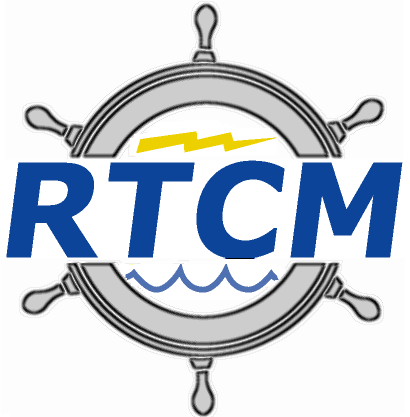
**CDV - RTCM 12100.0**

RTCM Paper 011-2016-SC121-088



**RTCM STANDARD 12100.0**

**CREATION AND QUALIFICATION**

**OF**

**APPLICATION-SPECIFIC MESSAGES (ASM)**

DEVELOPED BY

RTCM SPECIAL COMMITTEE NO. 121

January 26, 2022

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Radio Technical Commission for Maritime Services

1150 18th Street NW., Suite 910  
Washington, DC 20036, U.S.A.

E-Mail: info@rtcm.org

Web Site: https://www.rtcm.org

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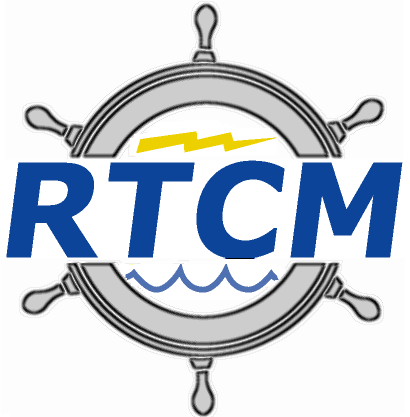
*1150 18th Street NW., Suite 910  
Washington, DC 20036, U.S.A.*

*Telephone: +1-703-527-2000*

*E-Mail: info@rtcm.org*

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RTCM STANDARD

FOR

THE CREATION AND QUALIFICATION

OF

APPLICATION-SPECIFIC MESSAGES (ASM)

# Scope

This Standard specifies requirements for the development of Application-Specific Messages (ASM), and methods to qualify them against those requirements. It is intended for use by competent authorities in determining which ASM are allowed to be transmitted in their designated area(s). [[1]](#footnote-2)

ASM transmitted via an Automatic Identification System (AIS) Very High Frequency (VHF) Data Link (VDL) [[2]](#footnote-3) must conform to the requirements for data structure and transmission specified in ITU-R M.1371. ASM transmitted on channels other than “AIS 1” and “AIS 2” should conform to requirements for data structure and transmission specified in either ITU‑R M.1371 or   
ITU-R M.1842, and may also conform to additional requirements for transmission, for example, those specified in ITU-R M.2092 for a VHF Data Exchange System (VDES) or RTCM 12301 for VHF-FM Digital Small Message Service (VDSMS).

# References

The documents listed in 2.1, 2.2, 2.3 and 2.4 are references for this Standard. For these undated documents, the latest edition or version in effect when this Standard is published,[[3]](#footnote-4) applies.

## Provisions

The following documents contain provisions which, through reference, constitute provisions of this Standard:

ISO 8601, *Data Elements and Interchange Formats – Information Interchange – Representation of Dates and Times*

Recommendation ITU-R M.1371, *Technical Characteristics for an Automatic Identification System Using Time Division Multiple Access in the VHF Maritime Mobile Band*

## Indispensable documents

The following document is indispensable in the application of this Standard:

IALA Rec. e-NAV-144, *Harmonized Implementation of Application Specific Messages (ASM)*

*IALA Guideline 1095, Harmonized Implementation of Application-Specific Messages (ASM)*

## Useful documents

The following documents are useful in the application of this Standard:

IMO SN.1/Circ.289, *Guidance on the Use of AIS Application-Specific Messages*

IMO SN.1/Circ.290, *Guidance for the Presentation and Display of AIS Application-Specific Messages Information*

