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Technical characteristics and methods of measurement for equipment for generation, transmission and reception of Digital Selective Calling (DSC) in the maritime MF, MF/HF and/or VHF mobile service; Part 4: Class E DSC

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document is part 4 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.2].

The present document covers the operator interfaces and operating system for Class E DSC equipment.

National transposition dates	
Date of adoption of this EN:	8 February 2017
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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document states the minimum requirements for general communication for shipborne fixed installations using DSC - class E.

Class E DSC is intended to be used in the Medium Frequency (MF) and/or High Frequency (HF) bands of the Maritime Mobile Service (MMS), for distress, urgency and safety communication and general communications and uses telephony for subsequent communications.

The present document is part 4 of a multi-part deliverable that covers the requirements to be fulfilled by equipment that is either integrated with a transmitter and/or a receiver or equipment that is a stand-alone DSC terminal.

These requirements include the relevant provisions and the guidelines of the IMO as detailed in MSC/Circ.803 [i.1] for non-SOLAS vessels participating in the GMDSS as well as Commission Decision of 4 September 2003 (2004/71/EC [i.3]).

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ITU Radio Regulations (2016).

[2] Recommendation ITU-R M.493-14 (09/2015): "Digital selective-calling system for use in the maritime mobile service".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] IMO Circular MSC/Circ-803: "Participation of non-SOLAS ships in the Global Maritime Distress and Safety System (GMDSS)".

[i.2] ETSI EN 300 338-1: "Technical characteristics and methods of measurement for equipment for generation, transmission and reception of Digital Selective Calling (DSC) in the maritime MF, MF/HF and/or VHF mobile service; Part 1: Common requirements".

[i.3] Commission Decision 2004/71/EC of 4 September 2003 on essential requirements relating to marine radio communication equipment which is intended to be used on non-SOLAS vessels and to participate in the Global Maritime Distress and Safety System (GMDSS).

[i.4] Maritime Safety Committee MSC 302(87): "Adoption of performance standards for bridge alert management".

[i.5] IEC 61924-2 Edition 1 (including IEC 61924-2 Corrigendum 1 November 2013): "Maritime navigation and radiocommunication equipment and systems - integrated navigation systems - Part 2: Modular structure for INS - operational and performance requirements, methods of testing and required test results".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 300 338-1 [i.2] and the following apply:

acknowledged: automated procedure that indicates the objective of the initial DSC message has been achieved

active: automated procedure which has control of the general receiver and transmitter and is thus able to engage in subsequent communications and receive DSC messages on both the watch receiver and general receiver

automated procedure: set of actions necessary to complete the objective of an initiating DSC message or non DSC communication event

NOTE 1: Four DSC automated procedures are designed to process these. They are the receiving of distress DSC messages, the receiving of non distress DSC messages, the sending of distress DSC alert attempts and the sending of non distress DSC messages. In addition a fifth procedure is designed to handle non DSC communication events.

NOTE 2: These automated procedures are called:

- Received distress automated procedure.
- Sending distress automated procedure.
- Received non-distress automated procedure.
- Sending non-distress automated procedure.
- Communications automated procedure.

block: inhibit a function by making it inaccessible from the user interface

class E: DSC class intended to provide minimum facilities for MF/HF DSC distress, urgency and safety as well as routine calling and reception, not necessarily in full accordance with IMO GMDSS carriage requirements for MF installations

default: value selected or an action taken by the equipment software in the absence of any operator input

distress DSC message: DSC message or acknowledgement containing the distress information

distress event: unique distress situation identified by two parameters of the distress information; the MMSI of the vessel in distress and the nature of distress

engaged: equipment that is busy handling an automated procedure

factory default: default value that is set by the manufacturer such that the field or behaviour is defined prior to any operator intervention

general receiver: transceiver used for the reception of all subsequent communications

NOTE: It is important to distinguish this unit from the watch receiver.

information characters: set of symbols in a DSC message that contains the items of interest for the recipient and is used to compute the ECC symbol that terminates the message

NOTE: These symbols are repeated in the DX/RX time diversity pattern.

initial DSC message: DSC message that starts an automated procedure

non distress DSC message: DSC messages or acknowledgments that do not have the format specifier or category of "distress"

objective: intent of the DSC message either to establish subsequent communications or request information

operator options: any choices the operator can make while the automated procedure is engaged

pertinent to the automated procedure: DSC messages that have something to do with the procedure and are therefore 'handled' by the procedure

NOTE: A DSC message is pertinent to an automated procedure if the set of information characters in the DSC message has the correct values.

pertinent to the station: any DSC message that would start an automated procedure if the radio were in standby

self-terminating alarm: short alarm that stops by itself without operator intervention

NOTE: The purpose of this alarm is to inform the operator that a DSC message is received but it does not require his immediate attention.

symbol (as part of the DSC sentence): 7 binary bits of a 10 bit DSC word that have the information content

top level: items, buttons, or functions are present and visible without requiring any action by the operator (such as scrolling, opening up menus, or removing any obscuring covers, etc.)

two-tone alarm: alarm consisting of a repetition of the 2 200 Hz frequency for 250 ms followed by a 1 300 Hz frequency for 250 ms

NOTE: This alarm is used for the initiation of the received distress DSC automated procedure.

urgency alarm: alarm consisting of a repetition of the 2 200 Hz frequency for 250 ms followed by 250 ms period of silence

NOTE: This alarm is used for the initiation of the received non distress DSC automated procedure when the category of the initiating DSC message is "urgency".

watch receiver: separate receiver in DSC radios that continuously monitors the appropriate MF, HF or MF and HF DSC distress frequencies

word (as part of the DSC sentence): 10 binary bits that make up the coded entities of a transmitted DSC message

NOTE: The 10 bits consist of a 7 bit "symbol" that gives the information content and 3 bit error check that gives the number of 0 binary bits in the 7 bit symbol.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 300 338-1 [i.2] apply.

4 Controls and Indicators in Class E DSC Equipment

4.1 Visual indication

4.1.0 General

Any visual display of the information content shall be clearly legible under all ambient light conditions.

4.1.1 DSC alphanumeric display

4.1.1.0 Primary display information

The display characters shall have a minimum height of 3,5 mm, and a nominal character width/height ratio of 0,7.

The display shall have a minimum of 12 characters per line and a minimum of 32 characters total.

Any displayed information shall be static. Horizontal scrolling techniques are not permitted (see clause 4.1.3).

The display shall be capable of:

- prompting the operator if an incorrect operation is attempted;
- displaying error messages;
- displaying incoming and logged calls in plain language;
- displaying all the user programmable information content of a DSC call.

4.1.1.1 Additional display information

Additional display characters or symbols shall be capable of:

- showing the functions and options currently available;
- displaying that unread received DSC calls are present in memory;
- displaying other visual alarms;
- displaying whether the position and time information is automatically entered or manually entered.

For integrated equipment there shall be additional display characters and symbols as required for displaying operating frequency, channel number and other radio parameters.

Where logic flows and procedural guidance, expressed by graphical symbols, have an advantage over text, this shall be allowed. Any graphical symbols shall be clearly defined in the operation manual.

4.1.2 Display requirements for additional controllers

Where the additional controller is a fixed installation, it shall have exactly the same characteristics as the primary controller, including the display.

Where the additional controller is a handheld device, it shall have exactly the same characteristics as the primary controller, except for the display, which may be scaled down for a minimum character height of 2 mm.

4.1.3 Handling visual information

In case all information, or user options, required for the active automated procedure, cannot be contained on a single screen, means shall be available to inform the user:

a) that more information is available;

b) how to select the relevant information not yet displayed, e.g. by means of a next button or info key.

5 Technical requirements

5.1 Facilities for DSC transmission and reception

5.1.1 Watch receiver capabilities

The watchkeeping receiver part of the DSC equipment shall be designed for continuous operation on:

- MF equipment: 2 187,5 kHz;
- HF equipment: 8 414,5 kHz: 4 207,5 kHz, 6 312 kHz, 12 577 kHz and 16 804,5 kHz.

The watchkeeping receiver need not operate when the transmitter is in use.

The user may be permitted to deselect up to three of the following frequencies as appropriate for propagation reasons:

- 4 207,5 kHz;
- 6 312 kHz;
- 12 577 kHz; and
- 16 804,5 kHz.

5.2 Facilities for coding and decoding of DSC

5.2.1 Call functions

The facilities for coding and composition of calls shall be so arranged that it is possible for the operator quickly and precisely to enter a call. The types of DSC calls provided in this equipment are specified in clause 5.2.4.

The CALL functions shall permit selection of the following functions:

- INDIVIDUAL: for making a call to a specific MMSI;
- GROUP: for making a call to a specific Group MMSI;
- GEOGRAPHIC: for making geographic area calls;
- RECEIVED CALLS: for retrieving stored incoming DSC calls;
- OTHER: for equipment housekeeping functions.

5.2.2 INDIVIDUAL calls

The INDIVIDUAL call facility shall permit either the MANUAL entry of a MMSI or the selection of a station from the DIRECTORY list. The DIRECTORY list shall have a facility for at least 10 entries. Their MMSIs shall be programmable. If the called station is a coast station (i.e. MMSI commencing 00) no further information shall be requested from the operator. If the called station is a ship station the equipment shall request input of a channel number.

The equipment shall assist the operator by suggesting a suitable inter-ship channel as defined in appendix 17 of the ITU Radio Regulations [1].

5.2.3 GEOGRAPHIC area calls

It shall be possible to transmit GEOGRAPHIC calls by means of deliberate actions, such as two levels of menu instructions.

The operator shall be able to select either Urgency or Safety category and the equipment shall propose the default working frequency of 2 182 kHz for MF equipment or 8 291 kHz for HF equipment (the operator shall have the option to change the frequency).

After the transmission of the GEOGRAPHIC call, the equipment shall automatically tune to selected working frequency and select the maximum transmitter power.

5.2.4 DSC call functionality

The following DSC calls shall be available in the equipment.

