# INFORMATION PAPER ON AIS AIDS TO NAVIGATION REPORT MESSAGES IN INLAND WATERWAYS

**Edition 1.1**

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# 1 INTRODUCTION

Inland AIS is a communication system based on maritime AIS to automatically provide position, identity and other navigation data of a ship and to exchange safety related information between ships and between ship and shore.

In maritime, AIS is also used to provide information for emphasizing classical aids to navigation for the marking of buoys, wrecks, wind farms, etc. Special AIS Aids to Navigation Report message (AIS AtoN) transfers the position and the meaning of the aids to navigation as well as information if the buoy is on the required position or not (off position).

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

Using the AIS AtoN report message it can represent a real buoy lying in the water or it may represent a position where no real buoy is present. This doing so as if there would be a buoy is called a virtual AtoN.

Ships, equipped with an appropriate display system like Inland ECDIS, can display the information contained in the AIS AtoN report message, e.g. as a symbol on the chart at the reported position of the AtoN. This functionality still needs to be standardised and is not yet implemented in all Inland ECDIS applications.

This information paper aims to introduce the function of an AIS AtoN report and to discuss pros and cons of a potential use of AIS AtoN messages in inland navigation.

The information paper intends to start an initial policy discussion at the EU RIS platform and river commissions whether or not it is worthwhile for the VTT and ECDIS Expert groups to further investigate in a technical solution for Inland AIS Aids to Navigation report for a potential use in inland navigation. This discussion should also bear in mind that there is already an ongoing project on AIS AtoN in inland navigation sponsored by the European Union.

## 2 REFERENCES

The content of this document is partially based on or refers to:

| 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 |
| 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 | EU | 13.3.2007 |
| Commission implementation regulation (EU) No 689/2012 of 27 July 2012 amending Regulation 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 | EU | 27.7.2012 |
| 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 | EU | 10.09.2013 |
| IMO Resolution MSC.232(82), Appendix 3 | IMO | |
| IEC 62388 Maritime navigation and radiocommunication equipment and systems - Shipborne radar | IEC | 26.06.2013 |
| IEC 62288 Maritime navigation and radiocommunication equipment and systems - Presentation of navigation-related information on shipborne navigational displays | IEC | 07.2014 |
| Recommendation ITU-R M.1371, "Technical characteristics for an automatic identification system using time-division multiple access in the VHF maritime mobile band" | ITU | February l 2014 |
| International Standard IEC 61993-2, Edition 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 | October 2012 |
| International Standard IEC 61162-Serie, “Maritime navigation and radio communication equipment and systems - Digital interfaces"<br>"Part 1: Single talker and multiple listeners”<br>"Part 2: Single talker and multiple listeners, high speed transmission" | IEC | <br>Nov. 2010<br>Sept. 1998 |
| UNECE Location code (RECOMMENDATION No. 16,) | UNECE | |
| UNECE Ship type code (RECOMMENDATION No. 28), | UNECE | |
| CCNR Technical clarifications on Inland AIS | CCNR | 2008 |

# 3 INTRODUCTION TO THE USE OF AIS AIDS TO NAVIGATION REPORTS

## 3.1 Use of AIS AtoN

The International Association of Maritime Aids to Navigation and Lighthouse Authorities (IALA) maintains an international harmonised buoying system which is also the basis of the information content of the maritime AIS AtoN report message.

IALA defines the use of AIS AtoN as follows (Recommendation A-126 on the use of AIS in maritime aids to navigation services):

- The primary purpose of an AIS AtoN Station is to promote and enhance safety and efficiency of navigation by one or more of the following:
- Providing a positive and all-weather means of identification;
- Transmitting accurate positions of floating AtoN;
- Indicating if a floating AtoN is off position;
- Provide additional AtoN capability through the use of Virtual AIS AtoN, where installation of physical AtoN is technically or operationally difficult;
- Enable timely/temporary marking of new hazards (fixed or dynamic) using Virtual AIS AtoN.

## 3.2 Information provided by AIS AtoN

The maritime AIS Aids to Navigation Report message provides information about the AtoN in uses e.g. Type, name, position of the AtoN, off-position indicator, etc. (see Annex I).

