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| **Radiocommunication Study Groups** |  |
|  | ARM7-4.4.3 |
|  |  |
| Source: Annex 19 of [5B/195](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=R15-WP5B-C-0195), [5B/242](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=R15-WP5B-C-0242), [5B/244](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=R15-WP5B-C-0244), [5B/254](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=R15-WP5B-C-0254), [5B/256](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=R15-WP5B-C-0256), [5B/276](https://www.itu.int/md/meetingdoc.asp?lang=en&parent=R15-WP5B-C-0276)  Subject: WRC-19 agenda item 1.9.1 | **Document 5B/TEMP/120-E** |
| **30 May 2017** |
| **English only** |
| Working Party 5B (WG 5B-3) | |
| Working Document towards a Preliminary draft NEW  report ITU-R M.[AMRD] | |
| Autonomous maritime radio devices | |

*[Editorial note: Reference to input documents have been highlighted for tracking purposes and to ensure such references are removed before the approval of the document]*

# 1 Background

This Report addresses Resolution **362 (WRC-15)** which will be agenda item 1.9.1 at WRC-19.

The aim of this agenda item is to prevent unregulated operation of such autonomous maritime radio devices to enhance safety of navigation and to ensure the integrity of the GMDSS which is the only system for distress, urgency, safety and routine communication for general shipping.

Applications with autonomous maritime radio devices are reflecting a new development in recent time. Due to the rapid technical progress and cost-effective production, more and more of such applications in the maritime environment are created and used in the field.

The intention of the document is to start the discussion on this agenda item and to try to structure the work on it. During the study period additional aspects may need to be added.

# 2 Structure of Work

## 2.1 Definitions

The term autonomous maritime radio device (AMRD) is not part of the database on ITU Terms and Definitions and needs clarification for a wider audience. In particular, this term may not be understood in IMO and a common definition or agreement may be helpful. The Joint IMO/ITU Experts Group suggests the following definition:

An AMRD is a mobile station; operating at sea and transmitting independently of a ship station or a coast station. Two groups of AMRDs are identified:

1 AMRDs that enhance the safety of navigation,

2 AMRDs that do not enhance the safety of navigation.

The scope of study is limited to devices that use RR Appendix **18** frequencies. It will also take into account the application defined by IMO for radio channels and IMO views on the difficulty to change the performance of mandatory bridge navigation equipment.

## 2.2 Compilation of existing autonomous maritime radio devices

As a first step, studies on the worldwide market should be done to draw up a comprehensive list of all known applications of autonomous maritime radio devices. As result, several kinds of applications using different technologies are to be expected.

To get a clear overview on these devices, to compile and later to categorize the existing AMRDs in the different countries, a Circular Letter to Administrations of Member States of the ITU with a Questionnaire on the distribution and the applications of AMRDs will be forwarded by the Radiocommunication Bureau. Beside distribution and applications of AMRDs the Questionnaire is asking for the used technology as well.

## 2.3 Description of technology which is implemented

For all detected types of AMRDs it is necessary to describe the technology used. Some applications for the same purpose may use different technologies, including combinations of technologies (including digital selective calling (DSC), automatic identification system (AIS), voice telephony, etc.).

## 2.4 Categorizing of autonomous maritime radio devices

As required by *invites* 2 of Resolution **362 (WRC-15)**, categorizing different devices means to evaluate whether an application may be operated inside or outside the maritime mobile service. For a correct estimation of the appropriate category not only the purpose of an application may be relevant, but also the technology used may be an important aspect. The source and object of radio communication may also determine the evaluation. As result of this study two categorized groups in accordance with the preliminary definition of AMRDs should be established:

1 AMRDs that enhance the safety of navigation,

2 AMRDs that do not enhance the safety of navigation.

The first group, AMRDs that enhance the safety of navigation [and safety of life], should be integrated in the maritime mobile service. These devices should use the frequencies of the current RR Appendix **18**.

The second group, AMRDs that do not enhance the safety of navigation, are operating in the mobile service in a maritime environment and the use of the frequencies of the GMDSS [and the current RR Appendix **18** should not be permitted].

## 2.5 Evaluation of the effect of AMRD on AIS for safety of navigation and search and rescue activities

The *further recognizing* of Resolution **362 (WRC-15)** states that the majority of autonomous maritime radio devices using AIS technology are operating in AIS 1 and AIS 2 frequency bands, and, to some extent, occupying the resources of MMSIs for ship stations or aids to navigation that an evaluation of the effects on the functioning of AIS used for the safety of navigation, and especially search and rescue activities implemented by AIS-search and rescue transmitters (AIS‑SARTs), is required. A view expressed in the Liaison Statement from IMO, [5B/13](http://www.itu.int/md/R15-WP5B-C-0013/en), stated concerns about overloading of the VHF data link (VDL).

## 2.6 Addressing / numbering required for operation

As a follow-up step, studies on addressing and numbering need to be carried out. For devices, which are categorized as AMRDs that enhance the safety of navigation and belonging to the maritime mobile service, an addressing / numbering system is needed which is in accordance with the identification rules of stations in the maritime mobile service (RR Article **19**, Recommendation [ITU-R M.585](http://www.itu.int/rec/R-REC-M.585/en)).