Table 1

CALL TYPE	Tx	Rx	Format specifier	Notes
Distress alert (RT)	Y	Y	112	
Distress alert (FEC)	N	Y	112	Subsequent comms 113
Distress acknowledgement (RT)	#	Y	116	
Distress acknowledgement (FEC)	#	Y	116	Subsequent comms 113
Distress relay individual (RT)	#	Y	120	This includes DROBOSE
Distress relay Individual (FEC)	#	Y	120	Subsequent comms 113
Distress relay Geographic area (RT)	#	Y	102	
Distress relay Geographic area (FEC)	#	Y	102	Subsequent comms 113
Distress relay All Ships (RT)	#	O	116	
Distress relay All Ships (FEC)	#	O	116	Subsequent comms 113
Distress relay ACK Individual (RT)	#	Y	120	
Distress relay ACK All Ships (RT)	#	O	116	
Distress relay ACK Individual (FEC)	#	Y	120	
Distress relay ACK All Ships (FEC)	#	O	116	
Geographic area RT call	Y	Y	102	Urgency (110) and Safety (108) only
Individual RT call	N	Y	120	Urgency (110) and Safety (108) only
Individual RT call acknowledgement	Y	N	120	Urgency (110) and Safety (108) only
Individual RT call acknowledgement "unable to comply"	Y	Y	120	Urgency (110) and Safety (108) only
Individual test call	Y	Y	120	Safety (108) only
Individual test call acknowledgement	Y	Y	120	Safety (108) only
Routine group call RT	Y	Y	114	
Routine individual RT call	Y	Y	120	
Routine individual RT call with position	Y	N	120	
Routine individual RT ACK	Y	Y	120	
Position request	N	Y	120	Safety (108) only
Position request ACK	Y	N	120	Safety (108) only
Distress Alert Cancel	Y	Y	112	This is the 'self addressed' distress ACK

If any other calls, not listed in table 1, are implemented in the device, they shall comply with tables A1-4.1 to A1-4.9 of Recommendation ITU-R M.493-14 [2]. Individual routine category polling and position calls from previous versions of Recommendation ITU-R M.493 may be implemented for the sake of reverse compatibility.

Call types marked # shall not be available in the equipment.

Call types marked Y shall be available in the equipment.

Call types marked N are not required to be available in the equipment.

Call types marked O are for reverse compatibility with older equipment.

6 Automated and Non-Automated Procedure Requirements in Class E DSC Equipment

6.1 Introduction

This clause covers the minimum level of software automation, operational simplicity, and interface consistency requirements for shipborne fixed installations using class E Digital Selective Calling equipment.

Perhaps the most important issue concerns an implied expectation for the use of the terminology "automated procedure" as used in the present document to appear in the user interface. The terminology "automated procedure" describes the set of algorithms that are used to encapsulate all the activities necessary to perform DSC, and non DSC communication events. The operator does not need to know anything about the existence of automated procedures in order to operate a radio that makes use of these algorithms. Though the present document refers to items such as the "Sending Distress Automated Procedure" such language shall not appear on the user interface of the equipment.

The primary purpose of DSC signalling is to provide the means to set-up subsequent communications between vessels and/or coast stations. A call may be considered as being the total duration from the start of the DSC signalling until the end of the subsequent communications, and the automated procedure is terminated.

The operational functionality described in the present document has the objective of not disturbing any ongoing call. Furthermore, the equipment shall assist the operator by providing simple audible indication of a received DSC call whilst the equipment is engaged and if that received DSC call is of a higher priority than the call in progress then the equipment shall be capable of displaying the information of this new call.

6.2 Non-automated features

6.2.0 Introduction

This clause describes the features of the equipment that are necessary to assure compliance to the ITU-R DSC functionality standards and support a smoother operation of the automation algorithms, but are not directly related to the automation algorithms.

6.2.1 DSC Message Composition

The equipment shall provide factory default values for all non distress DSC messages as specified in Recommendation ITU-R M.493-14 [2], annex 3 and summarized in figure A.1 for all parameters where the operator has the option to select or enter more than one value and has not already done so.

The default values for the operator-composed distress alert shall be the default distress alert as specified in the sent distress automated procedure.

A destination MMSI that does not have at least 9 digits entered is invalid.

No DSC message shall be able to be sent that has an invalid parameter.

For simplicity of the user interface:

a) the DSC message composition interface shall be such that the operator needs no user manual to initiate the desired DSC message;

b) parameter descriptions and terms shall be provided in plain language;

c) all parameters of the DSC message that do not require an operator choice shall be entered automatically;

d) guidance and/or prompting shall be provided for the entry of any necessary parameters of the DSC message if these parameters and/or their values are not plainly visible from context or on the display.

For data entry:

a) the equipment shall only allow the operator to compose and send DSC messages that are compliant with clause 5.2.4;

b) acknowledgements shall be automatically composed by the equipment and user options for these acknowledgements are provided by the automated procedures;

c) the equipment shall provide the operator with the choice of specifying the geographic area parameters as either a circle of radius 'r' about a centre point or the traditional latitude-longitude Mercator box and northwest corner point or about a centre point;

d) the equipment shall convert and round the radius-centre point entry according to the algorithm given in annex B;

e) the equipment shall provide an automatic determination of the channel and or frequencies of subsequent communication according to the algorithm given in Recommendation ITU-R M.493-14 [2], annex 3 and summarized in annex C.

The automated channel selection shall be able to be overridden.

It shall not be possible to select a distress channel for subsequent communications for DSC messages of priority routine.

The equipment shall automatically set the dot pattern length to 20 bits for all transmitted DSC messages addressed to a coast station and all individual acknowledgements with format specifiers 120 and 123.

Furthermore MF/HF equipment shall automatically set the dot pattern length to 200 bits for all transmitted DSC messages for:

- distress alerts;
- all calls addressed to a ship station other than messages addressed to a coast station or all individual acknowledgements with format specifiers 120 and 123.

6.2.2 Transmission of DSC messages and prioritized wait

If the transmit frequency is free the transmission shall begin immediately. If the transmit frequency is not free, and the DSC message is a distress alert, the alert shall be transmitted as soon as the channel becomes free or after 10 seconds, whichever occurs first. (The 10 seconds value is approximate average duration of a MF/HF DSC message.) For all other DSC messages, the equipment shall wait for the transmit frequency to become free and then the equipment shall delay transmission of the DSC message for a specified wait time.

The specified wait time shall depend upon the message type and priority. Distress DSC messages (except for alerts), urgency, safety, routine and test DSC messages shall wait one, two, three, and four "fixed" units of time plus a random addition described below, respectively, before attempting to transmit. Transmission occurs if and only if the channel is still free after this wait time has elapsed, otherwise the process is repeated.

The fixed "unit" of time shall be 100 milliseconds. The randomly generated component shall be some positive integer with resolution in milliseconds between zero and the fixed interval. The randomly generated part of the wait time shall be recomputed for every transmission attempt.

6.2.3 Alarms

Alarms shall have both a visual and aural component.

Any alarm that initiates for the purpose of getting the operator's attention shall provide the reason for and means to terminate the alarm.

Alarms shall be initiated for the reasons given in table D.1.

The means to terminate the alarms are given in table D.1.

The "two-tone" and "urgency-sound" alarms shall not be able to be disabled.

Those aural alarms are given by table D.2.

Alarms for other calls are specified in clause D.4.

6.3 Standby

NOTE: Standby is the state of the equipment when it is not engaged in a communications or DSC automated procedure.

The following functions and or information shall be available to the operator at top level while in standby:

a) the dedicated distress button;

b) a clearly labelled means to compose/send a non distress DSC message.

The following functions and or information shall be accessible to the operator via a maximum of two menu layers:

a) the station MMSI;

b) the latest (enhanced) position of the vessel;

c) the UTC time of that position;

d) a clearly labelled means to compose a distress alert prior to sending.

The following configuration options for acknowledgements and timers shall be available with the following factory defaults:

a) the option to auto acknowledge test DSC messages: set to on;

b) the option to auto acknowledge individually addressed, non distress DSC messages: set to off (see clause 6.7.7);

c) the option to set the maximum distance for sounding a two-tone alarm that does not self terminate upon initiation of a received distress automated procedure to some value greater than or equal to 500 nautical miles that includes "never self terminate": set to 500 nautical miles;

d) the option to set the no activity timeout to exit any non automated procedure activity to some value that includes no timeout: set to 10 min;

e) the option to set the no activity timeout of non distress DSC automated procedures to some value that includes no timeout: set to 15 min;

f) the option to set the no activity timeout of received distress DSC automated procedures to some value that includes no timeout: set to no timeout;

g) that there is no option to set any timeout of the unacknowledged sending distress automated procedure;

h) the option to set the no activity timeout of communications automated procedures to some value in the range 10 seconds to 10 min: set 30 seconds;

i) the option to auto acknowledge position request DSC messages: set to off.

A record of the DSC activity shall be available containing the following information which shall be able to be displayed:

a) The UTC time of reception and date (if available).

b) The frequency of reception.

c) The information content of the DSC message.

d) A minimum of the twenty most recently received DSC distress alert attempts and DSC messages with the category "distress". A single or multi frequency alert attempt shall be recorded as a single DSC message with an indication of how many of the alerts in the attempt were received. DSC alerts received on the same frequency within a period of 60 seconds shall be considered part of the same distress alert attempt. Consecutive alerts received on different frequencies within a period of 60 seconds shall be considered a multi frequency attempt. In both cases, the information characters assimilated by the automated procedure handling the distress alerts shall be the recorded information characters. In other words, if any errors in the information characters of a received alert are corrected by the reception of other alerts within the attempt, only the corrected version shall be recorded.

e) A minimum of the twenty most recently sent DSC messages, where a distress alert attempt is recorded as a single message.

f) A minimum of the twenty most recently received non distress DSC messages.

6.4 Sending distress automated procedure (need to be revised to HF multifrequency alert attempts)

6.4.1 Procedure

The sending distress automated procedure results when the operator presses the dedicated distress button to send a distress alert attempt. An informative schematic of the outline automated procedure is given in figure 1.

