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Agenda item [[2]](#footnote-2) 2.3

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Proposal for modification of AIS-related performance parameters

# Summary

The information reported via the automatic identification system (AIS) contains important data such as ship identity information, position information, motion parameters and sailing status, which is of great significance for improving the safety and efficiency of ship navigation. Table 4 of section 4.3 of IALA Guideline G1082 provides the requirements on parameters related to AIS reporting intervals. However, it is found in practice that the speed of most anchored vessels, when dragging anchor at a low speed, is less than 3 knots, and the AIS reporting interval for Class A vessels at the time of dragging anchor remains 3 minutes, which will have an adverse impact on maritime safety. Therefore, considering that the relevant AIS guidelines and performance parameter manuals are being revised recently, China MSA believes that it is necessary to make appropriate adjustments to the AIS reporting interval.

## Purpose of the document

In view of the actual situation of anchor dragging when the ship speed is 3 knots or lower, and the relevant provisions of the IALA Guideline G1082 on the reporting interval of Class A AIS at anchor, it is recommended to modify G1082, and appropriately adjust the reporting interval setting of Class A AIS to ensure maritime safety.

## Related documents

[1] IALA Committee work programme for 2023-2027

[2] G1084 Authorisation of AIS AtoN

[3] R0126 The Use of the AIS in Marine AtoN Service

[4] G1082 An Overview of AIS

[5] S1020 MARINE AIDS TO NAVIGATION DESIGN AND DELIVERY

# Background

In accordance with the work plan of agenda 2.3 “Full review of A-126, G1084 and other AIS associated documentation” in the “IALA COMMITTEE Work PROGRAMME 2023-2027”, the review will be conducted under the direction of the ARM Committee. Therefore, suggestions for modifying the AIS-related performance parameters are proposed to the ARM Committee.

# NECESSITY

## 3.1 According to Table 4 of section 4.3 of the IALA Guideline G1082 on the parameters related to AIS reporting intervals, for Class A AIS equipment, the AIS reporting interval is 3 minutes for speeds less than 3 knots in "At anchor" or "Moored" status, and 10 seconds for speeds higher than 3 knots. The technical recommendations and performance standards developed by ITU, IMO and other related organizations all contain similar requirements or citations. In practice, observation and analysis of a large number of anchoring ships show that the speed of most ships at the time of dragging anchor is lower than 3 knots, as shown by the cases provided in Annex 1 and 2.

### 3.2 When a ship drags anchor and is not dealt with in time, it will have a serious impact on the surrounding maritime traffic environment, possibly leading to dangerous incidents such as grounding, striking reefs, collision or capsizing of the ship. In navigation practice, most ships' speed over ground (SOG) does not exceed 3 knots when dragging anchor (unless adverse weather conditions such as typhoons and strong winds cause anchor loss or anchor chain breakage). After a ship has dragged its anchor, it takes a certain amount of time for the ship to re-set the anchor using its own power or for a tugboat to come to assist in controlling the ship's position (usually taking more than ten minutes). During this period, if the SOG does not exceed 3 knots, the reporting interval of Class A AIS equipment of the dragging anchor ship is 3 minutes according to Table 4. Then the ship has already moved a large displacement distance by the next reporting time (assuming that the ship drags anchor and maintains its course at the speed of 1 knot, the maximum displacement of the ship in 3 minutes is approximately 93 meters; at the speed of 2 knots, the maximum displacement in 3 minutes is approximately 185 meters; at the speed of 3 knots, the maximum displacement in 3 minutes is approximately 278 meters), and it can not accurately reflect the vector changes of SOG and course over ground (COG) when the ship is dragging, which is not conducive to attracting the attention of the ship or the driving personnel on duty of surrounding ships to the anchoring situation, and thus prone to dangerous accidents. Therefore, it is necessary to shorten the reporting interval of Class A AIS for ships at anchor.