For devices that are categorized as AMRDs that do not enhance the safety of navigation and are not integrated in the maritime mobile service, it might be possible and useful to create new and independent addressing and numbering systems, depending on the implemented technology.

## 2.7 Spectrum needs

The usage of the frequencies allocated to the maritime mobile service shall in principle be limited to devices that enhance the safety of navigation.

For the devices that do not enhance the safety of navigation, depending on the implemented technology, studies are necessary to identify spectrum needs to operate such devices.

Further studies need to be carried out to identify and allocate necessary spectrum for the usage of AMRDs. In accordance with *invites* 3 of Resolution **362 (WRC-15)**, sharing studies between different applications and technologies should be initiated to ensure safe operation and that no new constraints are placed on GMDSS and AIS. For special exemptions, it might be possible to share frequencies subject to RR App. **18**. Due to the fact that in the maritime environment reprogrammed or recoded maritime devices will be deployed, the frequencies in the “gap” of App. **18** may be suitable and of special interest. These frequencies are already generically allocated to the mobile service.

## 2.8 Operational and provisional actions

Studies on operational regulations for both categories of devices are important. In case of categorizing man over board devices, operating with a combination of DSC and AIS technology (new class M devices) in the maritime mobile service, it is necessary to explain the operational procedures and to describe them in an appropriate way either in the RR or in an ITU-R Recommendation.

Depending on technology and spectrum, also for AMRDs that do not enhance the safety of navigation new operational procedures might be necessary. Especially in cases when frequencies are shared, operational regulations are required. ITU-R Recommendations may be the appropriate way to implement such regulations.

# 3 Categorization of devices

For categorization, a two-step approach was used.

The first step was a compilation of the existing applications of AMRD which could be found on the worldwide market. To get a clear overview on these devices, to compile and to categorize the existing AMRDs in the different countries, Working Party 5B requested the Director of the Radiocommunication Bureau to issue a circular letter (5/LCCE/64), sent to ITU Member States with a questionnaire to request information of such devices. Responses were received from 16 member administrations and one NGO member.

The information was consolidated into tables to give a general description of the applications in Annex 2. Applications described in the responses to the questionnaire included diver emergency and Danbuoy/lifebuoy uses and these have been included in an MOB category as the function appears the same: A separate category for routine diver functions has been created.

Fishnet indicators have been divided into 2 categories; one to identify and locate a hazard; one for net recovery only.

General categories of ‘Tracking an object which is not a hazard to navigation’ and ‘Mobile AtoN for an object which is a hazard to navigation’ have been created. A racing mark and an oceanographic meteorological buoy could be in either category.

EPIRB and AIS-SART have been excluded as they are already in the radio regulations (RR). It may be necessary to consider the definition of EPIRB which is in the RR.

“**1.93** *emergency position-indicating radiobeacon station:* A *station* in the *mobile service* the *emissions* of which are intended to facilitate search and rescue operations”

Annex 3 is a consolidation of the detail of individual AMRDs and containing the technical realization by the applications listed in Annex 2.

While little information was received about the power or antenna height, one administration stated that tests in conjunction with IALA had indicated a typical range of 5nm to a receiving aerial 10m above sea level and much further to aircraft.

## 3.1 Other information from Questionnaire

Two respondents indicated that future Mobile AtoN might include virtual and physical types.

On respondent also reported devices operating on ISM frequencies.

Other than homing devices which do not transmit position information in their signals, all devices rely upon GNSS signals to obtain a position fix.