ITU, *Radio Regulations*

Recommendation ITU-R M.585, *Assignment and Use of Identities in the Maritime Mobile Service*

Recommendation ITU-R M.1842, *Characteristics of VHF Radio Systems and Equipment for the Exchange of Data and Electronic Mail in the Maritime Mobile Service RR Appendix 18 Channels*

RTCM 12301, *VHF-FM Digital Small Message Services*

Recommendation ITU-R M.2092, *Technical Characteristics for a VHF Data Exchange System in the VHF Maritime Mobile Band*

IEC 62288, *Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results*

## Other documents

The following documents were useful in the creation of this Standard:

IEC 80000 (series), *International System of Quantities and Units (ISQ)*

# Terms and definitions

## Terms

The following terms are used in this Standard:

AI 🢭 Application Identifier

AIS 🢭 Automatic Identification System

AIS 1 🢭 Maritime mobile VHF band channel operating on frequency 161.975 MHz [[4]](#footnote-5)

AIS 2 🢭 Maritime mobile VHF band channel operating on frequency 162.025 MHz 3

AIS VDL 🢭 AIS VHF Data Link

ASCII 🢭 American Standard Code for Information Interchange

ASM 🢭 Application-Specific Message(s)

Circ. 🢭 Circular

DAC 🢭 Designated Area Code

Ed. 🢭 Edition

e-Nav 🢭 e-Navigation

FI 🢭 Functional Identifier

FM 🢭 Frequency Modulation

Hz 🢭 Hertz

IALA 🢭 International Association of Marine Aids to Navigation and Lighthouse Authorities

IEC 🢭 International Electrotechnical Commission

IFM 🢭 International Functional Message

IMO 🢭 International Maritime Organization

ISO 🢭 International Organization for Standardization

ISQ 🢭 International System of Quantities and Units

ITU 🢭 International Telecommunications Union

ITU-R 🢭 ITU Radiocommunication Sector

M. 🢭 [ITU-R] Mobile, Radiodetermination, Amateur and Related Satellite Services

MHz 🢭 Megahertz

MID 🢭 Maritime Identification Digits

MMSI 🢭 Maritime Mobile Service Identity

Rec. 🢭 Recommendation

RR 🢭 [ITU] Radio Regulations

RTCM 🢭 Radio Technical Commission for Maritime Services

SN.[X] 🢭 [IMO] Safety of Navigation [Circular]

US 🢭 United States

UTC 🢭 Coordinated Universal Time

VDES = VHF Data Exchange System

VDL 🢭 [AIS] VHF Data Link

VDSMS 🢭 VHF-FM Digital Small Message Services

VHF 🢭 Very High Frequency

VTS 🢭 Vessel Traffic Services

WGS 🢭 World Geodetic System

WGS 84 🢭 WGS 1984

## Definitions

The following definitions apply for the application of this Standard:

### 

AI

Application Identifier

the combination of the DAC and FI

### 

AIS ASM

Automatic Identification System Application-Specific Message(s)

ASM intended for transmission via an AIS VDL

### 

AIS VDL

Automatic Identification System VHF-FM Data Link

the transmission media for exchange of data between AIS stations; by default, channels “AIS 1” and “AIS 2” in the maritime mobile VHF band

### 

ASM

Application-Specific Message(s)

binary message(s) where the data content is defined by the application and does not affect the operation of the transmission medium (e.g., via an AIS VDL or VDSMS)

### 

backward compatible

describes the use of a new version of an ASM with existing systems and equipment without special adaptation or modification of those systems or equipment

### 

DAC

Designated Area Code

a code, assigned by the competent authority, based on a MID in Article 19 of the RR

### 

default value

the unique value of [or within] a parameter that denotes a preselected option (e.g., the absence of available data)

### 

FI

Functional Identifier

a code, assigned by the competent authority to differentiate between ASMs

### 

MID

Maritime Identification Digits

a code, used to identify radio communication facilities’ base area (e.g., as part of their MMSI)

*See also Annex 1 of Rec. ITU-R M.585-5*.

