, immigration control and customs. Main user groups are customs, competent authorities and shipmasters.

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

2.7. **Waterway dues and port infrastructure charges**

In various locations in the Union, usage of the waterway and ports is subject to the payment of fees. Main user groups are competent authorities, shipmasters, fleet managers, waterway authorities and port authorities.

The traffic information shall be exchanged on request or at fixed points, defined by the competent waterway or port authority.

2.8. **Information needs**

Table 2.1 provides an overview of the information needs of the different services.

TABLE 2.1

Overview of information needs

	Identification	Name	Call sign	Navigational status	Type	Dimensions	Draught	Dangerous cargo	Destination	ETA	Number of persons	Position	Speed	Course	Heading	Rate of turn	Blue sign	Other information
Navigation — medium-term	X	—	X	X	X		X	X	X			X	X	X			X	
Navigation — short-term	X	—	X	X	X		X	X	X			X	X	X	X		X	

Navigation very short-term	Requirements are currently not met by VTT																	
VTM — VTS services	X	X		X	X	X	X	X	X	X		X	X	X	X			X	
VTM — lock operation	X	X		X	X		X	X					X		X				Air draught
VTM — lock planning	X	X		X	X	X	X	X					X	X	X				number of assisting tugboats, air draught, ETA/ RTA
VTM — bridge operation	X	X			X	X							X	X	X				Air draught
VTM — bridge planning	X	X		X	X	X							X	X	X				Air draught, ETA/ RTA
Calamity abatement	X	X			X			X	X	X		X	X		X				
TM — voyage planning	X	X				X	X		X	X			X	X					Air draught, ETA/ RTA
TM — transport logistics	X	X									X		X		X				
TM — port and terminal management	X	X		X	X	X		X	X				X		X				ETA/ RTA
TM — cargo and fleet management	X	X		X			X		X	X			X		X				ETA/ RTA
Enforcement	X	X		X	X			X		X	X	X	X		X				
Waterway and port infrastructure charges	X	X			X	X	X			X			X						

3. INLAND AIS TECHNICAL SPECIFICATION

3.1. **Introduction**

In maritime navigation, the IMO has introduced the carriage of automatic identification system (AIS): all seagoing vessels on international voyage falling under Chapter V of the SOLAS convention have to be equipped with AIS Class A mobile stations since the end of 2004.

Directive 2002/59/EC of the European Parliament and of the Council[7] establishes a Community vessel traffic monitoring and information system for seagoing vessels carrying dangerous or polluting goods using AIS for Ship Reporting and Monitoring.

AIS is considered as a suitable solution 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 technical specification while preserving full compatibility with maritime AIS and already existing standards and technical specifications in inland navigation.

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

AIS is:

— a system introduced by the IMO to support maritime safety of navigation; mandatory carriage requirement for all vessels in accordance with Chapter V of SOLAS convention,
— 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 thanks to the direct ship-to-ship data exchange,
— an autonomously operating system in a self-organised manner without master station. There is no need for a central controlling intelligence,
— based on international standards and procedures in accordance with Chapter V of SOLAS convention,
— a type approved system to enhance safety of navigation following a certification procedure,
— globally interoperable.

The purpose of this section is to define all necessary technical requirements, amendments and extensions to the existing AIS Class A mobile stations in order to create an Inland AIS mobile station for use in inland navigation.

3.2. **Scope**

The 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 electronic chart display systems such as the Inland Electronic Chart Display and Information System (Inland ECDIS) as defined in Commission Implementing Regulation (EU) No 909/2013[8]. AIS is intended to enhance safety of navigation in ship-to-ship use, surveillance (VTS), Vessel Tracking and Tracing, and calamity abatement support.

AIS mobile stations are divided into following types:

a) Class A mobile stations to be used by all sea going vessels falling under carriage requirements of Chapter V of SOLAS convention;

b) Inland AIS mobile station, having full Class A functionality on VHF Data Link level, deviating in supplementary functions designed for the use by inland vessels;

c) Class B SO/CS mobile stations with limited functionality which may be used by vessels not falling under carriage requirements for Class A or Inland AIS mobile stations;

d) AIS shore stations, including AIS base stations and AIS repeater stations.

The following modes of operation can be distinguished:

a) ship-to-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-to-shore operation: data from AIS equipped vessels can also be received by AIS shore stations connected to the RIS centre where a traffic image (Tactical Traffic Image and/or Strategic Traffic Image) can be generated;

c) shore-to-ship operation: voyage and safety related data from shore to vessel can be transmitted.

A characteristic of AIS is the autonomous mode, using self-organised time division multiple access (SOTDMA), without any need for an organising master station. The radio protocol is designed in a way that vessel stations operate autonomously in a self-organised manner by exchanging link access parameters. Time is divided into one minute frames with 2 250 time slots per radio channel which are synchronised by GNSS UTC time. Each participant organises 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 mobile station consists in general of the following components:

a) VHF transceiver (one transmitter, two 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 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 the maritime AIS.

Vessel Tracking and Tracing systems in inland navigation shall be compatible with AIS Class A mobile stations, as defined by IMO. Therefore, Inland AIS messages shall be able to provide the following types of information:

a) static information, such as official vessel 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 convoy, dangerous cargo on board;

d) inland navigation specific information, such as number of blue cones/lights according to ADN or ETA at lock/bridge/terminal/border.

For moving vessels the update rate for dynamic information on tactical level shall be between 2 and 10 seconds. For vessels at anchor it is recommended to have an update rate of several minutes, or an update triggered when information is amended.

Inland AIS mobile station does not replace, but supports navigational services such as radar target tracking and VTS. Inland AIS mobile station provides an additional input for navigational information: its value added is to provide means of surveillance and tracking of vessels equipped with Inland AIS. The position accuracy derived from Inland AIS mobile station using the internal (uncorrected) GNSS is typically above 10 metres. When the position is corrected using DGNSS from either maritime beacon differential correction service, AIS Message 17 or EGNOS (SBAS) the accuracy is typically below 5 metres. Due to their different characteristics, Inland AIS mobile station and radar complement each other.

3.3. **Requirements**

3.3.1. *General requirements*

Inland AIS mobile station is based on the AIS Class A mobile station in accordance with SOLAS convention.

Inland AIS mobile station shall cover the main functionality of AIS Class A mobile stations while considering the specific requirements for inland navigation.

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

The requirements set out in points 3.3 to 3.5 are complementary or additional requirements for Inland AIS, which differs from the AIS Class A mobile stations.

The Inland AIS mobile station design shall take into account the ‘Technical clarifications on the Vessel Tracking and Tracing standard’.