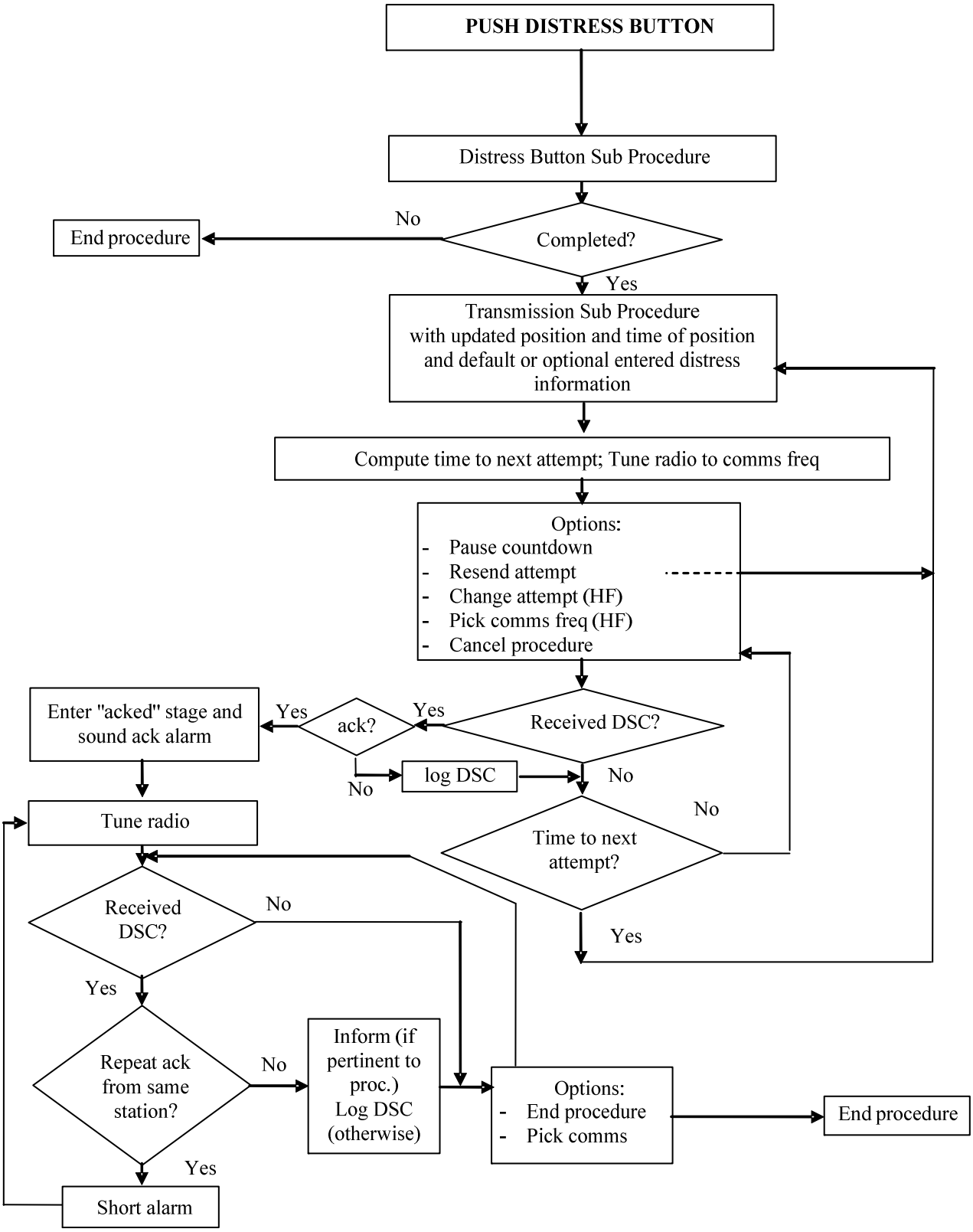


Figure 1: Sending distress procedure

6.4.2 Tasks

The radio shall follow the sending distress automated procedure as shown in figure 1.

The sending distress automated procedure shall handle the following events:

a) the distress button sub procedure;

b) prior to this procedure being acknowledged:

   1) on HF the setting of the watch receiver to scan all six distress frequencies (if not already doing so);

   2) the transmission of the alert attempt;

   3) calculating the time to an automated resending of the attempt (random, between 3,5 min and 4,5 min);

   4) tuning to the subsequent communication frequency (upon conclusion of the attempt);

   5) waiting for the reception of a distress alert acknowledgement;

   6) logging all other received DSC messages assuring they do not disrupt the procedure;

   7) retransmission of the alert attempt occurs after the calculated resend timer expires (3);

   8) providing the valid operator options which are:

      i) pausing the countdown to automated resending;

      ii) resending the alert attempt, with the last entered other parameters, using the dedicated DISTRESS button;

      iii) cancelling the alert attempt;

      iv) selecting amongst the six frequencies of subsequent communications (HF only);

c) after reception of the acknowledgement:

   1) stopping the automatic resending of the alert attempt;

   2) transmitting any remaining single alert of the attempt to completion;

   3) log received DSC messages not pertinent to the procedure in the appropriate call log;

   4) providing the valid operator options which are:

      i) selecting amongst the six frequencies of subsequent communications (HF only);

      ii) terminating the automated procedure.

6.4.3 Display

During the sending distress automated procedure the radio shall display the following items and/or information as appropriate at top level:

a) the fact one is engaged in sending a distress;

b) the distress information;

c) a warning before the automated resending of the attempt in case engaged in traffic;

d) the MMSI of the sender of the distress acknowledgement;

e) the sub-stages of the procedure:

   1) transmitting;

   2) waiting for acknowledgement;

3) alert acknowledged;

f) and the valid operator options.

During the sending distress automated procedure the radio shall make the following items and/or information accessible to the operator from top level:

a) the time remaining to the next automated resending of the attempt (prior to acknowledgement);

b) the elapsed time since receiving the distress alert acknowledgement (after acknowledgment).

6.4.4 Dedicated distress button sub procedure

The dedicated distress button shall be used for the following purposes in the following manner:

a) Use of the dedicated distress button is required to initiate the sending distress automated procedure.

b) The dedicated distress button shall be used exclusively for initiating the sending distress automated procedure.

c) Use of the dedicated distress button after entering parameters of the alert attempt via a menu or equivalent shall initiate the sending distress automated procedure with the alert attempt as composed by the operator.

d) Use of the dedicated distress button without entering parameters of the alert attempt via a menu or equivalent shall initiate the sending distress automated procedure with the default alert attempt. The default alert attempt is given by the following:

1) undesignated nature of distress;

2) the latest position of the vessel;

3) the UTC time of that position;

4) radio telephone for subsequent communication;

5) a single frequency alert attempt on MF;

6) multi frequency alert for HF.

Use of the dedicated distress button without entering parameters of the alert attempt via a menu or equivalent shall initiate the sending distress automated procedure with the default alert attempt regardless of the state of the radio, except when the radio is already engaged in the sending distress automated procedure.

The distress button sub procedure of the sending distress automated procedure shall be as follows:

a) Lifting of the spring loaded lid or cover, permanently attached to the equipment by, for example, hinges. This is ACTION 1.

b) Pressing and holding the distress button (ACTION 2) while:

i) displaying the seconds remaining to transmission of the attempt starting at three; and

ii) invoking an intermittent audio and intermittent visual alarm once each second.

c) If the distress button is released before the three seconds have elapsed stop the procedure (when releasing the button the radio shall return to its previous state).

d) When the three seconds have elapsed regardless of whether the button is continued to be held down or released completes ACTION 2 and the alert attempt is started.

e) Sounding a steady tone of two-second duration after ACTION 2 has completed and displaying a visual indication that the distress alert attempt has been sent.

6.4.5 Transmission of the alert attempt

The transmission sub procedure of the sending distress automated procedure shall be as follows:

a) the default distress alert is always a single frequency alert;

b) the default transmission frequency is always 2 187,5 kHz for MF equipment or 8 414,5 kHz for HF equipment;

c) the transmission starts;

d) the countdown to the next automated resending of the attempt is started;

e) if a distress acknowledgement is received the attempt shall cease after completion of any ongoing distress alert within the attempt;

f) five alerts shall be sent without a break between alerts;

g) the extended position information shall be sent only on completion of the 5^{th} alert.

6.4.6 Updating position

When a distress alert attempt is resent it shall update the position and UTC time of position information.

6.4.7 Handling received DSC Messages

Prior to acknowledgment of the sending distress automated procedure only the distress acknowledgement describing the same distress event is pertinent to the procedure. However, after transmission of a distress alert, the position request acknowledgment of that particular radio should be activated automatically and then stay active until reset by the user. The Position Request Acknowledgement should be sent automatically by the equipment if requested. All other DSC messages shall be ignored and only recorded in the log.

After the sending distress automated procedure has been acknowledged all DSC messages describing the same distress event are pertinent to the procedure and may be ignored. DSC messages not pertinent to the procedure shall be logged.

6.4.8 Alarms

The reception of the first distress alert acknowledgement pertinent to the procedure shall sound a distress acknowledgement alarm. Any subsequent acknowledgement shall only sound the self terminating alarm.

6.4.9 Determining Subsequent communications

Always 2 182 kHz and J3E mode for MF equipment or 8 291 kHz and J3E mode for HF equipment.

6.4.10 Automated tuning

Automatic tuning to the subsequent communications frequency shall occur after transmission of the first distress alert attempt.

On HF the operator shall have at least a 10 seconds warning prior to an automated resending of the alert attempt where the operator may pause the resending in case engaged in traffic.

Upon reception of the first distress alert acknowledgement, the tuning shall occur after the manual silencing of the alarm.

Subsequent acknowledgements from the same source demanding changes in subsequent communication frequencies shall occur automatically.

Subsequent acknowledgments from a different source shall indicate to the operator by some means that a change in frequency is requested, however, in the absence of any operator action, the tuning shall not occur.

6.4.11 Cancelling the Distress Alert

The distress cancel procedure consists of the cancel operation on all bands utilized by the distress alert attempts. The cancel operation consists of a DSC cancel (a self-addressed distress alert acknowledgement) followed by a voice cancel on the corresponding frequency of subsequent communication. The phrase "voice cancel" refers to the part of the cancel done over the subsequent communication frequencies whether it is by radio telephony or on MF and MF/HF by data.

Cancellation of a distress alert shall only be possible prior to acknowledgement.

Selection of the cancellation option during the sending of a distress alert attempt shall stop the transmission as soon as possible but only after any ongoing distress alert within the distress alert attempt is completed.

Upon selection of the cancel option the equipment should provide an explanation of the cancel procedure, and for HF the frequencies requiring cancellation shall be indicated to the operator.

The radio shall prompt the operator to confirm continuing with the cancel, or to abort the cancel procedure. If the latter is selected the sending distress automated procedure will be resumed.

If the user confirms the distress cancel then:

a) if the distress alert was sent on MF, transmit the distress cancel on 2 187,5 kHz;

b) if the distress alert was sent on HF, transmit the distress cancel on the DSC distress frequencies of all bands that were used for the HF distress alerts.

After the transmission of all of the self-addressed distress alert acknowledgments, the general receiver and transmitter shall in a sequence automatically be tuned to the subsequent communication frequency for all channels the cancel distress DSC call have been transmitted on. For each channel the operator shall be prompted to make the voice cancellation and the appropriate text for the voice cancellation shall be displayed. The operator shall acknowledge the voice cancel on each channel before the equipment is tuned to the next communication frequency.

Frequencies that have been cancelled shall be indicated.