# 4 Effect of AMRD on AIS for safety of navigation and search and rescue activities

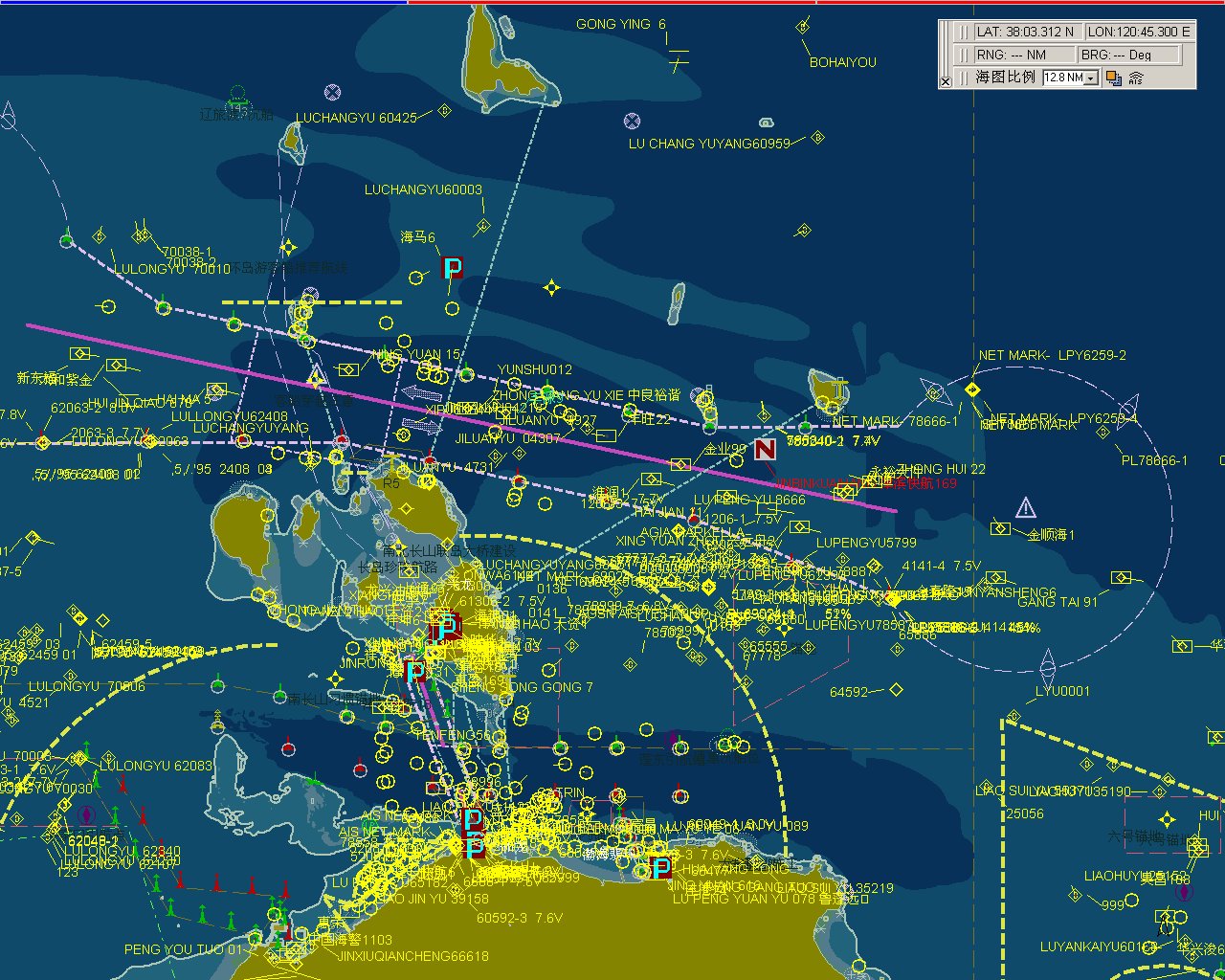
A survey conducted by one maritime radio administrative organization shows that the most extensive by number and by geographical distribution in their area using of AMRDs is for the fishery application. The devices are using AIS technology and mainly deployed in two different scenarios by different categories. Since there is no related regulation on this kind of devices, most of the fishery devices are using random access TDMA (RATDMA) technology for autonomous transmitting, and are numbered randomly. The fishing net indicators are always deployed in the shipping routes, and used to avoid ships colliding with the nets. They are categorized into the general group A as fishing equipment indicator for navigation hazard indication.

Besides, the other kind of extensive use devices, the aquaculture net indicators are always deployed outside the shipping route, and just for the purpose of identification. Some administrations were of the view that they could be categorized into the general group B, other’s had the view that these could also indicate a hazard and be Group A.

Such aquaculture indicators might be identified as an AToN, but Recommendation ITU-R M.1371 does not support this use and there can be administrative difficulties in assigning FATDMA slots for an AtoN and managing regular repositioning. In addition, there is uncertainty about whether the marking is to indicate a hazard or only to aid recovery.

Figure 1 is a typical example of screen snapshot of maritime administrative terminal in one of the VTS centers, which shows the large numbers of fishery devices deployed in the area of a busy waterway.

Figure 1



The fishing net indicators are practically beneficial to the safety of both the ships and the nets. However, along with the interests brought to the fishery industry, the increasing unregulated use of the devices are bringing some negative effects to maritime safety, mainly in the following aspects:

1 Since the fishery devices are usually configured and displayed as Class B shipborne stations, and furthermore the station identities are unregulated schemed, the large number of the devices causes the high density of objects in a specific VTS area.   
This always brings large difficulties and interference to the maritime administration operations such as the recognition of objects, the assessment of navigation conditions, the organization of vessel traffic and the surveillance of the dangerous cargos and so on. The consequences are obviously the greater work burden and the decreased efficiency. They are directly threatening the safety of the VTS area.

2 The random and compelled autonomous transmitting of messages by the increasing number of devices causes more and more risks to the protection and safety of AIS VHF Data Link. These will be harmful to the effectiveness and efficiency of AIS base stations and even the organization of the AIS networks. The potential harmful effect to the activity of AIS-SART and the receiving of messages from AIS-SARTs should also be considered.

3 The messages transmitted by the false Class B shipborne station can also be received by local ships and displayed on the bridge equipment. When a distress or safety incident happens in the area where the autonomous devices are deployed in large density, the false information displayed on the bridge equipment of rescue vessels on-site or on the terminal of a rescue coordination centre will also cause the misjudgement of the on-site environment and navigation conditions. This would be a very harmful effect to search and rescue activities.

*[Editor’s Note: Responsibility for regulations for collision avoidance lies with IMO. IALA is working on rules for dynamic AtoN.]*

# 5 Numbering Scheme

The numbering scheme is considered in Report M.[NEW\_MARNUM].