This information is typically broadcasted with a reporting interval of 3 minutes and can be received within the VHF coverage range of the transmitting AIS AtoN station or AIS shore station.

In case any data sets are left blank by the user the application shall automatically use the default values as given by the Vessel Tracking and Tracing standard.

After configuration of all values it shall be possible to save the values and write them back into the Inland AIS mobile station using the input sentences of IEC 61993-2 and the VTT standard.

## 3.3 Usability of maritime AIS AtoN message in inland navigation

The maritime AIS message 21 is based on the IALA buoyage system which is different from the buoyage system used in inland navigation (CEVNI buoyage system).

An Inland specific AtoN message for inland waterways needs to be defined and incorporated in the related standards (VTT and Inland ECDIS). Both standards have to be amended to enable a correct information and display of the AtoN.

A detailed comparison between the IALA and the CEVNI buoyage system can be found in Annex II.

# 4 THE VARIOUS CONFIGURATIONS OF AIS-AIDS TO NAVIGATION

An AIS Aids to navigation can be implemented in three ways, which are described in the following paragraphs.

## 4.1 Real AIS Aids to navigation

A Real AIS AtoN Station is an AIS station located on an AtoN that physically exists.

For example the AIS AtoN station is mounted on a buoy and broadcast actual real time data about the position and the status (e.g. on/off position) of that buoy

## 4.2 Synthetic AIS Aids to navigation

A Synthetic AIS AtoN is where the AtoN message is transmitted from a remote AIS station. There are two possibilities for the implementing such a synthetic AtoN.

### 4.2.1 Monitored Synthetic AIS AtoN

A 'Monitored Synthetic AIS AtoN' has a position sensor and a communication link between the AIS Station and the AtoN. The communication between the AtoN and AIS confirms the location and status of the AtoN.

### 4.2.2 Predicted Synthetic AIS AtoN

A 'Predicted Synthetic AIS AtoN' is not monitored to confirm its location or status. The use of Predicted Synthetic AIS AtoN broadcasts for fixed AtoN is acceptable as the location will not change, but the status of the AtoN cannot be verified.

## 4.3 Virtual AIS Aids to navigation

A 'Virtual AIS AtoN' is transmitted as AIS AtoN message for an AtoN that does not physically exist. When a Virtual AIS AtoN is used, the AtoN symbol or information would be available for presentation to a mariner on an electronic chart, even though there is no real AtoN such as a buoy or beacon. Such a message would typically be broadcasted by an AIS shore station or an AIS AtoN station.

# 5 ANALYSIS OF THE ADVANTAGES AND DISADVANTAGES OF THE DIFFERENT CONFIGURATIONS

## 5.1 Description of the method used

In this chapter advantages and disadvantages of the different types of AtoNs will be described in comparison to the real buoy without AIS AtoN station.

It has to be noted that all solutions that are using AIS AtoN information require certain equipment on board which may result in additional costs for the vessels in areas without existing carriage requirements for AIS and electronic chart systems. Existing systems for displaying electronic charts will need to be updated supporting this functionality.

## 5.2 Real buoy without AIS

The traditional way of marking the fairway with buoys without AIS is a well-known introduced system. It is easy to see and interpret under good visibility conditions and does not require any additional tools or equipment on board.

A real buoy with a radar reflector is typically visible on the radar screen while the type (colour) of the buoy cannot be unambiguously identified. Main disadvantage of such type of buoy is that deviations of the position cannot be automatically detected.

## 5.3 Real buoy with AIS AtoN station

Equipping a real buoy with AIS AtoN station provides unambiguous information about the type, name and real position of a buoy under all visibilities for all vessels equipped with AIS and electronic charts. Additionally an explicit off-position flag indicates major drifting of the buoy. It allows for detection of deviations of the position of the buoy for the administration which can be used to identify problems like drifting, theft or collisions with vessels.