### 

MMSI

Maritime Mobile Service Identity

a code, used to uniquely identify radio communication facilities (e.g., ship stations, coast stations)

### 

payload

describes the data content of an ASM, excluding identifying information required by the transport medium (e.g., the standard AIS framework and AI)

### 

range of valid values

the defined value(s) of the parameter, including the default value and reserved values

### 

reserved

the designation of bits within a parameter that denotes a preselected option to specifically set aside these bits as valid values (e.g., for future or regional use)

### 

shall

describes attributes which RTCM considers necessary to comply with this Standard

NOTE  The use of the term "shall" is not intended to limit the possibility of modifying this Standard through the language of a regulation or contract which incorporates this Standard by reference. If an ASM is developed to such an amended standard, any claim of compliance with this Standard in the ASM’s documentation shall also describe the modification.

### 

should

describes attributes recommended by RTCM, but not considered necessary to claim compliance with this Standard

### 

should not be used

the designation of bits within a parameter that are specifically excluded from the defined range of valid value(s) because the range of these values are outside the control of the originator (e.g., in accordance with the cited standard)

### 

standard AIS framework

consists of the message identifier, repeat indicator, source identifier and, for addressed messages, a destination identifier

### 

time stamp

describes the sequence of parameters denoting a date and/or time associated with an event described by an ASM (e.g., the date and time associated with a position)

# Requirements for the development of ASM

An ASM developer should accept the responsibility for the maintenance of their ASM. In order to maintain compatibility with systems and equipment using developer’s ASM, the developer should periodically review and reconfirm, revise or withdraw (i.e., from maintenance) their ASM (e.g., to account for the revision, amendment or supersession of a standard cited in the definition of the ASM or its parameters). Such a review process should not exceed three calendar years, and should include re-qualification against this Standard when it is revised or amended in such a way that it affects the ASM. Documentation of re-qualification against this Standard should be submitted to any competent authority using the ASM and to the IALA “Collection of ASM’s”.

NOTE  Qualification is specified in Clause 5.

This clause specifies the minimum requirements for the development of ASM.

## General requirements

These requirements apply to all ASM.

### Parameters

In general, consideration should be given to the number of bits used to represent each parameter.[[5]](#footnote-6)

#### Version parameter

1. An ASM shall have a version parameter.
2. The version parameter shall be three bits.

*See also 4.1.2.1*.

*See 5.1.1.1.*

#### Date and time parameters

If an ASM has a date or time parameter:

1. If the date/time parameter represents elapsed time:
   1. Its value(s) should be expressed in seconds, or in units directly derivable from seconds (e.g., minutes, hours, days);
   2. Alternatively, its value(s) for year, month, day and hour may be expressed relative to the transmission of the ASM, or relative to a time specified in the ASM, as “current” year/month/day/hour, “previous” year/month/day/hour, and “next” year/month/day/hour.

The specific relative representation used, and the (relative) time reference shall be identified in the developer’s documentation.

1. If the date/time parameter does not represent elapsed time:
2. Its value(s) shall be referenced to UTC; and
   1. Its value(s) should be expressed and formatted in accordance with ISO 8601.

*See also 4.1.2.2.*

The specific ISO 8601 representation(s) used shall be identified in the developer’s documentation.

* 1. Alternatively, its value(s) for year, month and day may be expressed relative to the transmission of the ASM, as “current” year/month/day, “previous” year/month/day, and “next” year/month/day.

The specific relative representation used shall be identified in the developer’s documentation.

*See also 4.1.2.2 and  4.2.1.1.*

*See 5.1.1.2.*

#### Horizontal position parameters

If an ASM has a horizontal position parameter:

1. Its values shall be referenced to the WGS 84 datum; and
2. Its value(s) shall be expressed in degrees of latitude and longitude, or in units directly derivable from degrees of latitude and longitude (e.g., minutes of arc).
3. North latitudes shall be expressed as positive values.
4. South latitudes shall be expressed as negative values.
5. East longitudes shall be expressed as positive values.
6. West longitudes shall be expressed as negative values.

