



ASSEMBLY
19th session
Agenda item 10

RESOLUTION A.802(19)
adopted on 23 November 1995

**PERFORMANCE STANDARDS FOR SURVIVAL CRAFT RADAR TRANSPONDERS
FOR USE IN SEARCH AND RESCUE OPERATIONS**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to prepare performance standards for survival craft radar transponders for use in search and rescue operations to be used in the Global Maritime Distress and Safety System (GMDSS) in order to ensure the operational reliability of such equipment and to avoid, as far as practicable, adverse interaction between such equipment and other communication and navigation equipment aboard ship,

NOTING the results of operational trials on 9 GHz SAR transponders reported by Governments to the ITU-R Sector, and being aware that the IEC is preparing a technical standard for a 9 GHz SAR transponder,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its sixty-third session,

1. ADOPTS the Recommendation on Performance Standards for Survival Craft Radar Transponders for Use in Search and Rescue Operations set out in the Annex to the present resolution;
2. RECOMMENDS Governments to ensure that survival craft radar transponders for use in search and rescue operations, which will form part of the GMDSS, conform to performance standards not inferior to those specified in the Annex to this resolution;
3. REQUESTS the Maritime Safety Committee to keep these Performance Standards under review and to adopt amendments thereto, as necessary;
4. REVOKES resolution A.697(17).

ANNEX

**RECOMMENDATION ON PERFORMANCE STANDARDS FOR SURVIVAL CRAFT
RADAR TRANSPONDERS FOR USE IN SEARCH AND RESCUE OPERATIONS****1 INTRODUCTION**

The 9 GHz SAR transponder (SART), in addition to meeting the requirements of the relevant ITU-R Recommendation and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

The SART should be capable of indicating the location of a unit in distress on the assisting units radars by means of a series of equally spaced dots (see resolution A.530(13)).

2.1 The SART should:

- .1 be capable of being easily activated by unskilled personnel;
- .2 be fitted with means to prevent inadvertent activation;
- .3 be equipped with a means which is either visual or audible, or both visual and audible, to indicate correct operation and to alert survivors to the fact that a radar has triggered the SART;
- .4 be capable of manual activation and deactivation; provision for automatic activation may be included;*
- .5 be provided with an indication of the stand-by condition;
- .6 be capable of withstanding without damage drops from a height of 20 m into water;
- .7 be watertight at a depth of 10 m for at least 5 min;
- .8 maintain watertightness when subjected to a thermal shock of 45°C under specified conditions of immersion;
- .9 be capable of floating if it is not an integral part of the survival craft;
- .10 be equipped with buoyant lanyard, suitable for use as a tether, if it is capable of floating;
- .11 not be unduly affected by seawater or oil;

* If an on-board test is performed using a shipborne 9 GHz radar, activation of the SART should be limited to a few seconds to avoid harmful interference with other shipborne radars and excessive consumption of battery energy.

- .12 be resistant to deterioration in prolonged exposure to sunlight;
- .13 be of a highly visible yellow/orange colour on all surfaces where this will assist detection;
- .14 have a smooth external construction to avoid damaging the survival craft; and
- .15 be provided with a pole or other arrangement compatible with the antenna pocket in a survival craft in order to comply with 2.4, together with illustrated instructions.

2.2 The SART should have sufficient battery capacity to operate in the stand-by condition for 96 h and, in addition, following the stand-by period, to provide transponder transmissions for 8 h when being continuously interrogated with a pulse repetition frequency of 1 kHz.

2.3 The SART should be so designed as to be able to operate under ambient temperatures of -20°C to $+55^{\circ}\text{C}$. It should not be damaged in stowage throughout the temperature range of -30°C to $+65^{\circ}\text{C}$.

2.4 The height of the installed SART antenna should be at least 1 m above sea-level.

2.5 The vertical polar diagram of the antenna and hydrodynamic characteristics of the device should permit the SART to respond to search radars under heavy swell conditions. The polar diagram of the antenna should be substantially omnidirectional in the horizontal plane. Horizontal polarization should be used for transmission and reception.