# 6 Spectrum for Group B AMRD

## 6.1 Frequency consideration for AMRD using AIS technology

The Resolution **362** (WRC-15) invites ITU-R to conduct the necessary studies in time for WRC-19 to determine the spectrum needs and technical and operational characteristics of autonomous maritime radio devices operating in the frequency band 156-162.05 MHz.

Figure. 2 shows the allocation and application of these bands. The continuous band 156.000‑157.450 MHz is contained in **RR** Appendix **18** corresponding to the lower legs of all channels. The mobile service bands 157.45-160.6 MHz and 160.975-161.475 MHz could also be used by the maritime mobile service. The band 160.975-161.475 MHz is not channelized in Appendix **18**. It is indicated that the band 160.975-161.475 MHz could be considered as a candidate for the study on this Agenda Item.

*[Editor’s note: Channel 2006 is designated in App* ***18*** *with footnote r) specifically for this purpose]*

Figure 2



In most countries, the band 160.975-161.475 MHz is mainly used by land mobile service. However, the use by applications in the maritime environment is not prohibited. As the application scenario is specially defined and the transmission power should be limited to a maximum of 1 W, the sharing of the band 160.975-161.475 MHz might be feasible. The long-term practice of existing AIS operation in the VHF bands also has proved the compatibility between the autonomous devices using AIS technology and the existing services.

After discussion, at least the following spectrum could be considered for this Group B AMRD

* App. 18, Ch. 2006
* the band 160.975-161.475 MHz (with bandwidth of 2 × 25 kHz simplex channels);

but further study is necessary

*[Editor’s Note: This frequency band is also under consideration for VDES AI 1.9.2.]*

6.2 Frequency consideration for AMRD using VHF DSC technology

6.3 Frequency consideration for AMRD using voice telephony

# 7 Operational and provisional actions

## 7.1 Group A AMRD

Taking account into the above-mentioned implications to the maritime safety, some considerations of the technical characteristic requirements are proposed as follows;

1 Regarding the general group A of AMRD which needs to be recognized by ships and maritime administrations, the following facts are proposed to be considered:

– They are allowed to use the AIS technology and operate in the RR App. **18** AIS 1 and AIS 2 frequency bands;

– They must be individually categorized from the other existing types of AIS described in the ITU-R Recommendation M.1371-5 and possibly a new identifier in ITU-R Recommendation M.585-7, so the objects displayed on the terminal of bridge equipment and of the maritime or SAR authorities could be screened in a technical way, such as a different layer, if necessary;

– They should only use the CS TDMA technology for accessing the networks, thus receivers must be embedded in the devices;

*[Editor’s note: There are concerns about the expanded use CSTDMA as there are currently patent issues.]*

– The transmitting power is limited up to a maximum of 1W;

– Considering the assessed coverage of the transmission by the devices and the average speed of ships, the interval of message transmission by a fixed-position AMRD should be not less than 6 minutes; the message update interval from a moving AMRD should not be less than those of Class B “CS” shipborne station which is stipulated in Table 2 of the Recommendation ITU-R M.1371-5;

– A specific message would be designed only for the purpose of identification and position report by AMRDs. The other functions of data transmission, such as those needed by the oceanic meteorological data transmitter could be undertaken by AIS technology or some other new technologies such as ASM, but should be operating in other frequency bands than the existing AIS channels.

### 7.1.2 Operational Procedures

*[Editor’s Note: Consider Recommendation M.541 for example.]*

## 7.2 Group B AMRD

Regarding the general group B of AMRD which do not need to be recognized by ships and maritime administrations, the following facts are proposed to be considered:

– They are allowed to use the AIS technology, but must operate in other frequency bands than AIS 1 and AIS 2;

– They are allowed to undertake the functions of identification and position report, as well as the data transmission. The message used could simply copy those of the existing AIS equipment.

– The transmitting power is also limited up to a maximum of 1W, taking into account the sharing with existing services;

– And the other technical requirements could be regulated by the relevant authorities.

### 7.2.1 Frequency sharing

### 7.2.2 Other

# 8 Conclusion

[TBD]

Annex 1

Possible Future Applications for AMRD

Dynamic Navigation Markers

An AIS device used to mark an impermanent hazard or obstruction to navigation, or to assist in recovery planning (i.e. search and rescue or environmental protection). The purpose of the communication is to identify the presence of a floating buoy, tethered/untethered object, hazard on the water, etc. Examples include Physical Oceanographic Real Time Sensors data eg Tidal, Wave Heights, Wind speed, etc.

The view of the Joint IMO/ITU Experts Group, Document [5B/113](http://www.itu.int/md/R15-WP5B-C-0113/en), was that for these devices, initial guidance should be given by IMO so that ITU can take appropriate measures regarding the assignment and use of identities, as well as the development of technical characteristics.