*See also 4.2.1.2*.

*See 5.1.1.3.*

#### Precision parameter

If the accuracy of the horizontal position parameters’ values are less than one ten-thousandth of a minute of arc, the ASM shall also have a precision parameter.

1. The parameter shall be two bits.
2. The value of the precision parameter shall indicate the number of decimal places in the values of the horizontal position that represent the precision of the position.

*See also Table 1*.

*See 5.1.1.3.1.*

|  |  |  |
| --- | --- | --- |
| Figure 1 – Precision Parameter | | |
| Parameter | No. of bits | Description |
| Precision | 2 | Precision of data in horizontal position parameters.  Data shall be truncated to the number of decimal places specified in this parameter.  range = 0-3 0 = default = uncertain  1 = 0.0  2 = 0.00 3 = 0.000 |

#### Vertical distance parameters

If an ASM has a vertical distance parameter:

1. The value(s) shall be expressed in meters, or in units directly derivable from meters.
2. The vertical distance shall be referenced to a vertical datum (e.g., a vertical survey datum).
3. If the ASM’s vertical distance must be referenced to multiple vertical datums (e.g., tidal datums), the ASM shall also have a vertical reference parameter.
4. The vertical datum(s) shall be identified in the developer’s documentation.
5. The value(s) of measurements made above the vertical datum(s) shall be expressed as positive value(s).
6. The value(s) of measurements made below the vertical datum(s) shall be expressed as negative values, unless the entire range of values for the vertical distance is below the vertical datum (e.g., depth relative to the surface of the water), in which case the measurements may be expressed as positive values.
7. If measurements below the vertical datum(s) are expressed as positive values, that fact shall be clearly stated in the developer’s documentation.

*See 5.1.1.4.*

#### Horizontal direction parameters

If an ASM has a horizontal direction parameter:

1. The value shall be expressed in degrees and decimal degrees, or in units directly derivable from degrees and decimal degrees (e.g., radians).
2. The direction shall be referenced to true north.

*See 5.1.1.5.*

#### Directional speed parameters

If an ASM has a directional speed parameter, the value shall be expressed in knots and decimal knots, or in units directly derivable from knots (e.g., meters per second, kilometers per hour).

*See 5.1.1.6.*

### Structure

#### Version parameter

A new ASM shall be structured such that its version parameter is the first parameter in its payload.

*See also 4.1.1.1 b)*.

#### Date and time parameters

If date and time value(s) are formatted in accordance with ISO 8601, they should be structured such that each date and time unit is represented by a separate parameter. Within such a structure, a relative year/month/day/hour may be used.

*See also Table 2.*

| Table 2 - Date / Time Parameter Examples | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Bits | Description | Bits | Description | Bits | Description |  | Description |
| Date / Time | Year | 14[[6]](#footnote-7) | range = 0-9999 0 = default = not available 10,000-16,383 = should not be used | 2 | range = 0-3 0 = default = not available 1 = previous calendar year 2 = current calendar year 3 = next calendar year | 0 | should not be used | 0 | should not be used |
| Month | 44 | range = 0-12 0 = default = not available 13-15 = should not be used | 4 | range = 0-12 0 = default = not available 13-15 = should not be used | 2 | range = 0-3 0 = default = not available 1 = previous calendar month 2 = current calendar month 3 = next calendar month | 0 | should not be used |
| Day | 5 | range = 0-31 0 = default = not available | 5 | range = 0-31 0 = default = not available | 5 | range = 0-31 0 = default = not available | 2 | range = 0-3 0 = default = not available 1 = previous calendar day 2 = current calendar day 3 = next calendar day |
| Hour | 5 | range = 0-24 24 = default = not available 25-31 = should not be used | 5 | range = 0-24 24 = default = not available 25-31 = should not be used | 5 | range = 0-24 24 = default = not available 25-31 = should not be used | 5 | range = 0-24 24 = default = not available 25-31 = should not be used |
| Minute | 6 | range = 0-60 60 =default = not available 61-63 = should not be used | 6 | range = 0-60 60 =default = not available 61-63 = should not be used | 6 | range = 0-60 60 =default = not available 61-63 = should not be used | 6 | range = 0-60 60 =default = not available 61-63 = should not be used |
| Second | 6 | range = 0-60 60 = default = not available 61-63 = should not be used | 6 | range = 0-60 60 = default = not available 61-63 = should not be used | 6 | range = 0-60 60 = default = not available 61-63 = should not be used | 6 | range = 0-60 60 = default = not available 61-63 = should not be used |
| Spare | 2 | set to zero | 4 | set to zero | 0 | set to zero | 5 | set to zero |
|  | 40 | Total | 32 | Total | 24 | Total | 24 | Total |