On HF once any single channel is cancelled, the operator shall be unable to exit the cancel procedure until all utilized channels have been cancelled.

Completion of the cancellation shall place the sending distress automated procedure in the acknowledged state.

The radio shall display to the operator the stages of the cancellation procedure such as "waiting for the operator to proceed" or equivalent, "transmitting the DSC cancel" or equivalent, "radio tuned for the voice cancel", or equivalent, "cancel procedure done" or equivalent.

6.4.12 Acknowledgments

The procedure shall be considered acknowledged upon reception of the first distress alert acknowledgement concerning the same distress event.

6.4.13 Termination

Prior to acknowledgement the procedure cannot be terminated either by the operator or the equipment; it may only be cancelled as described in clause 6.4.11.

After acknowledgment, the procedure may only be terminated manually.

After a sending distress automated procedure the equipment should not automatically start displaying any new unread DSC messages from memory.

6.4.14 Warnings

The procedure shall provide warnings for incorrect entered parameters. The operator shall have the option to go back to the stage of the procedure where the action was taken that caused the warning.

6.5 Receiving distress automated procedure

6.5.1 Procedure

The receiving distress automated procedure is initiated by the reception of the first multi-station distress DSC message of a distress event. An informative schematic of the outline automated procedure is given in figure 2.

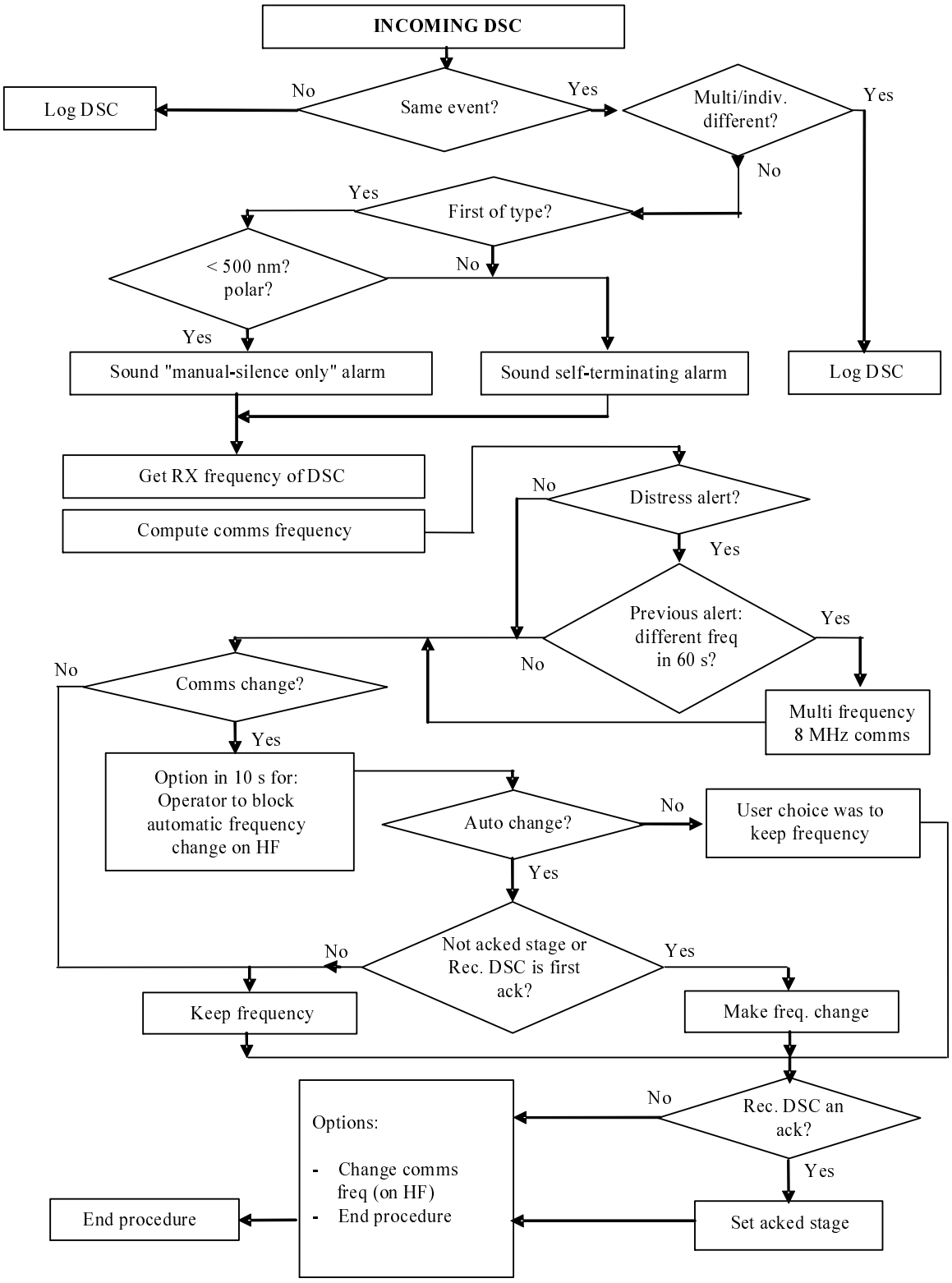


Figure 2: Receiving distress procedure

6.5.2 Tasks

The radio shall follow the received distress automated procedure as shown in figure 2.

The received distress automated procedure shall handle the following events:

a) the sounding of the appropriate alarms for DSC messages pertinent to the procedure;

b) logging all DSC messages pertinent to the station but not the procedure to the call log;

c) on HF keeping track of the frequencies of reception;

d) on HF appropriate tuning to the frequency and mode of subsequent communication and providing at least a 10 seconds warning if that tuning involves a change from the current tuning and the option to pause the tuning;

e) on HF scanning all 6 distress frequencies;

f) watching for the distress event acknowledgement or recognizing the self cancel;

g) providing the operator with the option to:

   1) on HF to change the frequency of subsequent communication;

   2) end the procedure.

6.5.3 Display

During the received distress automated procedure the radio shall display or make available to the operator the following items and/or information:

a) the fact one is engaged in receiving a distress;

b) the elapsed time since the procedure started (prior to acknowledgment);

c) the elapsed time since acknowledgement (after acknowledgment);

d) the latest distress information (MMSI of vessel in distress, nature of distress, position, time of position, comms);

e) the type (alert, relay, alert acknowledgement, relay acknowledgement), sender, and intended destination (individual, area, all ships) of the latest received DSC message;

f) at least a 10 seconds warning before any automated change in communications frequencies are invoked in case engaged in traffic;

g) the frequency of subsequent communication (HF only);

h) the frequencies on which the DSC messages have been received (HF only);

i) displaying the valid user options;

j) the ability to display information about the history of at least the received DSC messages pertinent to the procedure;

k) and the sub-stages of the procedure which are:

   1) waiting for acknowledgement;

   2) cancelled;

   3) acknowledged.

At top level the elapsed time, the stage of the automated procedure, and operator options shall be displayed.

6.5.4 Handling received DSC Messages

DSC messages pertinent to the station but not the procedure shall be automatically placed in the received call memory and is flagged as an "unread call in memory".

DSC messages that are pertinent to the procedure are all DSC messages concerning the same distress event. If the MMSI is unknown, DSC messages that are pertinent to the procedure are all DSC messages that have the same distress information (format specifier, nature of distress and subsequent communication - allow updated position and time). However, individually addressed DSC messages shall simply be logged if engaged in a received distress procedure handling multi-station (for example, all ships, area) addressed DSC messages or vice versa.

6.5.5 Alarms

In a given procedure, only the reception of the initial DSC message and the DSC message that first acknowledges the procedure shall sound an alarm unique to the DSC message type (with the two-tone sound reserved for the distress alert or relay if it initiates the procedure) which shall be manually silenced.

All subsequent examples of the DSC messages shall only sound the self terminating alarm.

6.5.6 Determining Subsequent communications

The subsequent communications frequency will be the distress telephony frequency in the same band as the received distress alert using J3E mode.

Table 2

Distress alert received on	Subsequent comms frequency
2 187,5 kHz	2 182 kHz
4 207,5 kHz	4 125 kHz
6 312 kHz	6 215 kHz
8 414,5 kHz	8 291 kHz
12 577 kHz	12 290 kHz
16 804,5 kHz	16 420 kHz

6.5.7 Automated tuning

The tuning to the subsequent communication frequencies as determined in clause 6.5.6 shall occur automatically upon reception of a distress DSC message in the following manner:

a) on HF the operator shall have a 10 seconds warning prior any tuning if the new subsequent frequency is different from the current;

b) the operator shall be able to pause the tuning in case engaged in traffic or accept the tuning;

c) prior to acknowledgement, the tuning to the new frequency shall occur in the absence of any operator action;

d) after acknowledgment the tuning to the new frequency shall only occur if the operator requests it (note that the procedure is not yet acknowledged until after the first acknowledgement starts the alarm).

6.5.8 Acknowledgments

The procedure handling all-ships distress DSC messages and distress alerts shall be considered acknowledged upon reception of the first distress alert acknowledgement or all ships distress relay acknowledgement.

A self addressed distress alert acknowledgement sent by the vessel in distress shall be recognized as a self cancel.

6.5.9 Termination

The procedure can be terminated manually or by the automated timeout. At least ten seconds prior to automated termination, a visual and discrete aural warning shall be displayed with the option to stop the automatic termination.

Once the procedure is terminated either by the user or automatic timeout, the equipment will automatically display any unread messages in memory, starting with the message with the highest priority as indicated in clause 6.9.

If the procedure is terminated manually by the user then integrated equipment may revert to the frequency that was previously selected before the DSC procedure.

6.5.10 Warnings

The procedure shall provide warnings for incorrect entered parameters. The operator shall have the option to go back to the stage of the procedure where the action was taken that caused the warning.

6.6 Sending non distress automated procedure

6.6.1 Procedure

The sending non distress automated procedure results when the operator selects to transmit a DSC message that does not contain the distress information. It also results when an acknowledgement to a sending non distress automated procedure that has been prematurely terminated is received ("an acknowledgement one quit waiting for"). An informative schematic of the outline automated procedure is given in figure 3.