The default setting of the transmission power shall be high power and shall only been set to low power if directed so by the competent authority.

3.3.2. *Information content*

Only Tracking and Tracing and safety related information shall be transmitted via Inland AIS mobile station.

The information content set out in points 3.3.2.1 to 3.3.2.5 shall be implemented in a way that it can be sent from an Inland AIS mobile station without the need for an external application.

The Inland AIS messages shall contain following information (items marked with ‘*’ have to be handled differently as for seagoing vessels):

3.3.2.1. *Static vessel information*

The static vessel information for inland vessels shall have the same parameters and the same structure as in the AIS Class A mobile stations as far as it is applicable. Any conversions from inland to maritime parameters shall be done automatically where feasible. Unused parameter fields shall be set to ‘not available’.

Inland specific static vessel information shall be added.

Static vessel information is broadcast autonomously from vessel or on request.

User identifier (MMSI)	in all messages
Name of vessel	AIS Message 5
Call sign of the vessel	AIS Message 5
IMO number	AIS Message 5 (not available for Inland vessels)
Type of vessel/convoy and cargo *	AIS Message 5 + Inland FI 10
Overall length (decimetre accuracy) *	AIS Message 5 + Inland FI 10
Overall beam (decimetre accuracy) *	AIS Message 5 + Inland FI 10
Unique European vessel identification number (ENI)	Inland FI 10
Reference point of reported position on the vessel (location of antenna) *	AIS Message 5

3.3.2.2. *Dynamic vessel information*

The dynamic vessel information for inland vessels shall have the same parameters and the same structure as in AIS Class A mobile stations as far as it is applicable. Not used parameter fields shall be set to ‘not available’.

Inland specific dynamic vessel information shall be added.

Dynamic vessel information is broadcasted autonomously from vessel or on request.

Position according to World Geodetic System from 1984 (WGS 84)	AIS Message 1, 2 and 3
Speed Over Ground (SOG)	AIS Message 1, 2 and 3
Course COG	AIS Message 1, 2 and 3
Heading HDG	AIS Message 1, 2 and 3
Rate of turn ROT	AIS Message 1, 2 and 3
Position accuracy (GNSS/DGNSS)	AIS Message 1, 2 and 3
Time of electronic position fixing device	AIS Message 1, 2 and 3
Navigational status	AIS Message 1, 2 and 3
Status of Blue sign *	AIS Message 1, 2 and 3
Quality of speed information	Inland FI 10
Quality of course information	Inland FI 10
Quality of heading information	Inland FI 10

3.3.2.3. *Voyage related vessel information*

The voyage related vessel information for inland vessels shall have the same parameters and the same structure than in AIS Class A mobile stations as far as it is applicable. Unused parameter fields shall be set to 'not available'.

Inland specific voyage related vessel information shall be added.

Voyage related vessel information is broadcasted autonomously from vessel or on request.

Destination (ISRS location code)	AIS Message 5
Category of dangerous cargo	AIS Message 5
ETA	AIS Message 5
Maximum present static draught *	AIS Message 5 + Inland FI 10
Dangerous cargo indication	Inland FI 10
Loaded/unloaded vessel	Inland FI 10

3.3.2.4. *Number of persons on board*

The number of persons on board is transmitted either as a broadcast message or as an addressed message from vessel to shore on request or on event.

Number of crew members on board	Inland FI 55
Number of passengers on board	Inland FI 55
Number of shipboard personnel on board	Inland FI 55

3.3.2.5. *Safety related messages*

Safety related messages (i.e. text messages) are transmitted when required as broadcast or as addressed messages.

Addressed Safety related message	AIS Message 12
Broadcasted Safety related message	AIS Message 14

3.3.3. *Reporting interval of information transmission*

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

The reporting rate for dynamic information can be switched between autonomous mode and assigned mode for moving vessels in inland waterway areas. The reporting rate can be increased up to 2 seconds in assigned mode. The reporting behaviour shall be switchable from an AIS base station (via AIS Message 23 for group assignment or Message 16 for individual assignment) and by commands from external ship-borne systems, via IEC 61162 interface as defined in Appendix B.

For static and voyage related the reporting rate shall be 6 minutes, on request, or if information is amended.

Following reporting rates shall be applicable:

Static vessel information:	Every 6 minutes, on request or when data has been changed
Dynamic vessel information:	Depends on navigational status and vessel operating mode, either autonomous (default) or assigned mode, see Table 3.1
Voyage related vessel information:	Every 6 minutes, on request or when data has been changed
Number of persons on board:	As required or on request
Safety related messages:	As required
Application Specific Messages:	As required (to be defined by competent authority)

TABLE 3.1

Update rate of dynamic vessel information

Vessel dynamic conditions	**Nominal reporting interval**
Vessel status ‘at anchor’ and not moving faster than 3 knots	3 minutes[a]
Vessel status ‘at anchor’ and moving faster than 3 knots	10 seconds[a]
Vessel operating in autonomous mode, moving 0 to 14 knots	10 seconds[a]
Vessel operating in autonomous mode, moving 0 to 14 knots and changing course	3 1/3 seconds[a]
Vessel operating in autonomous mode, moving 14 to 23 knots	6 seconds[a]
Vessel operating in autonomous mode, moving 14 to 23 knots and changing course	2 seconds
Vessel operating in autonomous mode, moving faster than 23 knots	2 seconds
Vessel operating in autonomous mode, moving faster than 23 knots and changing course	2 seconds
Vessel operating in assigned mode[b]	assigned between 2 seconds and 10 seconds

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

b Shall be switched by competent authority, when necessary.

3.3.4. *Technology platform*

The platform for Inland AIS mobile station is the AIS Class A mobile station.

The technical solution of Inland AIS mobile station is based on the same technical standards as AIS Class A mobile stations (Recommendation ITU-R M.1371 and international standard IEC 61993-2).

3.3.5. *Compatibility to AIS Class A mobile stations*

Inland AIS mobile stations shall be compliant to AIS Class A mobile stations and shall be capable of receiving and processing all AIS messages (according to Recommendation ITU-R M.1371 and technical clarifications on Recommendation ITU-R M.1371 by International Association of aids to navigation and Lighthouse Authorities (IALA)) and in addition the messages defined in point 3.4.

3.3.6. *Unique identifier*

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

3.3.7. *Application requirements*

Information referred to point 3.3.2 shall be input, stored and displayed directly within the Inland AIS mobile station.

The Inland AIS mobile station shall 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.

Necessary data conversions for the Minimum Keyboard Display (MKD) of the Inland AIS information content (e.g. knots into km/h) or MKD input and display of information concerning inland vessel types shall be handled within the Inland AIS mobile station.