Table 1

Dynamic navigation markers

| Item | Dynamic navigation markers | Remarks |
| --- | --- | --- |
| General description | An AIS device used to mark an impermanent hazard or obstruction to navigation, or to assist in recovery planning (i.e. search and rescue or environmental protection) |  |
| Purpose of communication | Identify the presence of a floating buoy, tethered/untethered object, hazard on the water, etc. | This could also include a search and rescue (SAR) datum marker deployed by SAR authorities to mark the location of a distress situation to other rescue craft. It could also include a device that reacts to environmental conditions and its post trajectory used for planning ongoing SAR efforts. |
| Source of communication | The self-contained device itself |  |
| Interest for user | Protection of marked objects and of ships navigating in area | Use should be limited to safety or environmental protection applications |
| Destination of communication | To all vessels in the vicinity | Open loop |
| Kind of communication | AIS | On channels AIS 1 and AIS 2. |
| Implication to ship stations | yes | The message sent by device needs to be read, recognized, displayed, acknowledged or responded by on-board navigation display |
| Implication to coast stations | Only in special cases depending on the used system, | if the message sent by device needs to be read, recognized, displayed, acknowledged or responded by an operator using information received by a coast station. |
| Implication to safety of navigation | Only devices which aid safety of navigation, safety of life or environmental protection should be allowed | However, the device could be configured on other frequencies in the mobile service when used as a property locator (e.g. fish pods). |
| Safety related communication | yes |  |
| Observation |  |  |
| Evaluation 1 | Review by IALA and IMO necessary |  |
| Result | [Dynamic navigation marker devices could be included in the permission list provided that its purpose furthers safety of navigation, environmental protection or safety of life and provided AIS messages appropriately identify the application] |  |

Annex 2

General list of applications for devices outside existing maritime mobile service

| Item | MOB |
| --- | --- |
| General description | Primarily personal rescue devices for person in the water in emergency situation |
| Purpose of communication | Alerting, tracking, homing |
| Source of communication | Independent device |
| Interest for user | Personal |
| Destination of communication | From person in the water to own vessel, or to all vessels in vicinity |
| Kind of communication | Different systems available: AIS, DSC, 121.5 MHz, 406 MHz, other frequencies, synthetic voice or in combination |
| Implication to ship stations | Yes |
| Implication to coast stations | Only in special cases depending on the system used, the position and the follow up situation (rescue coordination from shore side) |
| Implication to safety of navigation | Depending on the system |
| Safety related communication | Yes |
| Observation | Several different systems using different technologies are on the market. The different systems may be created for different kind of vessels (e. g. fast going container vessels, passenger vessels, fisher boats, yachts, single hand crews etc.) and divers in an emergency |
| Evaluation 1 | Additional assessment needs to be done for the different systems. In relation to the existing maritime mobile service, different results can be expected depending on the vessel type and device technology |
| Result | Depends on technology |

| Item | Diver routine |
| --- | --- |
| General description | Diver routine functions |
| Purpose of communication | Communications and locating |
| Source of communication | Personal device |
| Interest for user | Personal |
| Destination of communication | Dive vessel |
| Kind of communication | Single or combination of voice, DSC\*, AIS and other technology |
| Implication to ship stations | Only dive vessel |
| Implication to coast stations | No |
| Implication to safety of navigation | No |
| Safety related communication | No |
| Observation | Some inappropriate use of emergency signals for routine communications. The recommendations M.1371 and M.585 do not support this use at this time  *Editor’s Note: The use of DSC for routine communications should be eliminated* |
| Evaluation 1 |  |
| Result | Group B |

| Item | Fishing equipment indicator for navigation hazard indication |
| --- | --- |
| General description | Fishnet indicator for hazard indication |
| Purpose of communication | Identify and locate fishnet which may be a hazard to other vessels |
| Source of communication | Independent device, [ship equipped device] |
| Interest for user | Avoid damage to equipment |
| Destination of communication | From fishnet to all vessels in vicinity |
| Kind of communication | AIS |
| Implication to ship stations | Yes |
| Implication to coast stations | Depends on the technology and the area |
| Implication to safety of navigation | Yes |
| Safety related communication | Possible |
| Observation | Products are on the market and in use, but the current unregulated usage is confusing for navigators and VTM operators. The Recommendations M.1371 and M.585 do not support this use at this time |
| Evaluation 1 | Additional assessment needs to be done for the different systems. Different results in relation to the existing maritime mobile service may occur depending on the vessel type and device technology. Assess by IMO |
| Result | TBD |

| Item | Fishing equipment indicator for recovery |
| --- | --- |
| General description | Fishnet indicator for recovery |
| Purpose of communication | Identify and locate fishnet for recovery by owner |
| Source of communication | Independent device |
| Interest for user | Saves time and fuel in fishing operations |
| Destination of communication | Own fishing vessel |
| Kind of communication | AIS |
| Implication to ship stations | Only to owner fishing vessel |
| Implication to coast stations | No |
| Implication to safety of navigation | No |
| Safety related communication | No |
| Observation | Products on the market and in use, but the current unregulated usage is confusing navigators and VTM operators. |
| Evaluation 1 | This device should be Group B |
| Result | Group B |

| Item | Track objects which are not a hazard to navigation |
| --- | --- |
| General description | Track objects which are not a hazard to navigation |
| Purpose of communication | Track object, eg oil slick, tidal flow, ocean research sensor |
| Source of communication | Independent device |
| Interest for user | Special use, but may be person, enterprise or administration |
| Destination of communication | ? |
| Kind of communication | AIS or other technology depending on the range |
| Implication to ship stations | No |
| Implication to coast stations | No |
| Implication to safety of navigation | No |
| Safety related communication | No |
| Observation | Not known |
| Evaluation 1 | Group B |
| Result | No |