# Discussion

## 4.1 When the ship is anchored normally, it will swing periodically under the combined action of wind and current and the tension of the anchor chain. When the anchor position is normal, if the effect of wind and current is very small, the swaying angle of the bow from left to right is very small. If the effect of wind and current is relatively large, the swaying angle of the bow from left to right increases.

## 4.2 When a ship is dragging anchor, the swaying angle at the bow can be very small or even nonexistent, and the anchored vessel will have a continuous backward speed, which means the movement vector line of the ship will point consistently behind the ship's beam for an extended period. When a ship drags anchor, the ship has a certain SOG, and the COG is basically stable in a short period of time. For most ships dragging anchor, the change of the COG is within the range of ±10°, and the faster the speed of dragging anchor the smaller the change of the COG.

## 4.3 Table 4 clarifies that the reporting interval for Class A AIS is 10 seconds when a ship is under sailing status with a speed of 0-14 knots, and the ship dragging anchor (if not found in time) can be regarded to be under an uncontrolled sailing status, and it is more difficult to attract the attention of surrounding ships in the first instance due to hanging the anchor ball or displaying the anchor light (the anchored ship is required to display the relevant light type in accordance with the *Convention on the International Regulations for Preventing Collisions at Sea*, 1972). If the AIS report interval is still 3 minutes, the risk of dangerous accidents caused by the anchoring ship is higher than that of normal sailing ships. Considering the positioning accuracy of ships is 10-20 meters, even if the positioning accuracy of the differential global position system (DGPS) is 1-5 meters, when the highest positioning accuracy is 1 m, the speed error of the ship in a 10-second period is 0.2 knots. Therefore, when the ship is dragging anchor, even if the ship's speed does not exceed 3 knots while higher than 0.2 knots, it is safer and more reasonable to apply the reporting interval of 10 seconds for Class A AIS.

## 4.4 Due to the complex nature of a ship's anchor dragging, which is influenced by a combination of factors such as wind and current, the seabed conditions at the anchorage, the length of the anchor chain, and the type of anchor used, it is challenging to quantitatively establish a relevant model. We can only minimize the scope of the ship anchor model as much as possible to avoid overloading AIS channels while ensuring the safety of water traffic. Therefore, in order to timely identify the possible anchor dragging status of ships, while considering the fact that AIS parameter settings might affect the AIS channel load, China MSA provides a Class A AIS solution for consideration by the ARM Committee, i.e., shortening the AIS reporting interval of anchor dragging ships while comprehensively considering the influences of speed, displacement distance and course vector change, so as to increase the emergency response time for ships' anchor dragging as much as possible and avoid or reduce the damage caused by anchor dragging.

## 4.5 It is proposed to amend the setting of AIS equipment on board Class A ships in Table 4 of Section 4.3 of IALA Guideline G1082 to read as follows, "During the anchored state, when the ship's course over ground (COG) changes within range of ±10°during the first 10s, and the ship's speed to the ground is greater than 0.2 and does not exceed 3 knots, when the angle between the course over ground (COG) and the port or starboard side of the heading (HDG) is greater than 90°, the AIS reporting interval of 10 seconds also applies." After the modification of relevant parameters, taking into consideration the ship drift speed and course changes, the anchor dragging can be identified more accurately, thus reducing the influence of the ship's normal yawing, while not occupying too much AIS channel resource.

## 4.6 It is recommended to refer to Table 1 and Table 2 in Annex 1 of the latest ITU-R M.1371 Recommendation to separately list the reporting intervals of Class A shipborne mobile stations and the reporting intervals of devices other than Class A shipborne mobile equipment in Table 4 of section 4.3 of the IALA Guideline G1082 and to change the symbol "<" in the first and second rows of the table to "≤" to include the value itself, in order to make the table more intuitive, clear and rigorous..

# SUGGESTION

It is recommended that the ARM Committee consider the suggestions mentioned in paragraphs 4.5 and 4.6 of the discussion part of this document and modify the relevant contents of the green highlighted part of Table 4 (Annex 3) in section 4.3 of the G1082 guideline.