2.6 The SART should operate correctly when interrogated at a distance of up to at least 5 nautical miles by a navigational radar complying with resolutions A.477(XII) and A.222(VII), with an antenna height of 15 m. It should also operate correctly when interrogated at a distance of up to 30 nautical miles by an airborne radar with at least 10 kW peak output power at a height of 3,000 ft.

3 TECHNICAL CHARACTERISTICS

Technical characteristics of the SART should be in accordance with Recommendation ITU-R M.628-2.

4 LABELLING

In addition to the items specified in resolution A.694(17) on general requirements, the following should be clearly indicated on the exterior of the equipment:

- .1 brief operating instructions; and
- .2 expiry date for the primary battery used.



IMO

ASSEMBLY - 17th session
Agenda item 10

RESOLUTION A.694(17)
adopted on 6 November 1991

GENERAL REQUIREMENTS FOR SHIPBORNE RADIO EQUIPMENT FORMING PART OF
THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)
AND FOR ELECTRONIC NAVIGATIONAL AIDS

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

RECOGNIZING the need to prepare performance standards for shipborne radio equipment to ensure operational reliability and suitability of equipment used for safety purposes,

NOTING that regulation IV/14.1 of the International Convention for the Safety of Life at Sea, 1974 (SOLAS), as amended, requires all equipment to which chapter IV of the Convention applies to conform to appropriate performance standards not inferior to those adopted by the Organization,

NOTING ALSO that SOLAS regulation V/12(r) requires all shipborne navigational equipment installed on ships on or after 1 September 1984 to conform to appropriate performance standards not inferior to those adopted by the Organization,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-ninth session,

1. ADOPTS the Recommendation on General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids set out in the annex to the present resolution;
2. RECOMMENDS Governments to ensure that shipborne radio equipment forming part of the GMDSS and shipborne electronic navigational aids conform to performance standards not inferior to those specified in the annex to the present resolution;
3. REVOKES resolutions A.569(14) and A.574(14);
4. DECIDES that any reference to resolutions A.569(14) or A.574(14) in existing IMO instruments be read as a reference to the present resolution.

W/3974x/EWP

ANNEX

RECOMMENDATION ON GENERAL REQUIREMENTS FOR SHIPBORNE
RADIO EQUIPMENT FORMING PART OF THE GLOBAL MARITIME
DISTRESS AND SAFETY SYSTEM (GMDSS) AND FOR
ELECTRONIC NAVIGATIONAL AIDS

1 INTRODUCTION

1.1 Equipment, which:

- .1 forms part of the global maritime distress and safety system; or
- .2 is required by regulation V/12 of the 1974 SOLAS Convention as amended and other electronic navigational aids, where appropriate;

should comply with the following general requirements and with all applicable performance standards adopted by the Organization.

1.2 Where a unit of equipment provides a facility which is additional to the minimum requirements of this Recommendation, the operation and, as far as is reasonably practicable, the malfunction of such additional facility should not degrade the performance of the equipment specified in 1.1.

2 INSTALLATION

Equipment should be installed in such a manner that it is capable of meeting the requirements of 1.1.

3 OPERATION

3.1 The number of operational controls, their design and manner of function, location, arrangement and size should provide for simple, quick and effective operation. The controls should be arranged in a manner which minimizes the chance of inadvertent operation.

3.2 All operational controls should permit normal adjustments to be easily performed and should be easy to identify from the position at which the equipment is normally operated. Controls not required for normal operation should not be readily accessible.

3.3 Adequate illumination should be provided in the equipment or in the ship to enable identification of controls and facilitate reading of indicators at all times. Means should be provided for dimming the output of any equipment light source which is capable of interfering with navigation.

3.4 The design of the equipment should be such that misuse of the controls should not cause damage to the equipment or injury to personnel.

3.5 If a unit of equipment is connected to one or more other units of equipment the performance of each should be maintained.