In some cases it might happen that three different positions of the buoy are displayed to skippers (radar position, chart position and AIS position). This problem could be minimised by adaptations of the standards. Equipping a buoy with an AIS AtoN station causes extra costs for implementation and maintenance. Also each AIS AtoN station increases the load on the AIS VHF link.

## 5.4 Real buoy with monitored Synthetic AIS AtoN

Equipping a real buoy with a position sensor and a communication link to a remote AIS station provides unambiguous information about the type, name and real position of a buoy under all visibilities for all vessels equipped with AIS and electronic charts. Additionally an explicit off-position flag indicates major drifting of the buoy. It allows for detection of deviations of the position of the buoy for the administration which can be used to identify problems like drifting, theft or collisions with vessels.

The benefits for skippers are similar to a real buoy with an AIS AtoN station. In some cases it might happen that three different positions of the buoy are displayed to skippers (radar position, chart position and AIS position). This problem could be minimised by adaptations of the standards. Equipping a buoy with a position sensor and a communication link causes extra costs for implementation (less than AIS

AtoN station) and maintenance (additional communication costs may occur). Also each synthetic AIS AtoN station increases the load on the AIS VHF data link.

Given the additional communication link the risk of a malfunction of the AtoN transmissions is slightly higher than for a real buoy with AIS AtoN station.

### 5.5 Real buoy with predicted Synthetic AIS AtoN

Sending a predicted synthetic AIS AtoN message for a real buoy provides unambiguous information about the type, name and theoretic position of a buoy under all visibilities for all vessels equipped with AIS and electronic charts.

The transmission of predicted synthetic AIS AtoN messages causes no extra costs in areas where shore based AIS infrastructure is available.

Normally the position of buoy transmitted via AIS and the chart position are the same. Changes of the position of a buoy can be implemented faster in the AIS AtoN message than in the chart. In some cases it might happen that three different positions of the buoy are displayed to skippers (radar position, chart position and AIS position). This problem could be minimised by adaptations of the standards.

Because of the fact that the position information sent out via the AtoN message is not derived from an on-site measurement, it is not possible to automatically detect any deviations of the real position of the buoy.

Also each predicted synthetic AIS AtoN station increases the load on the AIS VHF data link.

### 5.6 Virtual AIS Aids to navigation

Sending an AIS message for a virtual AtoN provides unambiguous information about the type, name and position of a virtual buoy under all visibilities for all vessels equipped with AIS and electronic charts. Theoretically it would also be possible to transmit a polygon for marking of the fairway instead of transmitting multiple virtual buoys.

Changes of the position of a buoy e.g. in cases of incidents can be implemented faster using a virtual AIS AtoN than in the chart or for a real buoy.

The transmission of an AIS message for a virtual AtoN causes no extra costs in areas where shore based AIS infrastructure is available. Still additional costs for guaranteeing the necessary system availability (resulting in redundancy) might occur.

However it has to be taken into account that this might cause additional workload for the people involved. But it may reduce the workload of other people.

Precondition for the use of virtual AIS AtoNs is the seamless availability of Inland AIS and Inland ECDIS with heading information on all vessels resulting in significant costs for the vessels. Vessels without such equipment will not be able to navigate accordingly. In case of failure of the shore based AIS system, the onboard AIS station or the Inland ECDIS display no information about virtual AtoNs will be available. It is a risk to transmit safety relevant information solely through AIS.

Also each virtual AIS AtoN increases the load on the AIS VHF data link.

Finally the relevant police regulations had to be amended to allow replacing real buoys with virtual AIS AtoNs.

### 5.7 Tailor made solutions using virtual Aids to Navigation

Virtual AtoNs could be used to transmit specific information to a specific (limited) target group e.g. sea-going vessels with a big draught and/or typically only for a limited timeframe.

In this case only the target group would have to be equipped with AIS and Inland ECDIS in Navigation Mode. The necessary system infrastructure only needs to be implemented in the area of usage.

# 6 CONCLUSIONS AND RECOMMENDATIONS

The use of AIS AtoN messages in combination with real buoys may have benefits both for the skippers and administrations. However it has to be considered that not all vessels might be equipped to display AIS AtoNs. Further the availability and reliability of the AIS information cannot be guaranteed in all cases.