| Item | Mobile AtoN indicating a hazard |
| --- | --- |
| General description | Mobile AtoN indicating a hazard |
| Purpose of communication | Identifying and locating |
| Source of communication | Independent device |
| Interest for user | Safety or protection of others or object |
| Destination of communication | Vessels in vicinity |
| Kind of communication | AIS |
| Implication to ship stations | Yes |
| Implication to coast stations | Possible |
| Implication to safety of navigation | Yes |
| Safety related communication | Yes |
| Observation | It is unclear exactly what the physical object being marked is, and who is responsible. IALA is addressing this category of application. The Recommendations M.1371 and M.585 do not support this use at this time. |
| Evaluation 1 | Assessment needs to be done by IMO and IALA |
| Result | Group A |

| Item | **Oceanic meteorological buoys** |
| --- | --- |
| General description | Oceanic buoys for oceanic [meteorological][environmental] data collection.  [Editor’s note: This could probably be an AtoN or mobile AtoN] |
| Purpose of communication | Identify and locate a navigation hazard, aid recovery, |
| Source of communication | Independent device |
| Interest for user | Enterprise or administration |
| Destination of communication | To vessels in vicinity |
| Kind of communication | AIS |
| Implication to ship stations | Yes |
| Implication to coast stations | No |
| Implication to safety of navigation | Yes |
| Safety related communication | Possible |
| Observation | Status not known, but Recommendations M.1371 and M.585 do not support this use at this time unless it is a fixed device. |
| Evaluation 1 | Assessment needs to be done by IMO. |
| Result | TBD |

Annex 3

Technical realization of AMRDs currently on the market by application as described in Annex 4