Application Specific Messages (ASM) should be entered/displayed by an external application with the exemption of Inland AIS ASM DAC = 200 FI = 10 (Inland Ship static and voyage related data) and DAC = 200 FI = 55 (inland number of persons on board) which are implemented directly in the Inland AIS mobile station.

In order to program the inland specific data into the AIS transponder the digital interface sentences are defined in Appendix B.

The Inland AIS mobile station shall provide — as a minimum — an external interface for the input of DGNSS correction and integrity information according to the provisions of the Radio Technical Commission for Maritime Services Special Committee 104 on DGNSS.

3.3.8. *Type-approval*

Inland AIS mobile station shall be type-approved for compliance with these technical specifications.

3.4. **Protocol amendments for Inland AIS mobile station**

Due to evolution of the Recommendation ITU-R M.1371, several parameters allow for the use of new status codes. This does not harm the functioning of the AIS but may result in display of unrecognized status codes in equipment based on previous revisions of the standard.

3.4.1. *Table 3.2 Position report*

TABLE 3.2

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 0-3; 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 sailing; 9 = reserved for future amendment of Navigational Status for a high-speed craft; 10 = reserved for future amendment of Navigational Status for Wing In Ground (WIG); 11 = power-driven vessel towing astern (regional use)[a] 12 = power-driven vessel pushing ahead or towing alongside (regional use)[a]; 13 = reserved for future use; 14 = AIS-SART (active); 15 = not defined = default (also used by AIS)
Rate of turn ROT AIS	8	0 to + 126 = turning right at up to 708° per min or higher 0 to – 126 = turning left at up to 708° per min or higher Values between 0 and 708° per min coded by ROTAIS = 4.733 SQRT(ROTsensor) degrees per min where ROTsensor is the Rate of Turn as input by an external Rate of Turn Indicator.

a	Not applicable within the Union for the purpose of this Regulation
b	Knots shall be calculated in km/h by external on-board equipment.
c	Shall only be evaluated if the report is coming from an Inland AIS mobile station and if the information is derived by automatic means (direct connection to switch).

		ROTAIS is rounded to the nearest integer value + 127 = turning right at more than 5° per 30 s (No Turn Indicator available) – 127 = turning left at more than 5° per 30 s (No Turn Indicator available) – 128 (80 hexadecimal) indicates no turn information available (default). ROT data should not be derived from COG information
Speed over ground	10	Speed over ground in 1/10 knot steps (0-102,2 knots) 1 023 = not available; 1 022 = 102,2 knots or higher[b]
Position accuracy	1	The position accuracy (PA) flag should be determined in accordance with ITU-R M. 1371 1 = high (=< 10 m) 0 = low (> 10 m) 0 = default
Longitude	28	Longitude in 1/10 000 min (± 180o, East = positive (as per 2's complement), West = negative (as per 2's complement), 181= (6791AC0 hexadecimal) = not available = default)
Latitude	27	Latitude in 1/10 000 min (± 90o, North = positive (as per 2's complement), South = negative (as per 2's complement), 91= (3412140 hexadecimal) = not available = default)
Course over ground	12	Course over ground in 1/10o (0-3599). 3 600 (E10 hexadecimal) = not available = default;

a Not applicable within the Union for the purpose of this Regulation

b Knots shall be calculated in km/h by external on-board equipment.

c Shall only be evaluated if the report is coming from an Inland AIS mobile station and if the information is derived by automatic means (direct connection to switch).

		3 601 — 4 095 shall not be used
True heading	9	Degrees (0-359) (511 indicates not available = default).
Time stamp	6	UTC second when the report was generated by the electronic positioning fixing system (EPFS) (0-59, or 60 if time stamp is not available, which shall also be the default value, or 61 if positioning system is in manual input mode, or 62 if Electronic Position Fixing System operates in estimated (dead reckoning) mode, or 63 if the positioning system is inoperative)
Special manoeuvre indicator: blue sign	2	Indication if blue sign is set[c] 0 = not available = default, 1 = not engaged in special manoeuvre = blue sign not set 2 = engaged in special manoeuvre = blue sign is set yes, 3 is not used
Spare	3	Not used. Should be set to zero. Reserved for future use.
RAIM-flag	1	Receiver autonomous integrity monitoring (RAIM) flag of electronic position fixing device; 0 = RAIM not in use = default; 1 = RAIM in use. RAIM-flag should be determined in accordance with ITU-R M. 1371
Communication state	19	Communication state should be determined in accordance with ITU-R M. 1371
Total	**168**	**Occupies one slot**

a Not applicable within the Union for the purpose of this Regulation

b Knots shall be calculated in km/h by external on-board equipment.

c Shall only be evaluated if the report is coming from an Inland AIS mobile station and if the information is derived by automatic means (direct connection to switch).

3.4.2. *Ship static and voyage related data (Message 5)*

TABLE 3.3

Ship static and dynamic data report

Parameter	Number of bits	Description
Message ID	6	Identifier for this message 5
Repeat indicator	2	Sent by the repeater to indicate how many times a message has been repeated 0-3; Default = 0; 3 = do not repeat any more
User ID (MMSI)	30	MMSI number
AIS version indicator	2	0 = Station compliant with Recommendation ITU-R M. 1371-1; 1 = Station compliant with Recommendation ITU-R M. 1371-3 (or later), 2 = Station compliant with Recommendation ITU-R M. 1371-5 (or later), 3 = Station compliant with future editions
IMO number	30	0 = not available = default — not applicable to Search And Rescue aircraft 0000000001-0000999999 not used 0001000000-0009999999 = valid IMO number; 0010000000-1073741823 = official flag state number.[a]
Call sign	42	7 × 6 bit ASCII characters, '@@@@@@@' = not available = default Craft associated with a parent vessel, should use

a	Shall be set to 0 for inland vessels.
b	Best applicable vessel type shall be used for inland navigation (see APPENDIX C).
c	The dimensions shall be set to the maximum rectangle size of the convoy.
d	The decimetre accuracy of the inland information shall be rounded upwards.
e	The reference point information has to be taken out of the SSD interface sentence by distinguishing the field 'source identifier'. Position reference point information with source identifier AI, has to be stored as internal one. Other source identifiers shall lead to reference point information for the external reference point.
f	The centimetre accuracy on the inland information shall be rounded upwards.
g	The ISRS Location Codes as part of the RIS Index shall be used derived from the European Reference Data Management System (ERDMS) kept by the European Commission.