The usefulness of such a combined solution has to be investigated and decided case by case because it is depending on the local situation and conditions. Preconditions are the amendment of the standards as well as potential investments into the shore infrastructure and the onboard equipment.

The use of virtual AIS AtoNs as replacement for real buoys is not recommended because it doesn't seem feasible for the near future to equip the whole fleet including pleasure crafts with Inland AIS mobile station and Inland ECDIS with heading devices. *In addition experiences must be gained about the safety risk and reliability of the entire system.*

Still local tailor made solutions using virtual Aids to Navigation might be implemented.

The Inland ECDIS EG and VTT EG have incorporated the use of Inland AIS AtoNs into Edition 2.0 of the VTT standard. The summary of that new approach is contained in Annex I of this document.

That solves the problem of the differences between the inland and the maritime coding of AtoNs which is explained in Annex III of this document.

The Inland ECDIS EG and VTT EG want to encourage further pilot implementation and testing of AIS AtoN applications in order to gain practical experiences.

# ANNEX I – AIS AIDS TO NAVIGATION REPORT IN INLAND NAVIGATION

**--- FINAL VERSION ---**

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# 1 AIS AIDS TO NAVIGATION IN INLAND NAVIGATION

## 1.1 Introduction

AIS provides the possibility to dynamically transfer information about Aids to Navigation. For the use in inland navigation the existing maritime AIS AtoN message (Msg. 21) needs to be extended to reflect the specifics of the inland buoyage system.
The existing maritime AIS AtoN message is based on the IALA buoyage system. For inland navigation the AIS AtoN needs to reflect the European Inland AtoN system.

The AIS AtoN message can be used to provide information for emphasizing classical aids to navigation for the marking of waterways, wrecks, etc. It transfers the position and the meaning of the aids to navigation as well as information if a buoy is on the required position or not (off position).

## 1.2 Technical implementation of the Inland AIS AtoN message

### 1.2.1 Use of Message 21: Aids to Navigation report

For the use on inland waterways the AIS AtoN message (Msg. 21) as defined in recommendation ITU-R M.1371 is being used. The additional European Inland types of AtoNs are coded using the “AtoN status” bits.

*Table 1.1*

**Aids to Navigation 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<br>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 1-1 |
| Name of Aids-to-Navigation | 120 | Maximum 20 characters 6-bit ASCII, as defined in Table 47 “@@@@@@@@@@@@@@@@@@@@” = not available = default.<br>The name of the AtoN may be extended by the parameter “Name of Aid-to-Navigation Extension” below |
| Position accuracy | 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” |

| Parameter | Number of bits | Description |
|---|---|---|
| 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 1-1) if relevant (1) |
| Type of electronic position fixing device | 4 | 0 = Undefined (default)<br>1 = GPS<br>2 = GLONASS<br>3 = Combined GPS/GLONASS<br>4 = Loran-C<br>5 = Chayka<br>6 = Integrated Navigation System<br>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<br>8 = Galileo<br>9-14 = not used<br>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.<br>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<br>00000000 = default (3) |
| 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 (2). |
| Assigned mode flag | 1 | 0 = Station operating in autonomous and continuous mode = default 1 = Station operating in assigned mode |

| Parameter | Number of bits | Description |
|---|---|---|
| Spare | 1 | Spare. Not used. Should be set to zero. Reserved for future use |
| Name of Aid-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 Aid-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 A-to-N 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 Aid-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** |

When using Figure 1-1 for AtoN the following should be observed:.

For fixed Aids-to-Navigation, virtual AtoN, and for off-shore structures, the orientation established by the dimension A should point to true north.

For floating aids larger than 2 m * 2 m the dimensions of the AtoN should always be given approximated to a circle, i.e. the dimensions should always be as follows A = B = C = D ≠ 0. (This is due to the fact that the orientation of the floating Aid to Navigation is not transmitted. The reference point for reported position is in the centre of the circle.)

A = B = C = D = 1 should 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.)