*[Editor’s note: Agreed content of ‘Table 2’ to be inserted here]*

|  |  |  |  |
| --- | --- | --- | --- |
| Name of AMRD | MOB | Product | Remarks |
| General technology/ main technical characteristics | AIS | McMurdo Smartfind S10, S20, S20 SRS Z501;  Orolia Limited Smartfind S10/S20, R10, M10 et M10W;  Kannad Safelink R10;  KANNAD MARINE R10 SRS;  Kannad Marine Safelink Solo PLB & Safelink PRO;  Ocean Signal M100/ M100X;  Weatherdock A109 easyONE;  Weatherdock A040, A040-BW-COM, A040-PRO, A049;  Weatherdock AG easyRESCUE-PRO;  Weatherdock AG A109 easyONE, A109-M easyONE-Manual;  Nautilus LifeLine Ltd Marine Rescue GPS;  Nautilus Lifeline Diver;  FT-TEC Electronics GmbH SEAANGEL-SA14-MOB;  SEAANGEL SA16+(NG);  ACR Electronics.Inc. AISLink-MOB 1;  ACR AIS LINK;  Wamblee W420/WS420/W420LP RESCUE-ME;  SCIO S2S BUDDY AIS;  ALLTEK TB-520;  OCEAN SIGNAL RESCUEME MOB1; AMEC AIS Man Over board Beacon TB-520;  MOB-30T, Samyung; |  |
| DSC | Wamblee W410 Rescue-Me TM |
| AERO (121.5MHz) | Wamblee W400 |
| AIS+DSC | Ocean Signal MOB1;  ACR Aislink MOB;  Mob1 Rescue ME;  Weatherdock AG A040-PRO easyRESCUE-PRO;  Marine Rescue Technologies Ltd sMRT V100;  Nautilus Marine Rescue GPS |
| DSC+ synthetic voice | Wamblee W410; |
| AIS+AIS-SART | Weatherdock A193-BT-CS; |  |
| HOMING DEVICE | RHOTHETA ELECTRONIK RT-B77 HELB;  WAMBLEE W400;  SEA MARSHALL AU9;  INDRA RP-GPS-LHA 2.0;  SCIO S2S |  |
| AIS+AERO | Ocean Signal M100/M100X;  Marine Rescue Technologies Ltd sMRT AU10-HT; |  |
| AIS-DSC-AERO | Wamblee W450-W450LP;  Marine Rescue Technologies Ltd Crewsafe V200; |  |
| AIS-868 | SEAREKA DIVANSI MOB |  |
| Frequency band/ Resource consumption | AIS1 | X | by this factor, the device could be judged if it is within the scope of the Agenda Item. For example, some device that is not operating in the maritime mobile service band could be excluded. |
| AIS2 | X |
| Ch 6 (Czech) | X |
| Ch 70 | X |
| Ch 16 | X |
| 121.5MHz | X |
| Deployment scenario | person locating for rescue (Australia & Canada) | (X) with additional equipment only | deployed by person, or free drift object, or man-controlled moving object, etc. this is helpful for determining the implication to ships and safety of navigation |
| Homing (Norway) | X |
| Man over board alerting and locating (China) | X |
| Coverage |  |  | this depends on some technical parameters, such as transmitting power, antenna height or etc. |
| main technical characteristics | AIS Message 1 & 14; SRM text “MOB ACTIVE” (U.K.) |  | including the power, the message size, the transmitting cycle, etc, for the purpose of determining the requirement of numbering and spectrum |
| Assessment |  |  | the existing consumption of the resources of MMS, including numbering and spectrum |
| Comments | Enhancing safety of life at sea(China)  In open loop; acknowledgement only; possible for VHF Class A (Germany & Netherlands)  Person locating for rescue (Italy)  Function close and open loop; Open loop AIS+loop; Open loop AIS+homing 121.5MHz;Open loop AIS; ID with 970 (France)  There has been an uptake of these MOB devices for commercial & recreational vessels and also for diver location. MOBs previously seem to be mainly limited to 406 MHz transmission (Cospas-Sarsat) and 121.5 MHz for homing.  MOB use will improve safety and the chance of successful rescue. (New Zealand) | open system, but AIS is no alerting system, additional equipment or software is needed |  |
| Evaluation 2 |  | See Table 1 | If the further evaluation is needed |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of AMRD | Diver | Product | Remarks |
| **General technology/ main technical characteristics** | Voice communication, DSC (Australia & Italy) | Nautilus Lifeline | Where AIS or DSC is used, use of GNSS is assumed |
| AIS, VHF DSC (Australia UK) | Nautilus Marine Rescue GPS  Nautilus Lifeline Marine Rescue Radio |
| ENOS-Beacon alerts to a special ENOS-Receiver the GPS position (Netherlands) | Seareq e.K. ENOS-System |
| VHF radio telephony, DSC, AIS (Germany & Netherlands) | Nautilus LifeLine Ltd., Nautilus Marine Rescue GPS;  Seareq e.K. ENOS-System,  Nautilus LifeLine VHF-GPS Radio for Divers!;  Weatherdock AG A040-DP easyRESCUE-DIVEpro;   |  | | --- | | Weatherdock AG easyRESCUE-DIVE A040-D | |
| DSC+AIS (Canada) | Nautilus Lifeline Marine Rescue |  |
| **Frequency band/ Resource consumption** | AIS1 | X | by this factor, the device could be judged if it is within the scope of the Agenda Item. For example, some device that is not operating in the maritime mobile service band could be excluded.  The use of the distress alert is not according to ITU-R Recommendation M.493 and M.585. |
| AIS2 | X |
| CH 70; Ch 16 ~~156.80MHz~~; Ch 6~~156.30MHz~~ (Australia) | X |
|  |  |
| 155.500 –162.250MHz, 25 kHz channel spacing, AIS 1 & AIS 2~~161.975 + 162.025~~; All App. 18 channels incl. Ch 70~~156.525MHz~~ alert function on ch 70(Germany) | – |
| VHF marine radio, all channel/GPS/DSC (U.K.) |  |  |
| **Deployment scenario** | diver communication, diver locating (Australia)  diver rescue and locating system (Netherlands) | (X) with additional equipment only | deployed by person, or free drift object, or man-controlled moving object, etc. this is helpful for determining the implication to ships and safety of navigation  Program your vessel’s MMSI to activate DSC (not currently permitted) (Canada) |
| locating and alerting device for divers; VHF handheld radio for divers; MOB especially for divers, diver rescue and locating system (Germany) | X |
| diver locating | X |
| Coverage |  |  | this depends on some technical parameters, such as transmitting power, antenna height or etc. |
| main technical characteristics |  |  | including the power, the message size, the transmitting cycle, etc, for the purpose of determining the requirement of numbering and spectrum |
| **Assessment** | Numbers free to program and to change; alert function with 970xxxxxx (Germany) |  | the existing consumption of the resources of MMS, including numbering and spectrum |
| Comments | Individual Distress Relay, Distress Alert (Germany & Netherlands) | open system, but AIS is no alerting system, additional equipment or software is needed | The use of the distress alert is not according to ITU-R Recommendation M.493 and M.585. |
| Evaluation 2 |  | See Table 1 | If the further evaluation is needed |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of AMRD | **Fish net** | Product | Remarks |
| **General technology/ main technical characteristics** | AIS | Matsutec HAB-80-HAB-120 (France);  easyPOS’N’HOO; Matsutec/China HAB-80 HAB-120 (Netherlands & Germany);  Actitech Marine VR15 (Canada)  Matsusec HAB 120; SRT Marine Systems Buoy-Trak Transponder(U.K.) | All AIS use relies upon GNSS signals for position |
| **Frequency band/ Resource consumption** | AIS1 | X | by this factor, the device could be judged if it is within the scope of the Agenda Item. For example, some device that is not operating in the maritime mobile service band could be excluded. |
| AIS2 | X |
| 155.500 –162.250MHz (Germany) | X |
| 155.450MHz  155.475MHz (Norway) | – |
| 156.025 to 162.025 MHz (U.K.) | – |
| **Deployment scenario** | Locating | X | deployed by person, or free drift object, or man-controlled moving object, etc. this is helpful for determining the implication to ships and safety of navigation |
| Tracking | X |
| Coverage |  |  | this depends on some technical parameters, such as transmitting power, antenna height or etc. |
| main technical characteristics | Power: 5W/8W;  Class B Msg; (France)  AIS Message Type: 1,14(U.K.) |  | including the power, the message size, the transmitting cycle, etc, for the purpose of determining the requirement of numbering and spectrum |
| **Assessment** | 25kHz channel spacing;  Maritime identity free to program and to change;  941xxxxxx maritime identity (France) |  | the existing consumption of the resources of MMS, including numbering and spectrum |
| Comments | Contributing to the identification and location of fish nets, but negatively affecting navigation, maritime supervision and search and rescue (China)  Detrimental to vessel tracking and the safety of navigation (Canada) |  |  |
| Evaluation 2 |  | See Table 1 | If the further evaluation is needed |