#### Byte boundaries

1. An ASM shall be structured such that its payload ends on a byte boundary (i.e., where the length of the payload is an integer multiple of eight bits).

If the payload does not end on a byte boundary, spare bits shall be added at the end of the payload to reach a byte boundary.

1. If an ASM’s parameters are grouped together in “blocks” (e.g., multiple date/time parameters,[[7]](#footnote-8) multiple position parameters,[[8]](#footnote-9) multiple “reports” [[9]](#footnote-10)), the ASM should be structured such that each “block” starts and ends on a byte boundary.
2. If a “block” does not begin immediately after a byte boundary, spare bits should be added before the beginning of the “block” to reach the byte boundary.
3. If a “block” does not end on a byte boundary, spare bits should be added at the end of the “block” to reach the byte boundary.

NOTE  The addition of spare bits to align “blocks” with byte boundaries will increase the size of the payload. As such, the addition of spare bits may not be practical for AIS ASM.

*See also 4.2.3.1.*

1. Spare bits shall be included in the documentation of the ASM.

*See 5.1.2.1.*

### Backward compatibility

The revision of an ASM shall be backward compatible with previous versions of the same ASM.[[10]](#footnote-11)

1. All parameters used in a previous version of an ASM shall exist in the revision.
2. Any changes to any parameter’s value(s) shall be in addition to and should not replace the previously defined value(s) or description(s) (e.g., the re-definition of spare or reserved bits).
3. Any changes to any parameter’s range(s) shall be within the previously defined range.
4. Any new parameter(s) shall be added without affecting the previous message structure (e.g., in place of spare bits, or after all previously existing parameters).

*See 5.1.3.*

### Documentation

1. Each ASM shall be documented.
2. The documentation shall include:
3. A description of the ASM;
4. The purpose of the ASM, which should include guidance for its operational use;
5. Guidance for operational use of ASM transmitted via AIS should include, for example, whether an ASM is intended to be broadcast, addressed, and/or sent in response to interrogation.

Such guidance might also include, for example, the intended method of transmission via an AIS VDL and any restrictions associated with that method (e.g., a restriction on message length not to exceed five consecutive transmission slots for FATDMA and three slots for RATDMA and the additional restriction for a shipborne mobile station not to exceed twenty transmission slots in a single frame).

1. Guidance for operational use of ASM transmitted via VDSMS should include, for example, the intended duration of its transmission. [[11]](#footnote-12)
2. The parameters used in the ASM: and
3. A description of each parameter;
4. The number of bits required for each parameter;
5. All valid values of each parameter, unused bits need not be designated as “not used”:
   * + 1. The range(s)/units of the valid value(s) of the parameter;
       2. The resolution of the valid value(s) of the parameter;

The resolution need not be specifically documented if it may be inferred from the range.

* + - 1. The default value of the parameter;

When possible, the first or last value in the range of valid value(s) of the parameter, if such does not result in an anomaly or in a sequence of five consecutive “1”s. For example, a developer expressing speed over ground in knots (e.g., for an aircraft) using eight bits might choose 256 as a logical default value. However, 256 would result in eight consecutive “1”s.