3.6 Where a digital input panel with the digits "0" to "9" is provided, the digits should be arranged to conform with relevant CCITT recommendations.^{1/} However, where an alphanumeric keyboard layout, as used on office machinery and data processing equipment, is provided, the digits "0" to "9" may, alternatively, be arranged to conform with the relevant ISO standard.^{2/}

4 POWER SUPPLY

4.1 Equipment should continue to operate in accordance with the requirements of this Recommendation in the presence of variations of power supply normally to be expected in a ship.

4.2 Means should be incorporated for the protection of equipment from the effects of excessive current and voltage, transients and accidental reversal of the power supply polarity.

4.3 If provision is made for operating equipment from more than one source of electrical energy, arrangements for rapidly changing from one source to the other should be provided but not necessarily incorporated in the equipment.

5 DURABILITY AND RESISTANCE TO ENVIRONMENTAL CONDITIONS

Equipment should be capable of continuous operation under the conditions of various sea states, ship's motion, vibration, humidity and temperature likely to be experienced in ships.^{3/}

6 INTERFERENCE

6.1 All reasonable and practicable steps should be taken to ensure electromagnetic compatibility between the equipment concerned and other radiocommunication and navigational equipment carried on board in compliance with the relevant requirements of chapter IV and chapter V of the 1974 SOLAS Convention.^{4/}

6.2 Mechanical noise from all units should be limited so as not to prejudice the hearing of sounds on which the safety of the ship might depend.

6.3 Each unit of equipment normally to be installed in the vicinity of a standard compass or a magnetic steering compass should be clearly marked with the minimum safe distance at which it may be mounted from such compasses.

^{1/} CCITT Recommendation E161/Q.11.

^{2/} ISO Standard 3791.

^{3/} IEC Publications 92-101 and 945.

^{4/} IEC Publications 533 and 945.

7 SAFETY PRECAUTIONS

7.1 As far as is practicable, accidental access to dangerous voltages should be prevented. All parts and wiring in which the direct or alternating voltages or both (other than radio frequency voltages) combine to give a peak voltage greater than 55 V should be protected against accidental access and should be isolated automatically from all sources of electrical energy when the protective covers are removed. Alternatively, the equipment should be so constructed that access to such voltages may only be gained after having used a tool for this purpose, such as spanner or screwdriver, and warning labels should be prominently displayed both within the equipment and on protective covers.

7.2 Means should be provided for earthing exposed metallic parts of the equipment but this should not cause any terminal of the source of electrical energy to be earthed.

7.3 All steps should be taken to ensure that electromagnetic radio frequency energy radiated from the equipment shall not be a hazard to personnel.

7.4 Equipment containing elements such as vacuum tubes which are likely to cause X-radiation should comply with the following requirement:

- .1 External X-radiation from the equipment in its normal working condition should not exceed the limits laid down by the Administration concerned.
- .2 When X-radiation can be generated inside the equipment above the levels laid down by the Administration, a prominent warning should be fixed inside the equipment and the precautions to be taken when working on the equipment should be included in the equipment manual.
- .3 If malfunction of any part of the equipment can cause an increase in X-radiation, adequate advice should be included in the information about the equipment, warning of the circumstances which could cause the increase and stating the precautions which should be taken.

8 MAINTENANCE

8.1 The equipment should be so designed that the main units can be replaced readily, without elaborate recalibration or readjustment.

8.2 Equipment should be so constructed and installed that it is readily accessible for inspection and maintenance purposes.

8.3 Adequate information should be provided to enable the equipment to be properly operated and maintained. The information should:

- .1 in the case of equipment so designed that fault diagnosis and repair down to component level are practicable, provide full circuit diagrams, component layouts and a component parts list; and

- .2 in the case of equipment containing complex modules in which fault diagnosis and repair down to component level are not practicable, contain sufficient information to enable a defective complex module to be located, identified and replaced. Other modules and those discrete components which do not form part of modules should also meet the requirements of .1 above.

9 MARKING AND IDENTIFICATION

Each unit of the equipment should be marked externally with the following information which should be clearly visible in the normal installation position:

- .1 identification of the manufacturer;
 - .2 equipment type number or model identification under which it was type tested; and
 - .3 serial number of the unit.
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