		‘A’ followed by the last 6 digits of the MMSI of the parent vessel. Examples of these craft include towed vessels, rescue boats, tenders, lifeboats and liferafts
Name	120	Maximum 20 characters 6 bit ASCII, see ITU-R M. 1371; @@@@@@@@@@@@@@@@@@@@ = not available = default. For Search And Rescue (SAR) aircraft, it should be set to ‘SAR AIRCRAFT NNNNNNN’ where NNNNNNN equals the aircraft registration number
Type of vessel and cargo	8	0 = not available or no vessel = default; 1 — 99 = as defined in ITU-R M. 1371;[b] 100 — 199 = preserved, for regional use; 200 — 255 = preserved, for future use Not applicable to SAR aircraft
Overall dimensions of vessel/ convoy and reference for position	30	Reference point for reported position; Also indicates the dimension of vessel in metres (see ITU-R M. 1371). For SAR aircraft, the use of this field may be decided by the responsible administration. If used it should indicate the maximum dimensions of the craft. As default should A = B = C = D be set to ‘0’[cde]

a	Shall be set to 0 for inland vessels.
b	Best applicable vessel type shall be used for inland navigation (see APPENDIX C).
c	The dimensions shall be set to the maximum rectangle size of the convoy.
d	The decimetre accuracy of the inland information shall be rounded upwards.
e	The reference point information has to be taken out of the SSD interface sentence by distinguishing the field ‘source identifier’. Position reference point information with source identifier AI, has to be stored as internal one. Other source identifiers shall lead to reference point information for the external reference point.
f	The centimetre accuracy on the inland information shall be rounded upwards.
g	The ISRS Location Codes as part of the RIS Index shall be used derived from the European Reference Data Management System (ERDMS) kept by the European Commission.

Type of electronic position 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 = Galileo 9 — 14 = not used 15 = internal GNSS
ETA	20	ETA; 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 For SAR aircraft, the use of this field may be decided by the responsible administration
Maximum present static draught	8	in 1/10 m, 255 = draught 25,5 m or greater, 0 = not available = default[f]
Destination	120	Maximum 20 characters using 6-bit ASCII; @@@@@@@@@@@@@@@@@@@@ = not available.[g]
Data Terminal Equipment (DTE)	1	Data terminal ready (0 = available, 1 = not available = default)

a Shall be set to 0 for inland vessels.

b Best applicable vessel type shall be used for inland navigation (see APPENDIX C).

c The dimensions shall be set to the maximum rectangle size of the convoy.

d The decimetre accuracy of the inland information shall be rounded upwards.

e The reference point information has to be taken out of the SSD interface sentence by distinguishing the field ‘source identifier’. Position reference point information with source identifier AI, has to be stored as internal one. Other source identifiers shall lead to reference point information for the external reference point.

f The centimetre accuracy on the inland information shall be rounded upwards.

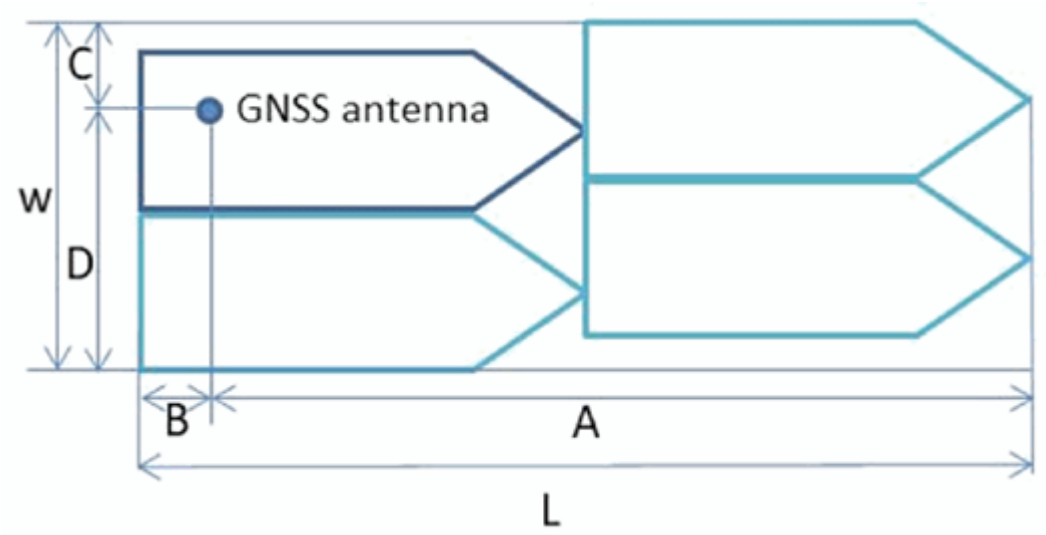
g The ISRS Location Codes as part of the RIS Index shall be used derived from the European Reference Data Management System (ERDMS) kept by the European Commission.

Spare	1	Spare. Not used. Shall be set to zero. Reserved for future use
Total	**424**	**Occupies two slots**

a	Shall be set to 0 for inland vessels.
b	Best applicable vessel type shall be used for inland navigation (see APPENDIX C).
c	The dimensions shall be set to the maximum rectangle size of the convoy.
d	The decimetre accuracy of the inland information shall be rounded upwards.
e	The reference point information has to be taken out of the SSD interface sentence by distinguishing the field 'source identifier'. Position reference point information with source identifier AI, has to be stored as internal one. Other source identifiers shall lead to reference point information for the external reference point.
f	The centimetre accuracy on the inland information shall be rounded upwards.
g	The ISRS Location Codes as part of the RIS Index shall be used derived from the European Reference Data Management System (ERDMS) kept by the European Commission.

Figure 3.1

Reference point for reported position and overall dimension of vessel/convoy



	Number of bits	**Bit fields**	**Distance (m)**	
A	9	Bit 21 — Bit 29	0 — 511 511 = 511 m or greater	Reference Point for reported position
B	9	Bit 12 — Bit 20	0 — 511	
The dimension should be in the direction of the transmitted heading information (bow).				
Reference point of reported position not available, but dimensions of vessel/convoy are available: A = C = 0 and B ≠ 0 and D ≠ 0.				
Neither reference point of reported position nor dimensions of vessel/convoy are available: A = B = C = D = 0 (= default).				
For use of the message table, A = most significant field. D = least significant field				

			511 = 511 m or greater	
C	6	Bit 6 — Bit 11	0 — 63 63 = 63 m or greater	
D	6	Bit 0 — Bit 5	0 — 63 63 = 63 m or greater	
L = A + B	Defined in Inland FI 10			Overall dimension used in Inland AIS mobile station
W = C + D				
The dimension should be in the direction of the transmitted heading information (bow).				
Reference point of reported position not available, but dimensions of vessel/convoy are available: A = C = 0 and B ≠ 0 and D ≠ 0.				
Neither reference point of reported position nor dimensions of vessel/convoy are available: A = B = C = D = 0 (= default).				
For use of the message table, A = most significant field. D = least significant field				

3.4.3. *Group assignment command (Message 23)*

Inland AIS mobile stations shall be addressed for group assignment by Message 23 using station type ‘6 = inland waterways’.