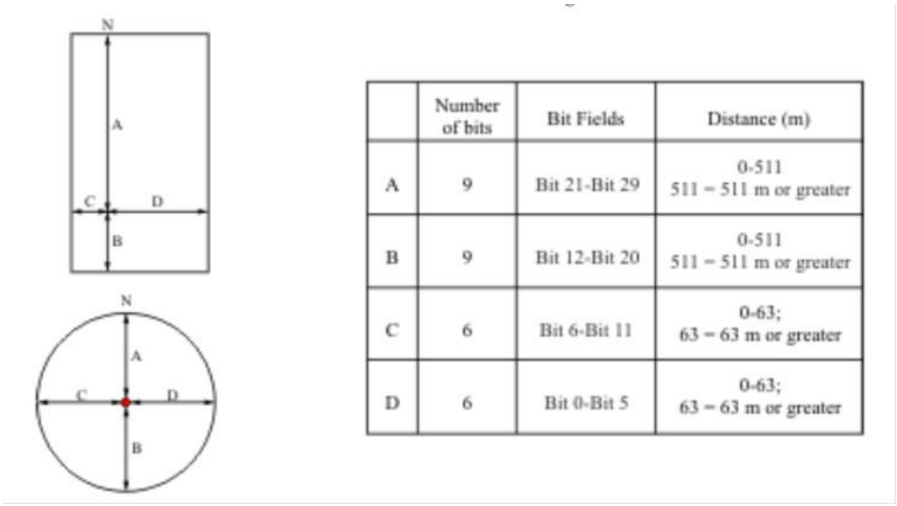
Floating off shore structures that are not fixed, such as rigs, should be considered as Code 31 type from *Table 1.2*. These structures should have their "Dimension/reference for position" parameter as determined above in Note (1). For fixed off shore structures, Code 3 type from *Table 1.2*, should have their "Dimension/reference for position" parameter as determined above in Note (1). Hence, all off shore AtoN and structures have the dimension determined in the same manner and the actual dimensions are contained in Message 21.

When transmitting virtual AtoN information, i.e. the virtual/pseudo AtoN Target Flag is set to one (1), the dimensions should be set to A=B=C=D=0 (default). This should also be the case, when transmitting "reference point" information (see Table 73).

Shall be used to indicate Inland AtoN types using page 001 and the Inland AtoN codes as provided in *Table 1.3*

Figure 1-1

**Reference point for reported position of a maritime aid to navigation, or the dimension of an aid to navigation**




| | Number of bits | Bit Fields | Distance (m) |
|---|---|---|---|
| A | 9 | Bit 21-Bit 29 | 0-511<br>511 = 511 m or greater |
| B | 9 | Bit 12-Bit 20 | 0-511<br>511 = 511 m or greater |
| C | 6 | Bit 6-Bit 11 | 0-63;<br>63 = 63 m or greater |
| D | 6 | Bit 0-Bit 5 | 0-63;<br>63 = 63 m or greater |

If the type of AtoN to be transmitted is covered within the existing IALA types of AtoNs (according to *Table 1.2*) no changes need to be applied.

*Table 1.2*

**Types of Aids-to-Navigation**

| | Code | Definition Maritime |
|---|---|---|
| | 0 | Default, Type of AtoN not specified |
| | 1 | Reference point |
| | 2 | RACON |
| | 3 | Fixed structures off-shore, 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 |
| 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 |

| | Code | Definition Maritime |
|---|---|---|
| | 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 aids to navigation 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.

### 1.2.2 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 MID 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.

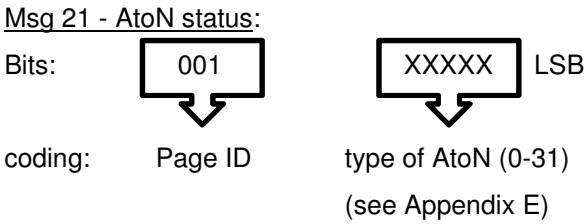
On European inland waterways page ID 1 of the AtoN status field contains the list of inland-specific type of AtoN used.

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.

