

# *GMDSS operational requirements*

## *General*

The GMDSS enables a ship in distress to send an alert using various radio systems. These systems are designed such that the alert has a very high probability of being received by either shore rescue authorities and/or other vessels in the area. Equipment performing GMDSS functions must be simple to operate and (wherever appropriate) be designed for unattended operation.

Distress Alerts must be able to be initiated from the position from which the ship is normally navigated (ie; the bridge). EPIRBs are required to be installed close to, or capable of remote activation from the position from which the ship is normally navigated.

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## *Equipment to be carried*

The SOLAS GMDSS regulations are structured such that all GMDSS ships are required to carry a minimum set of equipment, with (basically) more equipment being required the further the ship travels from land. The SOLAS GMDSS regulations do not make particularly easy reading - a simplified version of the equipment required to be carried for each sea area is detailed below.

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## *Minimum requirements*

GMDSS ships are required to carry the following minimum equipment:

[A VHF radio installation capable of transmitting DSC on channel 70, and radiotelephony on channels 16, 13 and 6. \(see Note 1\).](#)

[One SART if under 500 GRT, 2 SARTs if over 500 GRT.](#)

[Two portable VHF transceivers for use in survival craft if under 500 GRT, three if over 500 GRT.](#)

[A NAVTEX receiver, if the ship is engaged on voyages in any area where a NAVTEX service is provided.](#)

[An Inmarsat EGC receiver, if the ship is engaged on voyages in any area of Inmarsat coverage where MSI services are not provided by NAVTEX or HF NBDP \(see note 2\).](#)

[A 406 MHz or 1.6 GHz EPIRB](#)

*Note 1 - Voice watch required on channel 16 until 2005.*

*Note 2 - in practice, this means that all GMDSS A3 and A4 vessels are required to carry at least one Inmarsat C system.*

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## *Radio equipment - Sea area A1*

Every ship engaged on voyages exclusively in sea area A1 shall be provided with the minimum equipment specified previously, with the option to replace the 406 EPIRB with a VHF DSC EPIRB.



*GMDSS VHF equipment*

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### Radio equipment - Sea areas A1 and A2

Every ship engaged on voyages **beyond sea area A1, but remaining within sea area A2**, shall be provided with the minimum equipment specified previously, plus:

- **An MF radio installation** capable of transmitting and receiving on the frequencies 2187.5 kHz using DSC and 2182 kHz using radiotelephony;
- **a DSC watchkeeping receiver** operating on 2187.5 kHz
- **A 406 MHz EPIRB**



*Typical GMDSS A2 station*

The ship shall, in addition, be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by:

- **A HF radio installation** operating on working frequencies in the (marine) bands between 1,605 kHz and 27,500 kHz. (This requirement is normally fulfilled by the addition of this capability in the MF equipment referred to earlier).

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### Radio equipment - Sea areas A1, A2 and A3

*These vessels have two options to satisfy their GMDSS requirements. The options allow a vessel to choose from the **primary method to be used for ship-shore alerting** ;*

Every ship engaged on voyages **beyond sea areas A1 and A2, but remaining within sea area A3** shall be provided with the minimum equipment specified previously, plus **either**:

- **An Inmarsat C ship earth station :**
- **An MF radio installation and 2187.5 kHz DSC watchkeeping receiver;**
- **A 406 MHz EPIRB**

**OR**

- **An MF/HF radio installation** capable of transmitting and receiving on all distress and safety frequencies in the (marine) bands between 1,605 kHz and 27,500 kHz: using DSC, radiotelephony; and NBDP
- **An MF/HF DSC watchkeeping receiver** capable of maintaining DSC watch on 2,187.5 kHz, 8,414.5 kHz and on at least one of the distress and safety DSC frequencies 4,207.5 kHz, 6,312 kHz, 12,577 kHz or 16,804.5 kHz; at any time, it shall be possible to select any of these DSC distress and safety frequencies
- **A 406 MHz EPIRB**
- **An Inmarsat ship earth station**



*Typical GMDSS A3 station*

In addition, ships shall be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by an MF/HF radio installation operating on working frequencies in the (marine) bands between 1,605 kHz and 27,500 kHz. This requirement is normally fulfilled by the addition of this capability in the MF/HF equipment referred to earlier.

*In practice, MF only transceivers are not produced - all marine MF radio equipment is also fitted with HF facilities.*

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### **Radio equipment - Sea areas A1, A2, A3 and A4**

**In addition to carrying the equipment listed previously**, every ship engaged on voyages in **all sea areas** shall be provided with:

- **An MF/HF radio installation** as described earlier
- **An MF/HF DSC watchkeeping receiver** as described earlier
- **A 406 MHz EPIRB**

In addition, ships shall be capable of transmitting and receiving general radiocommunications using radiotelephony or direct-printing telegraphy by an MF/HF radio installation as described earlier.

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### **Means of ensuring availability of ship station equipment**

Regulation 15 of the SOLAS GMDSS regulations defines 3 methods to ensure availability of GMDSS equipment at sea;

- At sea electronic maintenance, requiring the carriage of a qualified radio/electronic officer (holding a GMDSS First or Second class Radio-Electronics Certificate) and adequate spares and manuals;
- Duplication of certain equipment; or
- Shore based maintenance

Ships engaged on voyages in sea areas A1 and A2 are required to use at least one of the three maintenance methods outlined above, or a combination as may be approved by their administration. Ships engaged on voyages in sea areas A3 and A4 are required to use at least two of the methods outlined above.

And of course what all that means is that 99% of A3 GMDSS ships, along with probably 100% of A1 and A2 GMDSS ships do not opt for at sea maintenance - they either duplicate the equipment and use shore based maintenance (for A3 ships), or use shore based maintenance only (A1 and A2 ships).

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## **Equipment to be duplicated for area A3 vessels**

GMDSS ships operating in A3 areas are required to provide the following duplicated equipment;

- Two complete VHF installations (including DSC), and **either**;
- Two complete Inmarsat C systems and one MF radio system, **or**;
- One complete Inmarsat C system and one complete MF/HF radio system (including a scanning DSC receiver and NBDP equipment).

Many GMDSS ships opt for the latter option (1 Inmarsat C and one MF/HF DSC system), on cost grounds. Unfortunately, this has proven to be one of the underlying causes of the present extremely high [false alerting rate](#) on some GMDSS systems.

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## **Power supply requirements**

GMDSS equipment is required to be powered from three sources of supply:

- ship's normal alternators/generators;
- ship's emergency alternator/generator (if fitted); and
- a dedicated radio battery supply.

The batteries are required to have a capacity to power the equipment for 1 hour on ships with an emergency generator, and 6 hours on ships not fitted with an emergency generator.

The batteries must be charged by an automatic charger, which is also required to be powered from the main and emergency generators.

Changeover from AC to battery supply must be automatic, and effected in such a way that any any data held by the equipment is not corrupted (ie: "no break").

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## **Operator qualifications**

There are a number of different types of GMDSS qualifications, as follows:

- First Class Radio-Electronic Certificate;
- Second Class Radio-Electronic Certificate; and
- GMDSS General Operator's Certificate

The First and Second Radio-Electronic Certificates are diploma and associate diploma level technical qualifications. They are designed for Ship's Radio-Electronic Officers, who sail on GMDSS ships which use the option of at-sea electronic maintenance.

The GMDSS General Operator's Certificate is a non-technical operator qualification, designed for Navigating Officers.

The GMDSS General Operator's Certificate is normally awarded after a ten day course and examination.