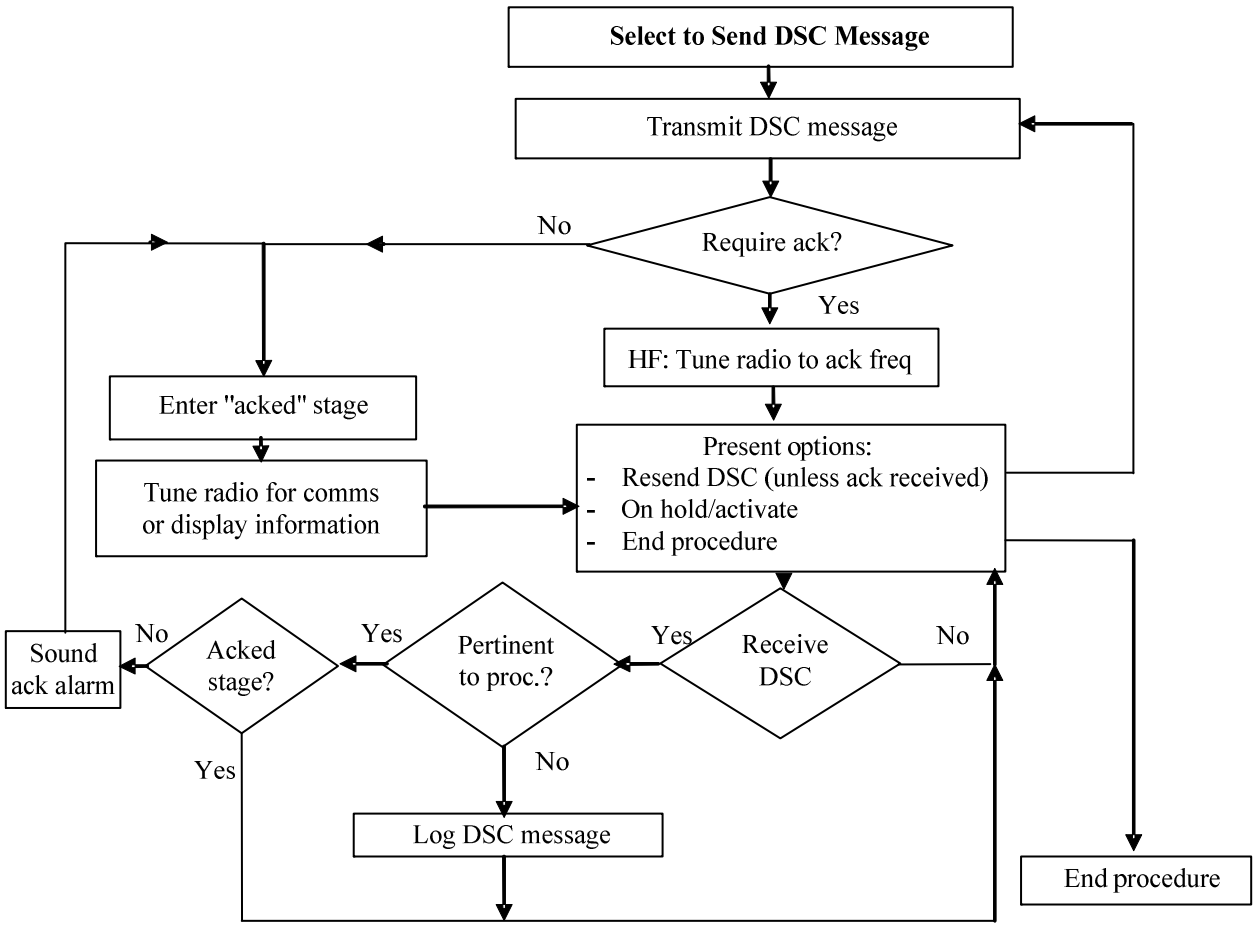


Figure 3: Sending non distress automated procedure

6.6.2 Tasks

The radio shall follow the sending non distress automated procedure as shown in figure 3.

The sending non distress automated procedure shall handle the following events:

a) prior to acknowledgement:

   1) the transmission of the composed/selected DSC message;

   2) if the DSC message demands no acknowledgment setting the procedure to acknowledged;

   3) if the DSC message demands an acknowledgement:

      i) on HF tuning the general receiver to the frequency of the DSC acknowledgement if required;

      ii) waiting for the acknowledgement and alarming when received;

      iii) any received DSC message pertinent to the station but not the procedure shall be treated according to clauses 6.9.1 and 6.9.2;

      iv) providing the valid operator options which are:

         - resend the initial DSC message;

         - terminate the procedure;

b) upon reception of an "able to comply" acknowledgement or being set to acknowledged:

   1) tuning the general receiver and transmitter to the frequency of subsequent communication or displaying the requested information;

   2) ignoring any received DSC message pertinent to the procedure since it is a duplicate;

   3) any received DSC message pertinent to the station but not pertinent to the procedure shall be treated according to clauses 6.9.1 and 6.9.2;

   4) providing the valid operator options which are:

      i) resend the initial DSC message if it requires no acknowledgement;

      ii) terminate the procedure;

c) upon reception of an "unable to comply" acknowledgement it shall display the reason given.

6.6.3 Display

During the sending non distress automated procedure the radio shall display or make available to the operator the following items and/or information:

a) the fact one is engaged in sending a non distress DSC message;

b) the elapsed time since sending the initial DSC message (prior to acknowledgement); or

c) the elapsed time since being acknowledged (once acknowledged or considered acknowledged);

d) the information content of the initial DSC message sent which is:

   1) the type of DSC message (description);

   2) the priority of the DSC message;

   3) the destination;

   4) the frequencies of subsequent communication if any;

   5) on HF the frequency of the sent DSC message;

6) whether or not the DSC message requires an acknowledgement;

e) if acknowledged, the information content of the acknowledgement which is:

1) the type of acknowledgment (description);

2) the priority of the DSC acknowledgement;

3) the sender;

4) to whom the DSC acknowledgement was sent;

5) the means of subsequent communication or the requested information;

6) if appropriate the frequency change or unable to comply and reason;

7) the frequencies of subsequent communication if any;

8) on HF the frequency of the acknowledgement;

f) the valid operator options; and

g) the sub-stages of the procedure which are:

1) waiting for free channel;

2) transmitting;

3) waiting for acknowledgement;

4) linked for communications;

5) procedure done (no more to do).

At top level the elapsed time, the stage of the automated procedure, and operator options shall be displayed.

6.6.4 Handling received DSC Messages

Any received DSC message pertinent to the station but not pertinent to the procedure shall be treated according to clauses 6.9.1 and 6.9.2.

DSC messages that are pertinent to the procedure are acknowledgements to the initial DSC message.

6.6.5 Alarms

The reception of the first acknowledgement pertinent to the procedure shall sound the appropriate acknowledgement alarm as specified in tables D.1 and D.2.

Any subsequent acknowledgement may be ignored as only individually addressed non distress DSC messages have acknowledgements.

6.6.6 Automated tuning

On HF, DSC messages using the duplex DSC channels requiring acknowledgements shall tune the general receiver to the anticipated frequency of the DSC acknowledgement.

If the DSC message requires subsequent communications, the general receiver and transmitter shall be tuned to the frequencies given in the acknowledgement upon reception of the "able to comply" acknowledgement.

If the acknowledgement received is "unable to comply" the radio shall not tune to the originally proposed frequency.

If the acknowledgement received is "able to comply" but proposes a new working frequency that is not available the radio shall not tune to the proposed frequency, but inform the operator that he has to make a new call request to the called station.

If no acknowledgement is required the transmitter shall be tuned to the frequency of subsequent communications given by the initial DSC message.

6.6.7 Delayed Acknowledgements

If an acknowledgement to a sending non distress automated procedure is received after the procedure has been prematurely terminated, the automated procedure shall initiate itself recreating the initial DSC message based upon the acknowledgement. The procedure shall inform the operator that "an acknowledgement that the equipment quit waiting for" has been received. If the acknowledging station responded with "unable to comply" acknowledgement it shall display the reason given.

6.6.8 Termination

Termination is done manually or by the automated timeout. At least ten seconds prior to automated termination, a visual and discrete aural warning shall be displayed with the option to stop the automatic termination.

Once the procedure is terminated either by the user or automatic timeout, the equipment will automatically display any unread messages in memory, starting with the message with the highest priority as indicated in clause 6.9.

If the procedure is terminated manually by the user then integrated equipment may revert to the frequency that was previously selected before the DSC procedure.

6.6.9 Warnings

The procedure shall provide warnings for incorrect entered parameters. The operator shall have the option to go back to the stage of the procedure where the action was taken that caused the warning.

6.7 Receiving non distress automated procedure

6.7.1 Procedure

The received non distress automated procedure results when a DSC message is received that does not contain the distress information and is not an acknowledgement. An informative schematic of the outline automated procedure is given in figure 4.