# ACTION REQUESTED OF THE COMMITTEE

The ARM Committee is invited to consider the above revision suggestions, to consider revising the G1082 guidelines, and take actions as appropriate.

1. ANNEX1

The CASE of anchoring of the ship "OC GRXXXE "

On July 6, 2024, the vessel "OC GRXXXE" experienced anchor dragging at the hazardous cargo anchorage in the Yangtze River in Zhangjiagang, China (See Figure 1 for the anchor dragging track of OC GRXXXE as monitored by VTS radar playback). During the period from 20:26 to 20:30 local time, the vessel underwent a transition from a swinging motion phase to a stable anchoring motion phase. Starting from the anchor movement phase at 20:27, the vessel's COG experienced a stable displacement of approximately 260 meters within the range of ±10°. During this process, the maximum stable speed was around 2.5 knots, lower than 3 knots. It took merely about 4 minutes for the vessel to reach the maximum stable speed of 2.5 knots. If the vessel continues to drift steadily at a speed of 2.5 knots, when the AIS report information is updated once again, the maximum anchoring distance of the vessel can reach approximately 230m, and the vessel has entered the channel at this point, which is highly likely to cause ship collision accidents.



*Figure 1 Anchoring trajectory diagram of “OC GRXXXE”*

1. ANNEX2

The CASE of anchoring of the ship "XXXXX VICTORY "

On July 23, 2024, the vessel "XXXXX VICTORY" experienced anchor dragging at the hazardous cargo anchorage in the Yangtze River in Zhangjiagang, China (See Figure 2 for the anchor dragging track of XXXXX VICTORY as monitored by VTS radar playback). During the period from 22:12 to 22:26 local time, the vessel underwent a transition from a phase of swinging motion to a stable anchoring motion stage. From the stage of stable anchoring movement at 22:21, the COG of the vessel had a displacement of approximately 200m in the stable direction within the range of ±10°, and the maximum stable speed in this process was approximately 1.2 knots, lower than 3 knots. The vessel took only about 12 minutes to go from starting to drop anchor to reaching its maximum stable speed of 1.2 knots. If the vessel continues to drift steadily at a speed of 1.2 knots, when the AIS report information is updated again, the maximum anchoring distance of the vessel can reach approximately 100m, and the ship will have entered the channel by this time, which is highly likely to cause ship collision accidents.



*Figure 2 Anchor trajectory diagram of “XXXXX VICTORY”*

1. ANNEX3

IALA Guideline g1082 Chapter 4.3 TABLE 4

***Table 4 AIS Station Reporting Intervals***

|  |  |
| --- | --- |
| **Station Type** | **Nominal Interval** |
| Class B ≤ 2 knots | 3 minutes |
| Class A ≤ 3 knots in “At anchor” or “Moored” status | 3 minutes |
| Class B > 2 knots | 30 seconds |
| Class A > 3 knots in “At anchor”(If within the first 10s, -10°≤∆COG≤10°,0.2 knots＜SOG≤3 knots, the COG and HDG port or starboard angle is greater than 90°, also applicable) or “Moored” status | 10 seconds |
| Class A 0-14 knots | 10 seconds |
| Class A 0-14 knots and changing course | 3 seconds |
| Class B “SO” 14-23 knots | 15 seconds |
| Class A 14-23 knots | 6 seconds |
| Class B “SO” > 23 knots | 5 seconds |
| Class A 14-23 knots and changing course; or > 23 knots | 2 seconds |
| Search And Rescue Aircraft (airborne mobile equipment) | 10 seconds |
| AIS Base Station | 10 seconds |
| AIS Aid to Navigation | 3 minutes |
| Transmissions of AIS Application Specific Messages | 3 minutes |
| Transmissions of AIS Long Range Reports (message 27) | 6 minutes |
| AIS-SART, MOB-AIS or EPIRB-AIS | 8 messages/ minute |
| Note: Class B “CS” reporting rate will be impacted in high VDL loading situations. | |

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)