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| --- | --- | --- | --- |
| Name of AMRD | Track Objects | Product | Remarks |
| **General technology/ main technical characteristics** | AIS similar (Norway) | Weatherdock A140 |  |
| AIS | Weatherdock AG A193 vmsTRACK-PRO-CS, A138 vmsTRACK, A118 easyPOSALERT, A140 easyPOS’N’HOOK (Netherlands & Germany) |
| **Frequency band/ Resource consumption** | 155.450MHz, 155.475MHz (Norway) | X | by this factor, the device could be judged if it is within the scope of the Agenda Item. For example, some device that is not operating in the maritime mobile service band could be excluded. |
| 155.500 –162.250 25 kHz channel spacing, alert function on 161.975 + 162.025MHz (Germany) | X |
| **Deployment scenario** | Tracking/location (Norway) | (X) with additional equipment only | deployed by person, or free drift object, or man-controlled moving object, etc. this is helpful for determining the implication to ships and safety of navigation |
| tracking and monitoring of vessels or other objects in a special area; tracking of yachts (Germany) | X |
| Coverage |  |  | this depends on some technical parameters, such as transmitting power, antenna height or etc. |
| main technical characteristics |  |  | including the power, the message size, the transmitting cycle, etc, for the purpose of determining the requirement of numbering and spectrum |
| **Assessment** |  |  | the existing consumption of the resources of MMS, including numbering and spectrum |
| Comments |  |  |  |
| Evaluation 2 |  | See Table 1 | If the further evaluation is needed |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of AMRD | Mobile AtoNs | Product | Remarks |
| **General technology/ main technical characteristics** | AIS and others (France) |  |  |
| AIS, data transfer, broadcast of information (Netherlands & Germany) |  |
| AIS | Manufactures / Suppliers: Vespa Marine, Vega Industries, Sealite (New Zealand) |
| **Frequency band/ Resource consumption** | AIS 1 | X | by this factor, the device could be judged if it is within the scope of the Agenda Item. For example, some device that is not operating in the maritime mobile service band could be excluded. |
| AIS 2 | X |
| **Deployment scenario** |  | (X) with additional equipment only | deployed by person, or free drift object, or man-controlled moving object, etc. this is helpful for determining the implication to ships and safety of navigation |
|  | Channel Marking;  Hazard Marking (New Zealand) | X |
|  | X |
| Coverage |  | ca 5 nm | this depends on some technical parameters, such as transmitting power, antenna height or etc. |
| main technical characteristics |  |  | including the power, the message size, the transmitting cycle, etc, for the purpose of determining the requirement of numbering and spectrum |
| **Assessment** |  |  | the existing consumption of the resources of MMS, including numbering and spectrum |
| Comments | Several navigation buoys in New Zealand are fitted with AIS –Therefore on the rare occasion when a buoy goes off station, it would fit the AMRD definition. Navigation safety would be improved by the automatic notification when an AtoN goes off station. One instance of a survey vessel using an AIS AtoN to mark survey equipment being towed. Note: The AtoN is being transmitted on message 21 but the MMSI starts with 98. This improves navigation by marking hazard zone behind the vessel. (New Zealand) | open system, but AIS is no alerting system, additional equipment or software is needed |  |
| Evaluation 2 |  | TBD | If the further evaluation is needed |

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| --- | --- | --- | --- |
| Name of AMRD | Oceanographic Buoy | Product | Remarks |
| **General technology/ main technical characteristics** | AIS | SW MIDI 185 (Ukraine) |  |
| **Frequency band/ Resource consumption** | AIS1 | X | by this factor, the device could be judged if it is within the scope of the Agenda Item. For example, some device that is not operating in the maritime mobile service band could be excluded. |
| AIS2 | X |
| **Deployment scenario** | Oceanic meteorological data transmission (China) | (X) with additional equipment only | deployed by person, or free drift object, or man-controlled moving object, etc. this is helpful for determining the implication to ships and safety of navigation |
| Buoy locating (Ukraine) | X |
| Coverage |  |  | this depends on some technical parameters, such as transmitting power, antenna height or etc. |
| main technical characteristics |  |  | including the power, the message size, the transmitting cycle, etc, for the purpose of determining the requirement of numbering and spectrum |
| **Assessment** |  |  | the existing consumption of the resources of MMS, including numbering and spectrum |
| Comments | Little influences on safety of navigation (China) | open system, additional equipment or software is needed |  |
| Evaluation 2 |  | See Table 1 | If the further evaluation is needed |

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