3.5. **Inland AIS Messages**

3.5.1. *Additional Inland AIS messages*

To comply with the information needs, specific Inland AIS messages are defined. In addition to the information content which shall be implemented directly in the Inland AIS station, the Inland AIS mobile station may transmit additional information through Application Specific Messages (ASM). This information content is normally handled by an external application, such as Inland ECDIS.

The use of Inland AIS ASM is in the responsibility of the river commission or the competent authorities.

3.5.2. *Application identifier for Inland AIS Application Specific Messages*

The application specific messages consist of the AIS Class A mobile stations framework according Recommendation ITU-R M.1371 (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 the following elements:

(a) 10-bit designated area code (DAC): international (DAC = 1) or regional (DAC > 1);

(b) 6-bit function identifier (FI) — allows for 64 unique application specific messages.

For the European harmonized Inland AIS Application Specific Messages the DAC ‘200’ is used.

In addition national (regional) DAC may be used in local ASM e.g. test pilots. Nevertheless it is strongly recommended to avoid the usage of regional ASM.

3.5.3. *Information content through Application Specific Messages*

Inland AIS ASM DAC = 200 FI = 10 (Inland Ship static and voyage related data) and DAC = 200 FI = 55 (inland number of persons on board) are implemented directly in the Inland AIS mobile station (see points 3.5.3.1 and 3.5.3.2).

3.5.3.1. *Inland ship static and voyage related data (Inland specific Message FI 10)*

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

TABLE 3.4

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. 0-3; Default = 0; 3 = do not repeat any more
	Source ID	30	MMSI number
	Spare	2	Not used, shall be set to zero. Reserved for future use
Binary data	Application identifier	16	DAC = 200, FI = 10
	Unique European vessel identification number (ENI)	48	8*6 Bit ASCII characters 00000000 = ENI not assigned = default
	Length of vessel/ convoy	13	1 — 8 000 (rest not to be used) length of vessel/convoy in 1/10 m 0 = default
	Beam of vessel/ convoy	10	1 — 1 000 (rest not to be used) beam of vessel/convoy in 1/10 m; 0 = default
	Vessel and convoy type	14	Numeric vessel and convoy type as described in *Appendix C*

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

			0 = not available = default
	Dangerous cargo indication	3	Number of blue cones/lights 0 — 3; 4 = B-Flag, 5 = default = unknown
	Maximum present static draught	11	1 — 2 000 (rest not used) draught in 1/100 m, 0 = default = unknown
	Loaded/unloaded	2	1 = loaded, 2 = unloaded, 0 = not available/default, 3 shall not be used
	Quality of speed information	1	1 = high, 0 = low/ GNSS = default[a]
	Quality of course information	1	1 = high, 0 = low/ GNSS = default[a]
	Quality of heading information	1	1 = high, 0 = low = default[a]
	Spare	8	Not used, shall be set to zero. Reserved for future use
	Total	**168**	**Occupies one slot**

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

3.5.3.2. *Number of persons on board (Inland specific message FI 55)*

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

TABLE 3.5

Number of 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. 0-3; 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 shall be set upon retransmission: 0 = no retransmission = default; 1 = retransmitted.
	Spare	1	Not used, shall be set to zero. Reserved for future use
Binary data	Application identifier	16	DAC = 200, FI = 55
	Number of crew members on board	8	0 — 254 crew members, 255 = unknown = default
	Number of passengers on board	13	0 — 8 190 passengers, 8 191 = unknown = default
	Number of shipboard personnel on board	8	0 — 254 shipboard personnel, 255 = unknown = default
	Spare	51	Not used, shall be set to zero. Reserved for future use.
	Total	**168**	**Occupies one slot**

4. OTHER AIS MOBILE STATIONS ON INLAND WATERWAYS

4.1. **Introduction**

Vessels not obliged to operate Inland AIS mobile stations may use other AIS mobile stations. The following mobile stations can be used:

(a) AIS Class A mobile station in accordance with Articles 35(2) and 35(3) of Commission Directive 2014/90/EU[(9)];

(b) AIS Class B mobile station in accordance with point 4.2.

The use of such stations in inland waterways is up to the decision of the Competent Authority responsible for the navigation in that area.

If such stations are used on a voluntary basis, the shipmaster shall keep the manually entered AIS data constantly up to date. No incorrect data shall be transmitted over AIS.

4.2. **General requirements for AIS Class B mobile stations on inland waterways**

AIS Class B has restricted functionalities compared to Inland AIS mobile stations. The messages sent out by an AIS Class B mobile station are transmitted with a lower priority in comparison to Inland AIS mobile stations.'

In addition to the requirements resulting from other Union legal acts, in particular, Directive 1999/5/EC of the European Parliament and of the Council[10] and Commission Decision 2005/53/EC[11], AIS Class B mobile stations installed on vessels navigating on Union inland waterways shall meet the requirements set out in:

(a) Recommendation ITU-R M. 1371;

(b) IEC International Standard 62287 (including DSC channel management).

Note: It is the responsibility of the Competent Authority responsible for the navigation in that area to ascertain the conformity of AIS Class B mobile stations to the standards and requirements listed in the second subparagraph prior to issuing a ship station license, assigning a Maritime Mobile Service Identifier (MMSI) number, for example by type approval of the relevant AIS Class B mobile stations.

5. AIS AIDS TO NAVIGATION IN INLAND NAVIGATION

5.1. **Introduction**

A navigational aid (also known as Aids to Navigation, or AtoN) is a marker which provides support during navigation. Such aids include markings for lighthouses, buoys, fog signals, and day beacons. A list of types of AtoNs is included in Table 5.2.

The AIS technology provides the possibility to dynamically transfer information about AtoNs.

For the use in inland navigation the maritime AIS AtoN report (Message 21) needs to be extended to reflect the specifics of the inland buoyage system.

The maritime AIS AtoN report is based on the IALA buoyage system. For inland navigation the AIS AtoN report needs to reflect the European Inland AtoN system described in Section 5.

The AIS AtoN report transfers the position and the meaning of the AtoN as well as information if a buoy is on the required position (on position) or not (off position).

5.2. **Use of Message 21: Aids to Navigation report**

For the use on inland waterways the AIS AtoN report (Message 21) as defined in Recommendation ITU-R M.1371 is being used. The additional European Inland types of AtoN are coded using the 'AtoN status' bits.