*See also 4.2.3.2 and Clause 3.2.2.1 of Annex 2 of ITU-R M.1371*

If the default value does not represent data “not available”, then a value representative of data “not available” shall also be defined. Again, the “not available” value should not result in a sequence of five consecutive “1”s.

* + - 1. Bits within the parameter designated as “should not be used” or “reserved” (e.g., for future or regional use);
      2. The specific ISO 8601 representation of date/time values, if applicable;

*See also 4.1.1.2 b)  2).*

* + - 1. The precision of position values, if applicable;

*See also 4.1.1.3.1.*

* + - 1. The datum for vertical distance values, if applicable;

*See also 4.1.1.5).*

* + - 1. The scale factor for numeric values, if applicable; and
      2. The offset for numeric values, if applicable;

1. The encoding method for each parameter (e.g., 2’s complement);
2. Time-related data issues (e.g., latency, expiration) associated with each parameter, if applicable; and
3. Quality-related data issues (e.g., validity, integrity) associated with each parameter, if applicable; and
4. The sequence of the parameters.

*See 5.1.4.*

## Additional AIS ASM requirements

These requirements apply to AIS ASM.

### Parameters

#### Date and time parameters

If an AIS ASM has a date or a time parameter that is not a time stamp for reported position information, it shall be formatted in accordance with the requirements specified in Clause 4 of Annex 5 of ITU-R M.1371.

*See also 4.1.1.2*.

*See 5.2.1.1.*

#### Horizontal position parameters

If an AIS ASM has horizontal position parameters, they shall be formatted in accordance with the requirements specified in Clause 4 of Annex 5 of ITU-R M.1371.

*See also 4.1.1.3*.

*See 5.2.1.2.*

### Character data

If an AIS ASM has parameters whose values are expressed as character data, the parameters shall be encoded using 6-bit ASCII in accordance with the requirements specified in Clause 3 of Annex 8 of ITU-R M.1371.

*See 5.2.2.*

### Structure

An AIS ASM shall be structured in accordance with the requirements specified in Clause 3.2.2.11 of Annex 2 and Clause 2 of Annex 5 of ITU-R M.1371.

1. An AIS ASM should be structured such that its length does not exceed three consecutive transmission slots.
2. If an ASM would exceed three consecutive transmission slots, it should be transmitted by means other than the AIS VDL (e.g., VDSMS)..

NOTE  The structure of an AIS ASM should include an AI even if the DAC and/or FI are unassigned.

*See 5.2.3.*

#### Bit stuffing

An AIS ASM shall be structured such that its parameters′ default or commonly used values do not result in a sequence of five consecutive “1”s, in accordance with the requirements specified in Clause 3.2.2.1 of Annex 2 of ITU-R M.1371.

*See 5.2.3.2.*

### IALA registration

An AIS ASM should be registered in IALA’s “Collection of ASM’s”.

# Methods of qualification for ASM

This clause specifies the methods of qualification for ASM.

Each qualification method requires “inspection of the developer’s documentation”. This refers to the examination of relevant documentation to confirm compliance with the requirements. Inspection of the developer’s documentation should be conducted by a suitably qualified person who has the necessary education, skill or experience to apply the documentation to the ASM. Compliance is determined by comparing the specified requirement against the documentation.

*See also Annex A*.

## General

These methods of qualification apply to all ASM.

### Parameters

#### Version parameter

*See 4.1.1.1.*

Confirm by inspection of the developer’s documentation that the ASM has a version parameter.

#### Date and time parameters

*See 4.1.1.2.*

If the ASM has a date or a time parameter:

1. If the date/time parameter represents elapsed time, confirm by inspection of the developer’s documentation that: the date/time value(s) are expressed in seconds, or in units directly derivable from seconds.

If the date/time parameter uses relative representation of elapsed time, its value(s) and the relative time reference are identified;

1. If the date/time parameter does not represent elapsed time, confirm by inspection of the developer’s documentation that:
2. The date/time value(s) are referenced to UTC; and
3. If the date/time value(s) are expressed and formatted in accordance with ISO 8601, the specific ISO 8601 representation(s) used are identified; or
4. If the date/time parameter uses relative representation of time, its value(s) and the relative time reference are identified.