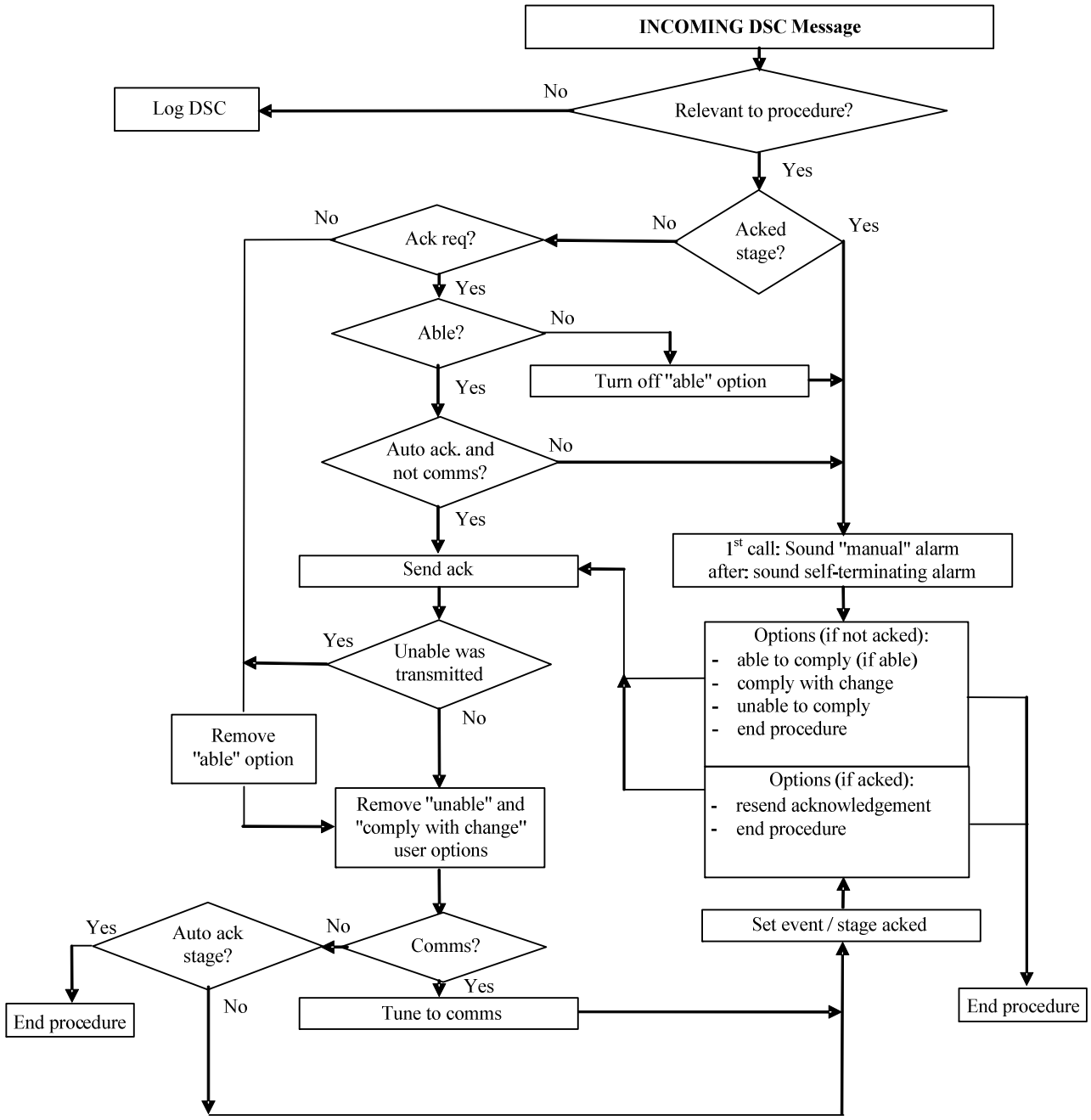


Figure 4: Receiving non distress procedure

6.7.2 Tasks

The radio shall follow the received non distress automated procedure as shown in figure 4.

The received non distress automated procedure shall handle the following events:

a) sound the appropriate alarms at the appropriate times for DSC messages pertinent to the procedure;

b) received DSC messages pertinent to the station but not the procedure shall be treated according to clauses 6.9.1 and 6.9.2;

c) denote the procedure as acknowledged if the DSC message requires no acknowledgement;

d) provide and compose the acknowledgement options as dictated by the initial DSC message;

e) on HF tune the transmitter to the appropriate DSC frequency for any selected acknowledgement if an acknowledgement is required;

f) tune the general receiver and transmitter to the frequencies of subsequent communications when and if required;

g) provide the operator with the option to:

1) prior to acknowledgment:

i) comply if able;

ii) comply with frequency change if there are communications;

iii) unable to comply;

iv) end the procedure;

2) after acknowledgement or being considered acknowledged:

i) resend the acknowledgment (after sending the first acknowledgment);

ii) end the procedure.

6.7.3 Display

During the received non distress automated procedure the radio shall display or make available to the operator the following items and/or information:

a) the fact one is engaged in receiving a non distress DSC message;

b) the elapsed time since the procedure started (prior to acknowledgment); or

c) the elapsed time since acknowledgement (after acknowledgment);

d) at least a 10 seconds warning before any automated change in communications frequencies are invoked in case engaged in traffic;

e) the information content of the received DSC message:

1) priority (category);

2) the sender;

3) to whom the DSC message was sent (format and MMSI);

4) means of subsequent communication or the requested or sent information;

5) frequencies of subsequent communication (if any);

6) on HF the frequency of the DSC message;

7) whether or not the DSC message requires an acknowledgement;

f) the information content of any acknowledgment sent:

1) priority;

2) the destination;

3) the communication frequency, or unable to comply and reason; or info

4) on HF the frequency of the acknowledgment;

g) displaying the valid user options; and

h) the sub-stages of the procedure which are:

1) waiting to send acknowledgement;

2) transmitting;

3) acknowledged;

4) waiting for a free channel.

At top level the elapsed time, the stage of the automated procedure, and operator options shall be displayed.

6.7.4 Handling received DSC messages

DSC messages pertinent to the station but not the procedure shall treated according to clause 6.9.

DSC messages that are pertinent to the procedure are repeats of the initial DSC message.

6.7.5 Alarms

When auto acknowledging position, poll, and test DSC messages, no alarm shall sound.

When auto acknowledging is not involved, an alarm shall sound and be terminated as specified in tables D.1 and D.2.

All repeat initial DSC messages shall sound the self-terminating alarm.

6.7.6 Automated tuning

DSC messages requiring acknowledgements shall determine the frequency of the DSC acknowledgement based upon the frequency of the received DSC message. If the channel of the DSC message cannot be determined, the acknowledgment shall be sent on the same frequency as the original DSC message was received (HF only).

If the DSC message requires subsequent communications, the general receiver and transmitter shall be tuned to the frequencies of the subsequent communications given in the acknowledgement if acknowledgments are requested. Otherwise the general receiver shall be tuned to the frequency of subsequent communication given by the initial DSC message:

a) The operator shall have a 10 seconds warning prior any tuning if the new subsequent frequency is different from the current.

b) The operator shall be able to pause the tuning in case engaged in traffic or accept the tuning.

6.7.7 Acknowledgments

Acknowledgment options shall only be provided if the initial DSC message requests an acknowledgement and the acknowledgment option is possible.

EXAMPLE: The "able to comply" option is not possible for an individually addressed DSC message requesting telephony but providing no subsequent communication frequency information.

Only the "comply with mode/frequency change" and "unable to comply" options are possible.

In the case of a received individual call, the radio shall be capable of identifying if the requested working frequency identified in the call is available in the equipment:

- If this frequency is available the radio shall display the call details and compose an "able to comply" acknowledgement which shall only be transmitted manually. Switching to the frequency identified shall only be performed after a manual "able to comply" acknowledgement has been transmitted.

- If this frequency is not available the radio shall display the call details and compose an "unable to comply" acknowledgement with 104 as the first telecommand and 108 as the second telecommand. This acknowledgement may be automatic.

Any "unable to comply" acknowledgement other than that specified above shall be "no reason given".

The "able to comply" option shall only require a single action by the operator to respond (e.g. lifting the handset). The operator shall not be required to compose any elements of this acknowledgement.

The "comply with frequency change" option shall require that the operator be able to enter/select frequencies before sending. The operator shall not be required to compose any other elements of this acknowledgement.

If an acknowledgement is resent by the operator it shall be identical to the first acknowledgment. It shall not be possible to further edit the content.

6.7.8 Termination

When auto acknowledging position, poll and test DSC messages the procedure shall self-terminate after sending the acknowledgement.

When sending an "unable to comply" acknowledgement the procedure shall terminate after completing the transmission.

In all other cases, termination is done manually or by the automated timeout. At least ten seconds prior to automated termination, a visual and discrete aural warning shall be displayed with the option to stop the automatic termination.

Once the procedure is terminated either by the user or automatic timeout, the equipment will automatically display any unread messages in memory, starting with the message with the highest priority as indicated in clause 6.9.

If the procedure is terminated manually by the user then integrated equipment may revert to the frequency that was previously selected before the DSC procedure.

6.7.9 Warnings

The procedure shall provide warnings for incorrect entered parameters. The operator shall have the option to go back to the stage of the procedure where the action was taken that caused the warning.

6.8 Communications automated procedure

6.8.1 Procedure

The communications automated procedure results when the operator engages in communications established by non DSC means. The critical purpose of this simple procedure is to assure that received DSC messages do not interrupt ongoing communications in the same manner that they do not disrupt any of the ongoing automated procedures handling DSC messages.

The communications automated procedure results when:

i) the radio transmitter has been keyed from the standby condition; or

ii) the receiver is activated by the reception of an appropriate signal; or

iii) a new receiver frequency has been selected.

6.8.2 Tasks

The communications automated procedure shall handle the following events:

a) received DSC messages pertinent to the station shall be treated according to clauses 6.9.1 and 6.9.2;

b) tune the general receiver and transmitter to the frequencies of communication;

c) provide the operator with the option to terminate the procedure.

6.8.3 Display

During the communications automated procedure the radio shall display or make available to the operator the following items and/or information:

a) the fact one is engaged in a communications procedure;

b) the frequency in use;

c) the operator options.

The following information shall be accessible to the operator via a maximum of two menu layers:

a) the station MMSI;

b) the latest position of the vessel;

c) the UTC time of that position.

6.8.4 Handling received DSC Messages

All received DSC messages pertinent to the station shall be treated according to clauses 6.9.1 and 6.9.2.

6.8.5 Tuning of the general receiver and transmitter

The procedure shall automatically tune the general receiver and transmitter to the frequencies selected.

6.8.6 Termination

The procedure may either be terminated manually or via an automatic timeout.

6.9 Handling incoming calls while the equipment is engaged

6.9.1 Procedure

This clause describes the handling of received DSC messages that are pertinent to the station while the radio is engaged.

6.9.2 Tasks

6.9.2.0 Introduction

If the radio is engaged in handling an automated procedure, received DSC messages that are pertinent to the station but not the currently active automated procedure are handled as described in this clause.

The equipment may be designed with the option to handle a single background non-terminated automated procedure. Clauses 6.9.2.5 and 6.9.2.6 shall only apply to such equipment.

6.9.2.1 Higher priority calls

6.9.2.1.0 Priority

DSC calls are prioritized according to table 3.

Table 3: Priority of DSC calls

Priority	Call type
Highest	Own Distress Alert
	Other Distress message (most recent)
	Other Distress message (oldest)
	All Ship Distress Ack
	All Ship/Geographic area Distress Relay
	All Ship/Geographical Distress category
	Individual Distress category
	All Ships/Geographical area Urgency
	Individual Urgency
	All Ships/Geographical area Safety
	Individual Safety
	Individual Routine
Lowest	Communication initiated by other means than DSC

If the equipment is engaged on a call and a DSC call is received with a higher priority than the current call the equipment will display the call information of the new call and present the operator with the following options:

a) accept the call; or

b) log the call.

A discrete audible alarm will sound. The radio will not change to any channel specified in the new call unless the operator manually accepts the new call.

6.9.2.1.1 Higher priority calls - acceptance

If the equipment is engaged, and the operator manually accepts this new higher priority call the equipment will:

a) abandon any current automated procedure, and engage in the new call; or

b) if the equipment is designed with the option to handle a background procedure, place the current automated procedure on hold and engage in the new call.

The equipment may then send any DSC response, or any acknowledgement, requested by this new call and select the channel for subsequent communications requested by this call.