TABLE 5.1

AIS AtoN Report

Parameter	Number of bits	Description
Message ID	6	Identifier for this message 21
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

ID	30	MMSI number, (see Article 19 of the RR and Recommendation ITU-R M.585)
Type of Aids-to-Navigation	5	0 = not available = default; refer to appropriate definition set up by IALA; see Figure 5-1[a]
Name of Aids-to-Navigation	120	Maximum 20 characters 6-bit ASCII, as defined in Table 47 '@@@@@@@@@@@@@@@@@@@@' = not available = default. The name of the AtoN may be extended by the parameter 'Name of Aids-to-Navigation Extension' below
Position accuracy (PA)	1	1 = high (≤ 10 m) 0 = low (> 10 m) 0 = default The PA flag should be determined in accordance with Recommendation ITU-R M.1371 table 'Determination of position accuracy information'
Longitude	28	Longitude in 1/10 000 min of position of an AtoN (± 180°, East = positive, West = negative 181 = (6791AC0h) = not available = default)
Latitude	27	Latitude in 1/10 000 min of an AtoN (± 90°, North = positive, South = negative 91 = (3412140h) = not available = default)
Dimension/reference for position	30	Reference point for reported position; also indicates the dimension of an AtoN (m) (see Figure 5-1), if relevant[b]
Type of electronic position 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. For fixed AtoN and virtual AtoN, the charted

		position should be used. The accurate position enhances its function as a radar reference target 8 = Galileo 9-14 = not used 15 = internal GNSS
Time stamp	6	UTC second when the report was generated by the EPFS (0-59 or 60) if time stamp is not available, which should also be the default value or 61 if positioning system is in manual input mode or 62 if electronic position fixing system operates in estimated (dead reckoning) mode or 63 if the positioning system is inoperative)
Off-position indicator	1	For floating AtoN, only: 0 = on position; 1 = off position. NOTE 1 — This flag should only be considered valid by receiving station, if the AtoN is a floating aid, and if time stamp is equal to or below 59. For floating AtoN the guard zone parameters should be set on installation
AtoN status	8	Reserved for the indication of the AtoN status 00000000 = default[c]
RAIM-flag	1	RAIM (Receiver autonomous integrity monitoring) flag of electronic position fixing device; 0 = RAIM not in use = default; 1 = RAIM in use; see Recommendation ITU-R M.1371 table 'Determination of position accuracy information'
Virtual AtoN flag	1	0 = default = real AtoN at indicated position; 1 = virtual AtoN, does not physically exist[d]
Assigned mode flag	1	0 = Station operating in autonomous and continuous mode = default 1 = Station operating in assigned mode

Spare	1	Spare. Not used. Should be set to zero. Reserved for future use
Name of Aids-to-Navigation Extension	0, 6, 12, 18, 24, 30, 36, … 84	This parameter of up to 14 additional 6-bit-ASCII characters for a 2-slot message may be combined with the parameter 'Name of Aids-to-Navigation' at the end of that parameter, when more than 20 characters are needed for the name of the AtoN. This parameter should be omitted when no more than 20 characters for the name of the AtoN are needed in total. Only the required number of characters should be transmitted, i.e. no @-character should be used
Spare	0, 2, 4, or 6	Spare. Used only when parameter 'Name of Aids-to-Navigation Extension' is used. Should be set to zero. The number of spare bits should be adjusted in order to observe byte boundaries
Total	**272-360**	**Occupies two slots**

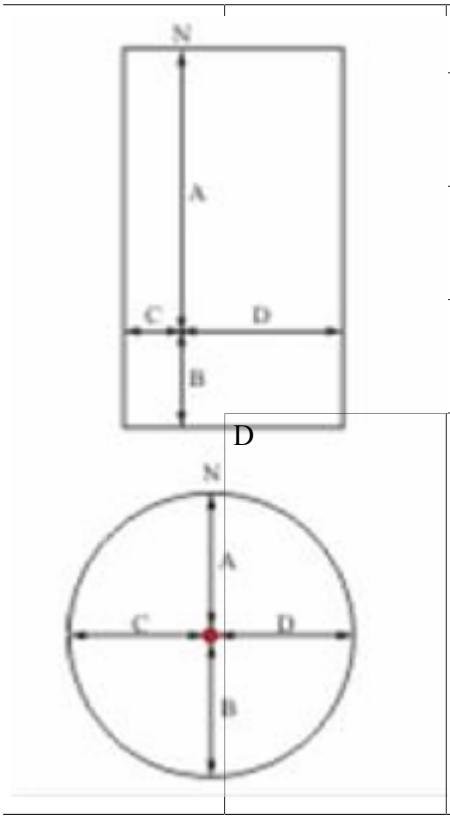
a In case an inland AtoN type code is being transmitted, this field (type of AtoN) shall be set to 0 = undefined

b When using Figure 5-1 for AtoN the following shall be observed:
- For fixed AtoN, virtual AtoN, and for offshore structures, the orientation established by the dimension A shall point to true north.
- For floating aids larger than 2 m * 2 m the dimensions of the AtoN shall always be given approximated to a circle, i.e. the dimensions shall always be as follows A = B = C = D ≠ 0. (This is due to the fact that the orientation of the floating AtoN is not transmitted. The reference point for reported position is in the centre of the circle.)
- A = B = C = D = 1 shall indicate objects (fixed or floating) smaller than or equal to 2 m * 2 m. (The reference point for reported position is in the centre of the circle.)
- Floating offshore structures that are not fixed, such as rigs, shall be considered as Code 31 type from *Table 5.2*. These structures shall have their 'Dimension/reference for position' parameter as determined above in Note (1). For fixed offshore structures, Code 3 type from *Table 5.2*, shall have their 'Dimension/reference for position' parameter as determined above in Note (1). Hence, all offshore AtoN and structures have the dimension determined in the same manner and the actual dimensions are contained in Message 21.

c For Inland AIS AtoN report this field shall be used to indicate the Inland AtoN type using page 001

d When transmitting virtual AtoN information, i.e. the virtual/pseudo AtoN Target Flag is set to one (1), the dimensions shall be set to A = B=C = D = 0 (default). This shall also be the case, when transmitting 'reference point' information

Figure 5-1 **Reference point for reported position of a maritime AtoN, or the dimension of an AtoN**



Number of bits	Bit Fields	Distance (m)
9	Bit 21 — Bit 29	0-511 511 — 511 m or greater
9	Bit 12 — Bit 20	0-511 511 — 511 m or greater
6	Bit 6 — Bit 11	0-63 63 — 63 m or greater
6	Bit 0 — Bit 5	0-63 63 — 63 m or greater

If the type of AtoN to be transmitted is covered within the existing IALA types of AtoN (according to *Table 5.2*) no changes need to be applied.