#### Horizontal position parameters

*See 4.1.1.3.*

If the ASM has horizontal [geographic] position parameters, confirm by inspection of the developer’s documentation that:

1. The value(s) are referenced to the WGS84 datum;
2. The value(s) are expressed in degrees of latitude and longitude, or in units directly derivable from degrees of latitude and longitude:
3. North latitudes are expressed as positive values;
   1. South latitudes are expressed as negative values;
   2. East longitudes are expressed as positive values; and
   3. West longitudes are expressed as negative values.

##### Precision parameters

*See 4.1.1.3.1.*

If the ASM has a horizontal position parameter and the accuracy of the parameter′s value(s) are less than one ten-thousandth of a minute of arc, confirm by inspection of the developer’s documentation that:

1. The ASM has a precision parameter; and
2. The value of the precision parameter indicates the number of decimal places in the values of the horizontal position representing the precision of the position.

#### Vertical distance parameters

*See 4.1.1.4.*

If the ASM has a vertical distance parameter, confirm by inspection of the developer’s documentation that:

1. The value(s) are expressed in meters, or in units directly derivable from meters.
2. The vertical distance is referenced to a vertical datum;
3. The vertical datum(s) are identified;
4. If the ASM’s vertical distance is referenced to multiple vertical datums, the ASM also has a vertical reference parameter.
5. Measurements above the vertical reference are expressed as positive values; and
6. Measurements below the vertical reference are expressed as negative values, unless the entire range of values for the vertical distance is below the vertical datum.

#### Horizontal direction parameters

*See 4.1.1.5.*

If the ASM has a horizontal direction parameter, confirm by inspection of the developer’s documentation that:

1. The value is expressed in degrees and decimal degrees, or in units directly derivable from degrees and decimal degrees ; and
2. The direction is referenced to true north.

#### Directional speed parameters

*See 4.1.1.6.*

If the ASM has a directional speed parameter, confirm by inspection of the developer’s documentation that the value is expressed in knots and decimal knots, or in units directly derivable from knots and decimal knots.

### Structure

#### Version parameter

If the ASM is new, confirm by inspection of the developer’s documentation that its version parameter is the first parameter in its payload.

#### Byte boundaries

*See 4.1.2.2.*

Confirm by inspection of the developer’s documentation that the ASM’s payload ends on a byte boundary and that spare bits are included, if necessary.

### Backward compatibility

*See 4.1.3.*

If the ASM is a revision of a previously existing ASM, confirm by inspection of the developer’s documentation that:

1. all parameters used in the previous version exist in the revision;
2. any changes to any parameter’s value(s) are in addition to and do not replace the previously defined value(s) or description(s);
3. any changes to any parameter’s range(s) are within the previously defined range; and
4. any new parameters are added without affecting the previous message structure.

### Documentation

*See 4.1.4.*

Confirm by inspection of the developer’s documentation that the ASM is documented and that the documentation includes:

1. a description of the ASM;
2. the purpose of the ASM, including guidance for its operational use;

*See also 5.1.4.1*;

1. the parameters used in the ASM:
2. a description of each parameter;
3. the number of bits required for each parameter;
4. all valid values of each parameter:
5. the range(s)/units of the valid value(s) of the parameter, including those designated as “reserved”, and “should not be used”, along with; the resolution of each value (which may be inferred from the range)
6. the default for each value, and, if applicable, the value for data “not available”;
7. the specific ISO 8601 date or time representation, if applicable

*See also 5.1.1.2 d))*;

1. the precision of position values, if applicable

*See also 4.1.1.3.1*;

1. the vertical reference, if applicable
2. the scale factor, if applicable;

*See also 5.1.1.3.1 a)*; and

1. the offset, if applicable;
2. the encoding method for each parameter;
3. time-related data issues associated with each parameter, if applicable;
4. quality-related data issues associated with each parameter, if applicable; and
5. the sequence of the parameters.