The defined types of Inland specific AtoN are intended for the use on inland waterways in Europe as defined in the guidelines on “Inland AtoN codes for the use in AIS Message 21” of the VTT Expert group. In those regions page ID 1 is exclusively reserved for the European Inland AtoN types.

If the parameter ”Type of aids-to-navigation” in Msg. 21 is different from “0 = Default, type of AtoN not specified”, the Inland-specific AtoN types as coded in the page 1 of the AtoN status bits must not be interpreted.




### 1.2.3 Inland AtoN Type Codes

This table provides all types of Inland AtoNs for use in AtoN status bits.

*Table 1.3*

**Types of Inland Aids-to-Navigation**

| | Code | CEVNI code | Name |
|---|---|---|---|
| | 0 | | Default, Type not specified |
| fixed aids, landmarks | 1 | 4.A + 4.B | Channel near the right bank |
| | 2 | 5.A + 5.B | Channel near the left bank |
| | 3 | 4.C + 4.D | Cross-over right bank |
| | 4 | 5.C + 5D | Cross-over left bank |
| | 5 | 8.C - 8.C2 | Bridge pillar |
| | 6 | 8.C3 + 8.C4 | Overhead cable |
| floating aids | 7 | 1.A - 1.D | Buoy right-hand side |
| | 8 | 2.A - 2.D | Buoy left-hand side |
| | 9 | 3.A - 3.D | Bifurcation |
| | 10 | 3.E1 + 3.F1 | Bifurcation, pass right-hand side |
| | 11 | 3.E + 3.F | Bifurcation, pass left-hand side |
| | 12 | 1.F + 1.F1 | Danger point or obstacle right-hand side |
| | 13 | 2.F + 2.F1 | Danger point or obstacle left-hand side |
| | 14 | DFND | Berth right-hand side |
| | 15 | DFND | Berth left-hand side |
| other | 16 | A.1 | No entry upstream |
| | 17 | A.1 | No entry downstream |
| | 18 | A.9 | Do not create wash upstream |
| | 19 | A.9 | Do not create wash downstream |
| | 20 | C.2 | Headroom limited |
| | 21 | new | Signal float |

| | | | |
|---|---|---|---|
| reserved | 22 | | Reserved for future use |
| | 23 | | Reserved for future use |
| | 24 | | Reserved for future use |
| | 25 | | Reserved for future use |
| | 26 | | Reserved for future use |
| | 27 | | Reserved for future use |
| | 28 | | Reserved for future use |
| | 29 | | Reserved for future use |
| | 30 | | Reserved for future use |
| | 31 | | Reserved for future use |

## 2 LIST OF APPLICABLE MID (MARITIME IDENTIFICATION DIGIT)

The following MID are used for the transmission of Inland AtoN information in page 1 of the AtoN status bits in AIS message 21 in Europe:

DRAFT PROPOSAL to be confirmed by the member states

| MID | Country | valid from |
|---|---|---|
| 203 | Austria | 2017 |
| TBD (205) | Belgium | |
| 207 | Bulgaria | |
| TBD (218) | Germany | |
| TBD (214) | Moldova | |
| 226 | France | |
| 238 | Croatia | |
| TBD (243) | Hungary | |
| TBD (246) | The Netherlands | |
| TBD (247) | Italy | |
| TBD (253) | Luxembourg | |
| 261 | Poland | |
| 264 | Romania | |
| TBD (267) | Slovak Republic | |
| TBD (269) | Switzerland | |
| 270 | Czech Republic | |
| TBD (272) | Ukraine | |
| TBD (273) | Russian Federation | |
| 279 | Serbia | |

## ANNEX II – USE OF AIS ATON

The International Association of Maritime Aids to Navigation and Lighthouse Authorities (IALA) maintains an international harmonised buoying system which is also the basis of the information content of the AIS AtoN report message.