TABLE 5.2

Types of Aids to Navigation

Code		Definition Maritime
	0	Default, Type of AtoN not specified
	1	Reference point
	2	RACON
	3	Fixed structures offshore, such as oil platforms, wind farms. (NOTE 1 — This code should identify an obstruction that is fitted with an AtoN AIS station)
	4	Emergency Wreck Marking Buoy

NOTE 1 — The types of AtoN listed above are based on the IALA Maritime Buoyage System, where applicable.

NOTE 2 — There is potential for confusion when deciding whether an aid is lighted or unlighted. Competent authorities may wish to use the regional/local section of the message to indicate this.

Fixed AtoN	5	Light, without sectors
	6	Light, with sectors
	7	Leading Light Front
	8	Leading Light Rear
	9	Beacon, Cardinal N
	10	Beacon, Cardinal E
	11	Beacon, Cardinal S
	12	Beacon, Cardinal W
	13	Beacon, Port hand
	14	Beacon, Starboard hand
	15	Beacon, Preferred Channel port hand
	16	Beacon, Preferred Channel starboard hand
	17	Beacon, Isolated danger
	18	Beacon, Safe water
	19	Beacon, Special mark
Floating AtoN	20	Cardinal Mark N
	21	Cardinal Mark E
	22	Cardinal Mark S
	23	Cardinal Mark W
	24	Port hand Mark
	25	Starboard hand Mark
	26	Preferred Channel Port hand
	27	Preferred Channel Starboard hand
	28	Isolated danger
	29	Safe Water
	30	Special Mark
	31	Light Vessel/LANBY/Rigs

NOTE 1 — The types of AtoN listed above are based on the IALA Maritime Buoyage System, where applicable.

NOTE 2 — There is potential for confusion when deciding whether an aid is lighted or unlighted. Competent authorities may wish to use the regional/local section of the message to indicate this.

5.3. **Extension of Message 21 with inland-specific type of AtoN**

The parameter field ‘AtoN status’ is used for the extension of Message 21 with inland-specific type of AtoN.

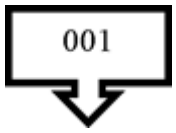
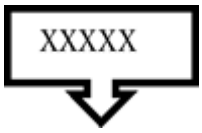
The parameter field ‘AtoN status’ is organised in eight pages, of which page ID 0 is 0 = default, page ID 1 to 3 is for regional use and page ID 4 to 7 is for international use. The first three bits of the AtoN status filed defines the page ID, the remaining 5 bits contains the information of the page.

The region, in which page ID 1 to 3 is applicable is defined by the Maritime Identification Digits within the MMSI of the transmitting AIS AtoN station. Thus the bit coding of the 5 information bits in the AtoN status field is only applicable in this specific region.

As regards Union inland waterways page ID 1 of the AtoN status field contains the list of inland-specific type of AtoN used.

To set an inland-specific type of AtoN in Message 21 two steps have to be made. First the parameter ‘Type of aids-to-navigation’ in Message 21 needs to be set to ‘0 = Default, type of AtoN not specified’. Second, the parameter ‘AIS status’ needs to be set to page ID 1 and the appropriate code of the Inland-specific type of AtoN, as follows:

Msg 21 — AtoN status:

Bits:			LSB
coding:	Page ID	type of AtoN (0-31)	

Appendix A

ABBREVIATIONS

AI	Application Identifier
AIS	Automatic Identification System
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ASCII	American Standard Code for Information Interchange
ASM	Application Specific Message
AtoN	Aids to Navigation
DAC	Designated Area Code
DGNSS	Differential GNSS
FI	Functional Identifier
GLONASS	(Russian) GLObal NAvigation Satellite System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HDG	Heading
IAI	International Application Identifier
ID	Identifier
ITU	International Telecommunication Union
MMSI	Maritime Mobile Service Identifier as referred to in ITU Recommendation ITU-R M585
ROT	Rate Of Turn
Class B SO/CS	Class B mobile stations using either carrier-sense time division multiple access (CSTDMA) technique ('CO'), or Self-organising time division multiple access (SOTDMA) technique ('SO')
SOLAS	Safety Of Life At Sea
SQRT	Square root
UTC	Universal Time Coordinated
VHF	Very High Frequency
VTS	Vessel Traffic Services

Appendix B

DIGITAL INTERFACE SENTENCES FOR INLAND AIS

B.1 **Input sentences**

The serial digital interface of the AIS is supported by existing IEC 61162 sentences. The detailed descriptions for the digital interface sentences are found in IEC 61162.

In addition the following digital interface sentences are defined for Inland AIS mobile station.

B.2 **Inland waterway static ship data**

This sentence is used to change settings, which are not covered by SSD and VSD.

$PIWWSSD,cccccccc,xxxx,x.x,x.x,x,x,x,x.x,x.x,x.x,x.x*hh<CR><LF>

field 1 2 3 4 5 6 7 8 9 10 11

Field	Format	Description
1	cccccccc	ENI number
2	xxxx	inland vessel type according to APPENDIX C
3	x.x	length of vessel 0 to 800,0 metre
4	x.x	beam of vessel 0 to 100,0 metre
5	x	quality of speed information 1 = high or 0 = low
6	x	quality of course information 1 = high or 0 = low
7	x	quality of heading information 1 = high or 0 = low
8	x.x	B value for internal reference position (distance reference point to stern)
9	x.x	C value for internal reference position (distance reference point to port side)
10	x.x	B value for external reference position (distance reference point to stern)
11	x.x	C value for external reference position (distance reference point to port side)

B.3 **Inland waterway voyage data**

This sentence is used to enter inland navigation voyage vessel data into an Inland AIS mobile station. For setting the inland voyage related data the sentence $PIWWIVD with the following content is used

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

field 1 2 3 4 5 6 7 8 9 10 11 12 13

Field	Format	Description
1	x	See Recommendation ITU-R M.1371 Msg 23 reporting interval settings, default setting: 0
2	x	number of blue cones: 0-3, 4 = B-Flag, 5 = default = unknown
3	x	0 = not available = default, 1 = loaded, 2 = unloaded, rest not used
4	x.x	static draught of vessel 0 to 20,00 metres, 0 = unknown = default, rest not used
5	x.x	air draught of vessel 0 to 40,00 metres, 0 = unknown = default, rest not used
6	x	number of assisting tugboats 0-6, 7 = default = unknown, rest not used
7	xxx	number of crew members on board 0 to 254, 255 = unknown = default, rest not
8	xxxx	number of passengers on board 0 to 8 190, 8 191 = unknown = default, rest not used
9	xxx	number of shipboard personnel on board 0 to 254, 255 = unknown = default, rest not used
10	x.x	Convoy extension to bow in (metre.decimetre = resolution in dm)
11	x.x	Convoy extension to stern in (metre.decimetre = resolution in dm)

12	x.x	Convoy extension to port side in (metre.decimetre = resolution in dm)
13	x.x	Convoy extension to starboard side in (metre.decimetre = resolution in dm)

In case of null fields the corresponding configuration setting shall not be changed.