6.9.2.1.2 Higher priority calls - non acceptance

If the equipment is engaged, and the operator does not manually accept this new higher priority call, then the new call is automatically placed in the received call memory and is flagged as an "unread call in memory" and the equipment shall not send any DSC response or acknowledgement requested by this new call.

6.9.2.2 Other calls

If the equipment is engaged, and a DSC call pertinent to the station is received with a lower or equal priority to the current call, then the equipment will not display the call information of the new call. The new call is automatically placed in the received call memory and is flagged as an "unread call in memory".

A discrete audible alarm will sound. A visual indicator for unread received calls is activated. The radio will not change to any channel specified in the new call.

If the equipment is designed with the option to handle a background procedure received calls that are pertinent to the background procedure may update the stage of that procedure without alerting the operator.

A discrete audible alarm will sound. A visual indicator is shown indicating the background procedure has been updated. The radio will not change to any channel specified by the procedures stage until the procedure is activated by the operator.

6.9.2.3 Termination of automated procedures

While the operator is engaged in an automated procedure (different from an unacknowledged sending distress procedure) he can chose to terminate the call. The mean shall be clearly identified (e.g. display guided button press). It may also be automatic if a microphone hanger switch or handset switch is used, and the operator is engaged in subsequent communication.

6.9.2.4 Action after termination of an automated procedure

Once the operator has confirmed the termination of the current procedure as in clause 6.9.2.3 the equipment shall:

a) if no unread calls are stored in the memory, enter standby mode;

b) automatically display any unread calls in memory, starting with the call with the highest priority as indicated in table 3, thus initiating and activating the appropriate automated procedure from the stored information;

c) if the equipment is designed with the option to handle a background non-terminated automated procedure (optional), display the updated stage of the automated procedure:

   i) the operator shall now have the option to activate the displayed automated procedure; or

   ii) leave the displayed procedure in the list of non-terminated automated procedures on hold.

6.9.2.5 Putting automated procedures on hold (optional)

If the equipment is designed with the option to handle a background non-terminated automated procedure, it shall be possible for the operator to put the current active automated procedure on hold, by selecting e.g. "pause" or "hold". The user may also achieve this by accepting a higher priority call as described in clause 6.9.2.1.1.

6.9.2.6 Controlling non-terminated automated procedures (optional)

Only one automated procedure can be active at a time (since there is only one transmitter and general receiver in addition to the watch receiver) thus any action to activate the background automated procedure on hold inactivates the currently active automated procedure - and vice versa.

A background automated procedure on hold shall not react to incoming calls unless accepted by the operator, either by accepting a higher priority call (clause 6.9.2.1.1) or terminate the current active procedure (clause 6.9.2.4) thus:

a) the only operator options which are available are those that do not require use of the transmitter or general receiver such as to terminate or activate the automated procedure;

b) any subsequent tunings of the transmitter and general receiver that would occur if the procedure were active upon reception of a DSC message appropriate to the procedure shall not occur until the procedure is activated by the operator;

c) the display of the background automated procedure on hold may be requested by a simple button press or selection, and may be represented by a labelled icon;

d) all other features, including handling of the alarms and full display of information at the request of the operator, remain.

The operator shall be able to activate the displayed background automated procedure on hold by a single action (a button press or selection) unless the currently active procedure is transmitting, thus recreating all information required for continuing the selected automated procedure (e.g. voice frequency).

If the only automated procedure present on the equipment is a background procedure on hold, and incoming or "unread calls" will initiate automated procedures handling test, polling, or position requests and these procedures are setup to auto acknowledge, the equipment shall successively perform the auto acknowledgement and terminate these procedures.

If the operator accepts a call that is not pertinent to the active procedure, and if the new call will initiate a new automated procedure, and if there is already a procedure in the background, the user shall be asked what to do one of the following:

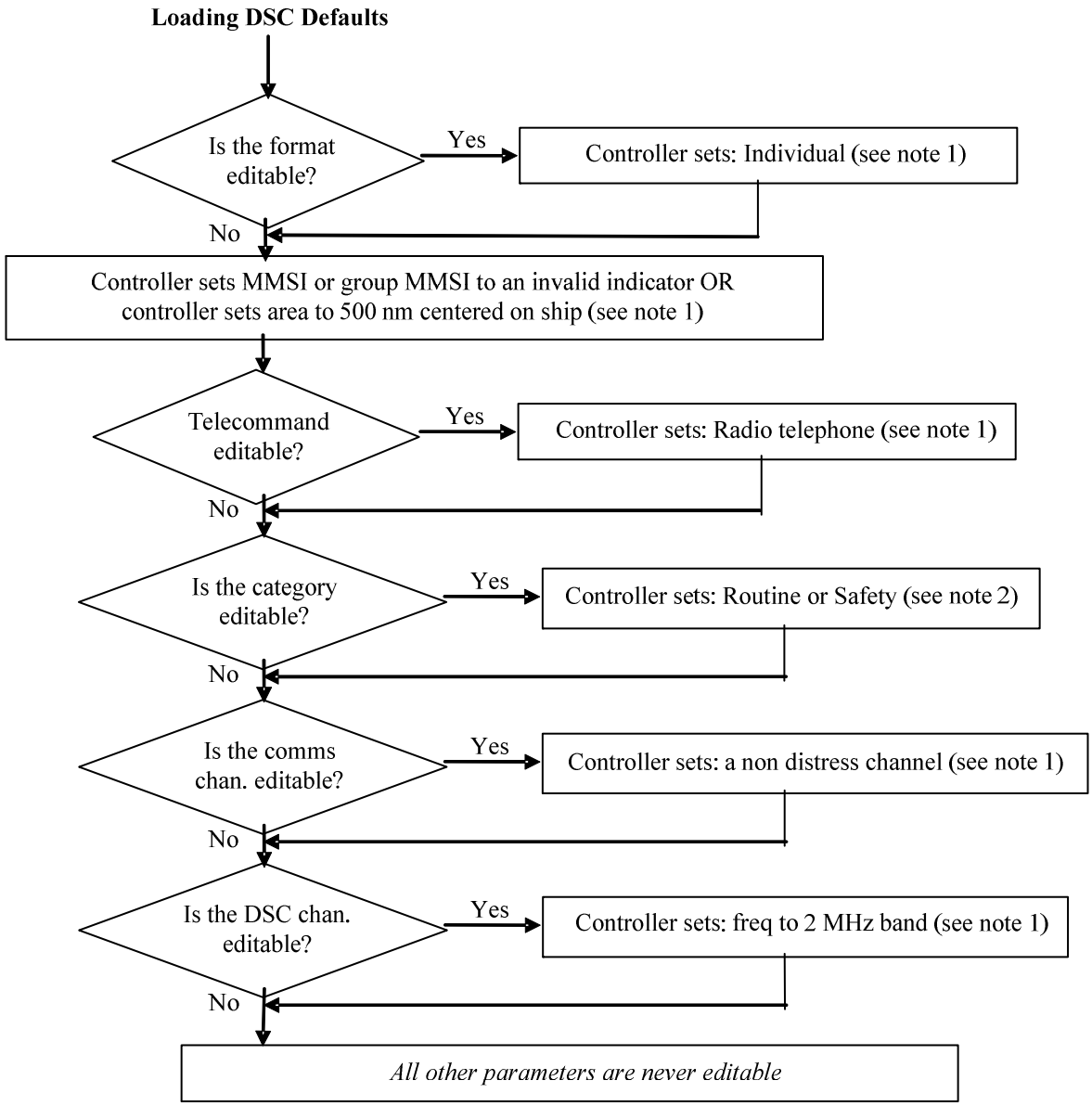
a) put the currently active procedure in the background and initiate the new automated procedure in foreground, hence ending the procedure currently parked in background;

b) cancel the acceptance and log the call as "unread call" in the call log.

Annex A (normative): DSC Message Composition

A.1 Default values

When default parameters are necessary, the factory default values shall be as shown in figure A.1.



NOTE 1: Only if the parameter has not already been set by the operator.
NOTE 2: The default is "routine" if allowed (it is not allowed for area or all ships messages), otherwise the default is "safety". This default is to be reset (the most recently entered value shall be overwritten) when the operator selects the option to compose a non distress DSC message at some later time.

Figure A.1: Loading DSC defaults

Annex B (normative): Radius-centre point conversion and rounding algorithm

B.1 Radius-centre point conversion

The Mercator box specification coded into the DSC message shall be the minimum sized box that encompasses the entire circle as illustrated in figure B.1.

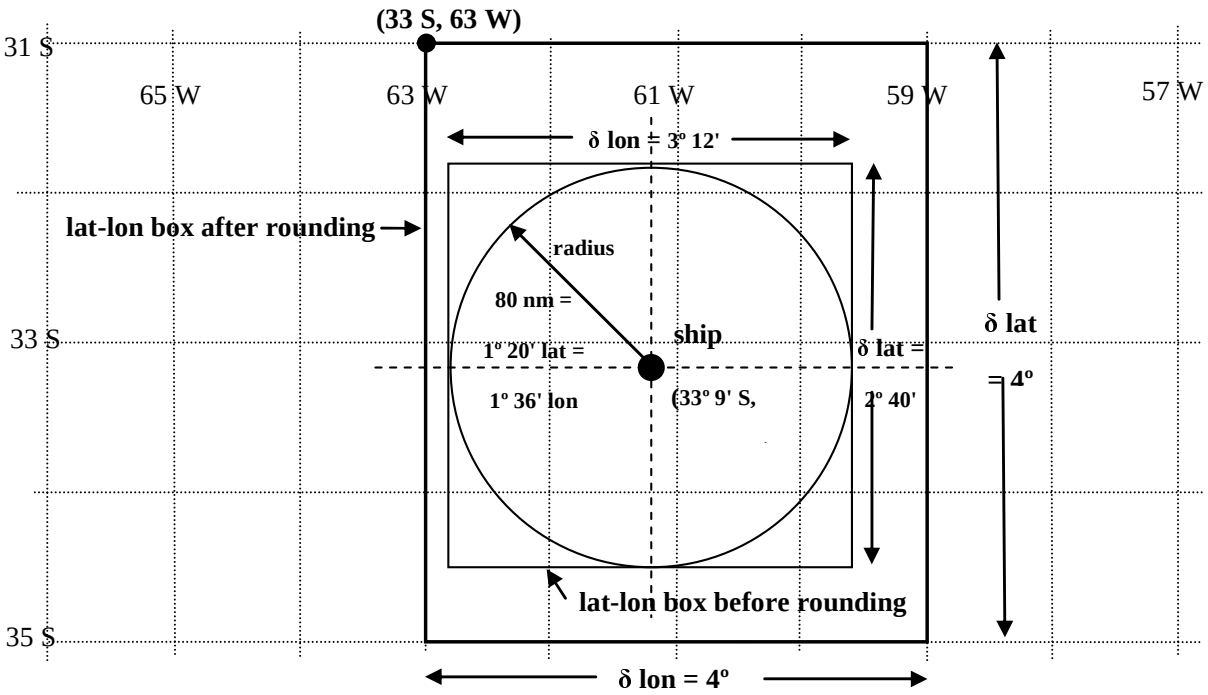


Figure B.1: Circle-radius to lat-lon box

The centre point, radius to northwest corner point, latitude-longitude Mercator box conversion shall take the following steps. The situation shown in figure B.1, a radius of 80 nautical miles cantered on the point (33º 9'S, 61º 10'W) is used as an example in the conversion algorithm below as an illustration.