IALA defines the use of AIS AtoN as follows (Recommendation A-126 on the use of AIS in maritime aids to navigation services):

The primary purpose of an AIS AtoN Station is to promote and enhance safety and efficiency of navigation by one or more of the following:

- Providing a positive and all-weather means of identification;
- Complementing existing services (e.g. racons) from AtoN;
- Transmitting accurate positions of floating AtoN;
- Indicating if a floating AtoN is off position;
- Promulgation of Application Specific Messages including:
    - Marking or delineating tracks, routes, areas, and limits (for example, areas to be avoided and Traffic Separation Schemes (TSS));
    - Marking offshore structures (for example, wind turbines, wave and tidal energy devices, oil and gas platforms); and
    - Providing weather, tidal, and sea state data.
- Provide additional AtoN capability through the use of Virtual AIS AtoN, where installation of physical AtoN is technically or operationally difficult;
- Enable timely/temporary marking of new hazards (fixed or dynamic) using Virtual AIS AtoN.

A further set of benefits for the AtoN provider include the following:

- Monitoring the status of an AtoN;
- Tracking an AtoN that is off position;
- Identifying ships involved in collisions with AtoN;
- Gathering real-time information on the ‘state of health’ of an AtoN; and
- Remotely controlling changes in AtoN parameters;
- Provide statistics on reliability of AtoN;
- Extend the coverage of AIS monitoring.

Information provided by AIS AtoN

The AIS Aids to Navigation Report message, technically called AIS Message 21 as defined in ITU-R M.1371, broadcast information on the:

- Type of AtoN;
- Name of the AtoN;
- Position of the AtoN;
- Position accuracy indicator;
- Type of position fixing device;
- On/Off position status;
- Real, Synthetic and Virtual AtoN identification;
- Dimension of the AtoN and reference positions; and
- Status of the AtoN systems.

This information is typically broadcast with a reporting interval of 3 minutes and can be received within the VHF coverage range of the transmitting AIS AtoN station or AIS shore station.

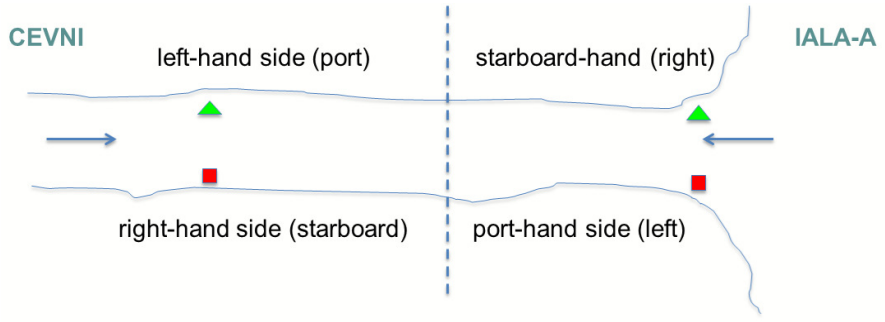
## ANNEX III – WHY ARE THE ATON TYPES DEFINED IN THE MARITIME BUOYAGE SYSTEM NOT SUFFICIENT FOR INLAND NAVIGATON?

The AIS message 21 is offering the values 24 and 25 to encode the buoys which are marking the fairway, but IALA areas are using different buoys then inland waterways:

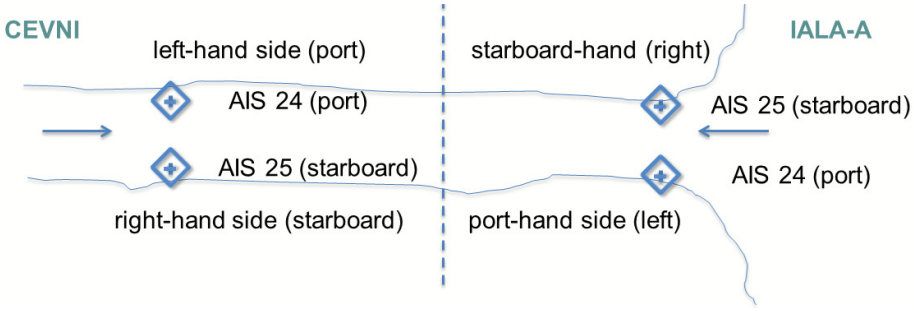
| AIS message 21<br>Type of AtoN | IALA-A | CEVNI and<br>Rhine Police Regulation |
|---|---|---|
| 24 Port hand mark (left) | Red / square | Green / conical |
| 25 Starboard hand mark (right) | Green /conical | Red /square |

An Inland ECDIS is therefore not able to determine the correct display of the AtoN message and has to use a generic symbol. The type of the buoy can only be provided as textual description in the pick report.