Appendix C

INLAND VESSEL AND CONVOY TYPES

This correspondence table is based on an excerpt of the 'Codes for Types of Means of Transport' according to UNECE Recommendation 28 and the maritime ship types as defined in Recommendation ITU-R M.1371 'Technical characteristics for a universal shipborne automatic identification system using time division multiple access in the VHF maritime mobile band'.

Vessel and convoy type		**maritime ship type**	
code	**vessel name**	**1st digit**	**2nd digit**
8000	Vessel, type unknown	9	9
8010	Motor freighter	7	9
8020	Motor tanker	8	9
8021	Motor tanker, liquid cargo, type N	8	0
8022	Motor tanker, liquid cargo, type C	8	0
8023	Motor tanker, dry cargo as if liquid (e.g. cement)	8	9
8030	Container vessel	7	9
8040	Gas tanker	8	0
8050	Motor freighter, tug	7	9
8060	Motor tanker, tug	8	9
8070	Motor freighter with one or more ships alongside	7	9
8080	Motor freighter with tanker	8	9
8090	Motor freighter pushing one or more freighters	7	9
8100	Motor freighter pushing at least one tank-ship	8	9
8110	Tug, freighter	7	9
8120	Tug, tanker	8	9
8130	Tug, freighter, coupled	3	1
8140	Tug, freighter/tanker, coupled	3	1

8150	Freightbarge	9	9
8160	Tankbarge	9	9
8161	Tankbarge, liquid cargo, type N	9	0
8162	Tankbarge, liquid cargo, type C	9	0
8163	Tankbarge, dry cargo as if liquid (e.g. cement)	9	9
8170	Freightbarge with containers	8	9
8180	Tankbarge, gas	9	0
8210	Pushtow, one cargo barge	7	9
8220	Pushtow, two cargo barges	7	9
8230	Pushtow, three cargo barges	7	9
8240	Pushtow, four cargo barges	7	9
8250	Pushtow, five cargo barges	7	9
8260	Pushtow, six cargo barges	7	9
8270	Pushtow, seven cargo barges	7	9
8280	Pushtow, eigth cargo barges	7	9
8290	Pushtow, nine or more barges	7	9
8310	Pushtow, one tank/ gas barge	8	0
8320	Pushtow, two barges at least one tanker or gas barge	8	0
8330	Pushtow, three barges at least one tanker or gas barge	8	0
8340	Pushtow, four barges at least one tanker or gas barge	8	0

8350	Pushtow, five barges at least one tanker or gas barge	8	0
8360	Pushtow, six barges at least one tanker or gas barge	8	0
8370	Pushtow, seven barges at least one tanker or gas barge	8	0
8380	Pushtow, eight barges at least one tanker or gas barge	8	0
8390	Pushtow, nine or more barges at least one tanker or gas barge	8	0
8400	Tug, single	5	2
8410	Tug, one or more tows	3	1
8420	Tug, assisting a vessel or linked combination	3	1
8430	Pushboat, single	9	9
8440	Passenger ship, ferry, red cross ship, cruise ship	6	9
8441	Ferry	6	9
8442	Red cross ship	5	8
8443	Cruise ship	6	9
8444	Passenger ship without accommodation	6	9
8445	Day-trip high speed vessel	6	9
8446	Day-trip hydrofoil vessel	6	9
8447	Sailing cruise ship	6	9
8448	Sailing passenger ship without accommodation	6	9
8450	Service vessel, police patrol, port service	9	9

8451	Service vessel	9	9
8452	Police patrol vessel	5	5
8453	Port service vessel	9	9
8454	Navigation surveillance vessel	9	9
8460	Vessel, work maintenance craft, floating derrick, cable-ship, buoy-ship, dredge	3	3
8470	Object, towed, not otherwise specified	9	9
8480	Fishing boat	3	0
8490	Bunkership	9	9
8500	Barge, tanker, chemical	8	0
8510	Object, not otherwise specified	9	9
1500	General cargo Vessel maritime	7	9
1510	Unit carrier maritime	7	9
1520	Bulk carrier maritime	7	9
1530	Tanker	8	0
1540	Liquefied gas tanker	8	0
1850	Pleasure craft, longer than 20 metres	3	7
1900	Fast ship	4	9
1910	Hydrofoil	4	9
1920	Catamaran fast	4	9

(**1**) OJ L 255, 30.9.2005, p. 152.

(**2**) Commission Regulation (EC) No 415/2007 of 13 March 2007 concerning the technical specifications for vessel tracking and tracing systems referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community (OJ L 105, 23.4.2007, p. 35).

(**3**) Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union (OJ L 194, 19.7.2016, p. 1).

(**4**) Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union (OJ L 194, 19.7.2016, p. 1).

(**5**) 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 (OJ L 255, 30.9.2005, p. 152).

(**6**) Commission Regulation (EC) No 414/2007 of 13 March 2007 concerning the technical guidelines for the planning, implementation and operational use of river information services (RIS) referred to in Article 5 of Directive 2005/44/EC of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community (OJ L 105, 23.4.2007, p. 1).

(**7**) Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system repealing Council Directive 93/75/EEC (OJ L 208, 5.8.2002, p. 10).

(**8**) Commission Implementing Regulation (EU) No 909/2013 of 10 September 2013 on the technical specifications for the electronic chart display and information system for inland navigation (Inland ECDIS) referred to in Directive 2005/44/EC of the European Parliament and of the Council (OJ L 258, 28.9.2013, p. 1).

(**9**) Commission Directive 2014/90/EU of 23 July 2014 on marine equipment and repealing Council Directive 96/98/EC (OJ L 257, 28.8.2014, p. 146).

(**10**) Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (OJ L 91, 7.4.1999, p. 10).

(**11**) Commission Decision 2005/53/EC of 25 January 2005 on the application of Article 3(3)(e) of Directive 1999/5/EC of the European Parliament and of the Council to radio equipment intended to participate in the Automatic Identification System (AIS) (OJ L 22, 26.1.2005, p. 14).