#### Guidance for operational use

*See  4.1.4 b) 2)*

Confirm by inspection of the developer’s documentation that the documented purpose of the ASM includes guidance for its operational use.

## AIS ASM

These methods of qualification apply to AIS ASM.

### Parameters

#### Date and time parameters

*See 4.2.1.1.*

If the AIS ASM has a date or a time parameter that is not part of a time stamp for reported position information, confirm by inspection of the developer’s documentation that the range, default value and the number of bits are in accordance with Clause 4 of Annex 5 of ITU-R M.1371.

#### Horizontal position parameters

*See 4.2.1.2.*

If the AIS ASM has horizontal position parameters, confirm by inspection of the developer’s documentation that the parameters, as applicable, are in the sequence specified in the 5th bullet of Clause 4 of Annex 5 of ITU-R M.1371.

### Character data

*See 4.2.2.*

If the AIS ASM has a parameter whose value is expressed as character data, confirm by inspection of the developer’s documentation that the parameter is encoded using 6-bit ASCII as specified in Clause 3 of Annex 8 of ITU-R M.1371, and as defined in Table 44 of that Clause.

### Structure

*See 4.2.3.*

Confirm by inspection of the developer’s documentation that the ASM is structured as specified in Clause 3.2.2.11 of Annex 2 and Clause 2 of Annex 5 of ITU-R M.1371.

#### Bit Stuffing

*See 4.2.3.2.*

Confirm by inspection of the developer’s documentation that the default and commonly used values of the AIS ASM’s parameters do not result in a sequence of five consecutive “1”s as specified in Clause 3.2.2.1 of Annex 2 of ITU-R M.1371.

1. ASM Qualification Checklist  
   (informative)

This qualification checklist is provided to aid in determining compliance with the requirements specified in this Standard. All section numbers refer to the standard.







1. Refer to the IALA “Collection of ASM’s” (https://www.iala-aism.org/asm/) for the ASM authorized to be transmitted in a designated area. For example, US MID=367. [↑](#footnote-ref-2)
2. By default, maritime mobile VHF band channels “AIS 1” (operating on frequency 161.975 MHz) and “AIS 2” (operating on frequency 162.025 MHz) [↑](#footnote-ref-3)
3. Including any amendment(s) in effect when this Standard is published [↑](#footnote-ref-4)
4. Maritime mobile VHF band channels “AIS 1” and “AIS 2” are reserved for use in AIS VDLs. [↑](#footnote-ref-5)
5. For example, three days elapsed time can be represented in 22 bits (i.e., expressed in days, hours, minutes, and seconds), in 18 bits (i.e., expressed in seconds), or in 17 bits (i.e., expressed in days and decimal days).

   *See also 4.1.1.2 a).* [↑](#footnote-ref-6)
6. ITU-R M.1371 clause 4 recommends a 4-digit year, requiring 14 bits and a 2-digit month, requiring 4 bits. [↑](#footnote-ref-7)
7. For example, a time stamp consisting of:

   - Year (14 bits);

   - Month (4 bits);

   - Day (5 bits);

   - Hour (5 bits);

   - Minute (6 bits); and

   - Second (6 bits). [↑](#footnote-ref-8)
8. For example:

   - Position accuracy (1 bit);

   - Longitude (28 bits); and

   - Latitude (27 bits). [↑](#footnote-ref-9)
9. For example:

   - A target report (120 bits)within a VTS-generated/synthetic target message; or

   *See IMO SN.1/Circ.289, FI 17*.

   - A sensor report (112 bits)within an environmental message.

   *See IMO SN.1/Circ.289, FI 26*. [↑](#footnote-ref-10)
10. A revision of an ASM that is not backward compatible is, here, a new ASM. [↑](#footnote-ref-11)
11. The transmission time of a VDSMS message shall not exceed 150 ms according to Clause 4.2.2 of RTCM 12301. [↑](#footnote-ref-12)