a) Define the centre point as given by the latitude - longitude point (θ, λ): (33º 9'S, 61º 10'W).

b) The radius shall be converted to units of latitude φ: (80 nautical miles = 1º 20' latitude).

c) The equivalent value in units of longitude shall be given by: $\gamma = \varphi / \cos\theta$, where θ is the latitude of the centre point: 1º 36' longitude = 1º 20' latitude / cos(33º 9'). If the longitude exceeds 49º 00', the longitude shall be truncated to that value since the maximum box width in the DSC sentence is 99º.

d) The dimensions of the Mercator box before rounding shall be given by (2φ, 2γ): (2º 40', 3º 12').

e) The northwest corner point of the Mercator box before rounding shall be given by moving the centre point latitude north by the radius distance φ and the centre point longitude west by the radius distance γ: (33º 9'S + 1º 20'N, 61º 10'W + 1º 36'W) = (31º 49'S, 62º 46'W).

B.2 Rounding

If the enhanced geographic position expansion option is not used, the northwest corner point and Mercator box dimensions shall be rounded. The rounding shall take place as follows:

a) The northwest corner point latitude shall be moved northward to the nearest whole degree latitude and the longitude shall be moved westward to the nearest whole degree longitude.

b) 31º 49'S becomes 31º S, a movement of 49'N and 62º 46'W becomes 63º W, a movement of 14'W.

c) The northward and westward movements needed to round the northwest corner point to whole degrees shall be added to the latitude height and longitude width of the Mercator box:

$$(2º\ 40' + 49', 3º\ 12' + 14') = (3º\ 29', 3º\ 26').$$

d) The final dimensions of the Mercator box shall be rounded upward to the nearest whole degree: (4º, 4º).

B.3 Special cases for either form of area data entry

a) If the final northwest corner point via either entry method exceeds 90ºN it shall be truncated to 90ºN and the latitude height of the Mercator box shall be adjusted accordingly.

b) If the final southern extent of the Mercator box via either entry method exceeds 90ºS the latitude height shall be truncated so that it reaches 90ºS.

c) If the final longitudinal dimension exceeds 99º, the dimension shall be truncated to 99º.

d) If the final latitudinal dimension exceeds 99º, the dimension shall be truncated to 99º.

Annex C (normative): Automated non distress channel selection algorithm

Automated subsequent communications channel selection provides a default channel for the operator for non distress DSC messages requiring subsequent communications based upon a simple algorithm. It shall be applied in the absence of any other specialized means of an automated communication setup.

a) 2 182 kHz for MF equipment or 8 291 kHz for HF equipment shall not be used as a default for routine category DSC messages.

b) If the DSC message is directed toward a ship station, a simplex channel shall be used (for example 2 177 kHz).

c) DSC messages directed toward a coast station shall let the coast station decide (position or all 126's in the frequency parameters of the DSC message).

d) DSC messages directed to a group (area) or all ships shall use the broadcast mode (126's for the TX channel in the frequency parameters of the DSC message).

e) On HF the band of the communication channel shall be in the band of the DSC message.

f) On HF the telephony channel set shall be chosen for voice communications.

The automated channel/frequency selection shall be able to be overridden (which will be necessary to select a distress channel for subsequent communications).

Annex D (normative): Alarms

D.1 Alarm specifications

Table D.1 summarizes the alarm characteristics required by the radio. The "**Event**" is the reason for the alarm. The "**sound**" specifies the default audio character of the alarm whose detailed characteristics are specified in table D.2. The "**increase**" specifies whether or not the alarm shall increase in volume over the first 10 seconds. The "**shutdown**" specifies whether the alarm shall be terminated manually (man), may be silenced automatically (auto), or automatically if the situation causing the alarm is corrected (corr). Manual silencing of alarms is always an option. The "**when aural required**" column specifies the conditions under which the aural alarm is mandatory.

In the event that an alarm is not cancelled manually then automatic cancellation shall take place after 2 minutes.

It is assumed in table D.1 that any references to received DSC messages refer only to messages implicitly or explicitly addressed to the station.

Table D.1: Alarm characteristics

Event	Sound	Increase	Shutdown see note 3	When aural is required
Initiating a received distress automated procedure (see note 1)	two-tone	Yes	Man	Only if within 500 nm of the vessel in distress or if from north of 70ºN or south of 70ºS otherwise alarm self-terminates.
Acknowledging a received distress automated procedure (see note 1)	distress ack	No	Man	Only if within 500 nm of the vessel in distress or if from north of 70ºN or south of 70ºS otherwise alarm self-terminates.
Acknowledging a sent distress automated procedure (see note 1)	distress ack	No	Man	Always.
rx DSC message not pertinent to unacknowledged sent distress automated procedure	silence	Does Not Apply	Does Not Apply	DSC message is only logged, no alarm of any type is required.
Initiating a received urgency non distress automated procedure	Urgency alarm	Yes	Man	Always when the priority of the non distress DSC message is (distress - see note 2) or urgency.
Acknowledging a sent urgency non distress automated procedure	urgency ack alarm	No	Man	Always when the priority of the non distress DSC message is (distress - see note 2) or urgency.
Initiating all other priority non distress automated procedures (see note 1)	routine alarm	Yes	Auto	When the priority of the non distress DSC message is safety, routine, ships business, or unknown.
Acknowledging all other priority sent non distress automated procedures	routine ack alarm	No	Auto	When the priority of the non distress DSC message is safety, routine, ships business, or unknown.
rx DSC message pertinent to an ongoing automated procedure	self terminating alarm	No	Auto	Always.
Auto termination of procedures; too many procedures	discrete	No	Auto	Always.
No own MMSI	warning	No	Auto	Only on equipment power up.
Automatic positioning ceases	warning	No	Man / corr	Only if configured for auto position updating and info has not been received for 10 minutes.
Position older than 4 hours	warning	No	Man	At all times the situation is satisfied.

Event	Sound	Increase	Shutdown see note 3	When aural is required
Position older than 23,5 hours	warning	No	Man	Only if older than 4 hours alarm has been silenced.
Pressing the dedicated distress button	count	No	____	At all times the situation is satisfied.

NOTE 1: Only when the event occurs due to the reception of a DSC message.
NOTE 2: The "distress priority" has been a source of great confusion. It is not a distress alert but a non distress DSC message with the priority "distress" which is no longer allowed in the latest version Recommendation ITU-R M.493-14 [2]. The distress priority non distress DSC message has no distress information, is sent as a single DSC message on a single frequency, and all subsequent communication information is given explicitly in the message. Like any other non distress DSC message in the old recommendation, it could be addressed to an individual, a group, an area, or all ships and have one of several possible telecommands.
NOTE 3: Shutdown of alarms may also be achieved by means of an external interface to an Integrated Communications System (ICS) (see MSC 302(87) [i.4] and IEC 61924-2 [i.5]).

D.2 Alarming with critical errors

If an automated procedure is initiated by a DSC message with critical errors (errors in the information symbols such that the procedure cannot take any action such as generating acknowledgements) the alarm shall self-terminate. The sound of the alarm shall be that it would have had if the DSC message were received without critical errors. The alarm specified in table D.1 (perhaps requiring manual termination) shall be delayed until that time the reception of subsequent or repeat DSC messages allows the procedure to correct the critical errors.

D.3 Default alarm sounds

The accuracy of the tones and durations specified in the table are not critical since they are for the human ear and not electronic detection. Nevertheless, the error shall not be more than 5 % in frequency and time. The waveforms may be sinusoidal, square, triangular, sawtooth, or any other form as long as the fundamental tone is clearly recognizable.

The two-tone and "urgency" alarms of table D.2 shall initially be of a power that is clearly distinguishable, but not interfere with, radiotelephone communications. If not manually cancelled within 10 seconds, the power shall start to rise to a level of at least 80 dB(A) within the next 10 seconds at a distance of 1 m from the equipment.

The "count" alarm of table D.2 shall have a power level of at least 80 dB(A) at a distance of 1 m from the equipment.

All other alarms (clause D.4) shall be of an audio level (or of a final level when appropriate) that is clearly distinguishable, but not interfere with, radiotelephone communications.

The operator shall be unable to neither customize the two-tone, distress acknowledgment, urgency and urgency acknowledgement alarms of table D.2 nor use these alarms for other purposes. Alarms for other purposes are specified in clause D.4.

Table D.2: Non configurable alarm sounds

Fixed Alarm sounds	Frequency (Hz) Tone 1	Frequency (Hz) Tone 2	Duration (ms) Tone 1	Duration (ms) Tone 2
two-tone (see note)	2 200	1 300	250	250
distress ack (see note)	2 200	1 300	500	500
urgency (see note)	2 200	Silence	250	250
urgency ack (see note)	2 200	Silence	500	500
count	2 000	Silence	500	500

NOTE: The two-tone, distress ack, urgency, and urgency ack alarms shall not be able to be customized. These alarms are continuously repeated until manually terminated.

D.4 Other alarm sounds

The manufacturer may implement alarm sounds for the following events:

- Routine calls and routine acknowledgement calls.
- Safety calls and safety acknowledgement calls.
- Warnings.
- Discrete alarms.
- Self-terminating alarms.

Alarms may be repeated as long as it is pertinent to the procedure, and awaiting user interaction (unhandled).

It is recommended the alarms are selected within an audible frequency range of 300 Hz to 3 300 kHz.

The manufacturer is encouraged to implement an option to disable alarms, except from those defined in table D.2.

History

Document history		
V1.1.1	February 2010	Publication
V1.2.0	November 2016	EN Approval Procedure AP 20170208: 2016-11-10 to 2017-02-08
V1.2.1	February 2017	Publication