In inland navigation the left-hand side and the right-hand side are determined by looking downstream. In maritime navigation starboard-hand and port-hand are determined by looking towards the entry into a harbour or an inland waterway when coming from the seaside. In the real world the green and red buoys are therefore always on the same side:

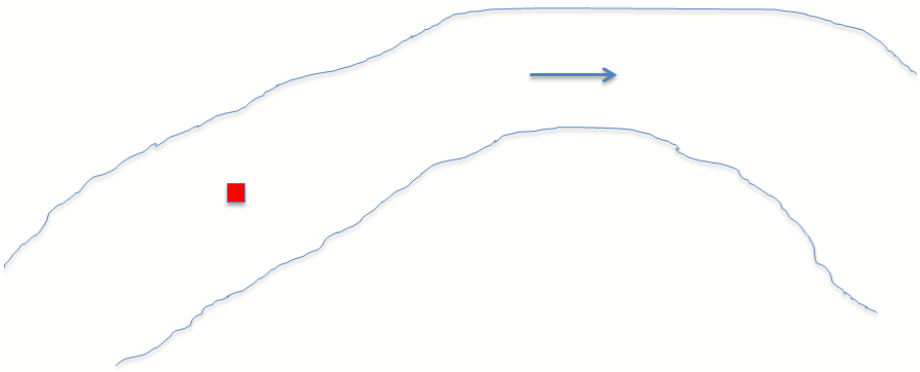



If the information about the buoys is provided by AtoN messages it is only possible to display generic symbols and the textual description:

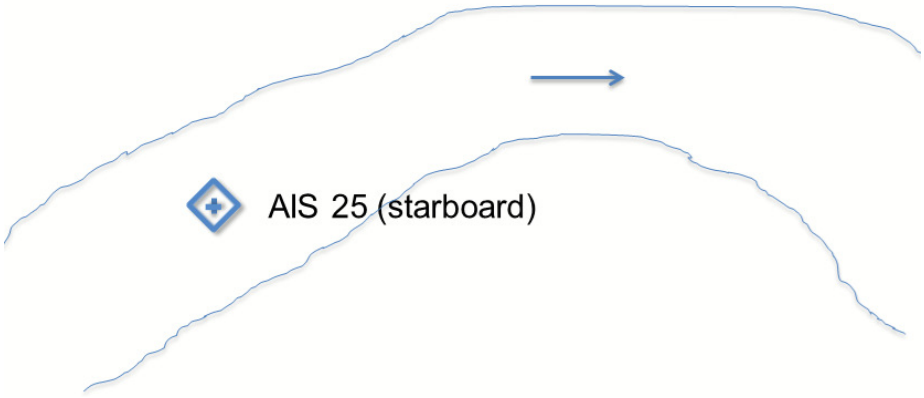


The skipper is therefore not able to decide on which side he has to pass the buoy if he does not know whether it is an IALA-A buoy or a CEVNI buoy. Neither the AtoN-symbolization nor the AtoN pick report is containing unambiguous information.

Real buoys are always unambiguous. Even if there is only one buoy in the middle of the fairway and the skipper does not know whether it is an IALA-A or a CEVNI buoy he knows on which side he has to pass the buoy:



But the information provided by the AtoN is not clear:




The CEVNI buoy “Bifurcation of the fairway” (without a preferred channel) cannot be encoded in the AtoN message. For the CEVNI buoys “Bifurcation of the fairway, preferable to pass on the right/left hand side” there is the same problem with right and left respectively red and green as for the buoys marking the sides of the fairway.

An Inland specific AtoN message is therefore needed to transmit clear information about buoys on inland waterways and the Inland ECDIS standard has to be amended to enable a correct display of the AtoN