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PROPOSALS FOR A PRELIMINARY DRAFT REVISION OF RECOMMENDATION ITU-R M.493-13

Digital selective-calling system for use in the maritime mobile service

1 Introduction

From previous WP 5B meetings proposals for minor corrections carried over for discussion, but it appears that substantial consolidation and modernisation of the digital selective-calling system is required for the next revision of Recommendation ITU-R M.493.

To take full advantage of the availability of GPS position data for radios; to refine the specifications for handheld VHF with DSC; to simplify the complicated menu trees; to insure more commonality across different manufacture's equipment and to make the Recommendation more understandable are widely recognised requests.

This contribution addresses some of the general problems by proposing possible enhancements of DSC by the followings:

- 1) include position data in Urgency and Safety announcements;
- 2) initiate Distress alerts by the Distress button, not by menu tree navigation;
- 3) define proper new Class H for portable VHF-DSC radio;
- 4) define standard DSC menu structures for VHF and MF/HF radios;
- 5) summarise the DSC functions by each class for VHF and MF/HF radios;
- 6) allow Position request and Position report calls for all classes of DSC equipment;
- 7) remove all redundant telecommands;
- 8) update and harmonise the terminology to make it consistent with the RR;
- 9) mandatory user interface specifications and standard automated procedures.

These proposals are taking into account the experience gained in recent years with state-of-the-art design practice of the marine equipment industry and long practice in training of radio operators.

Most proposed changes have been implemented in real equipment or tested on simulators.

2 Proposals

2.1 Include position data in Urgency and Safety announcements

In *Distress alerts* the most vital information, namely the identity and the position of the vessel in distress are made available immediately. In the DSC calling sequence the distress coordinates and the time of position is included.

Urgency calls are transmitted normally by ship stations to request urgent technical or medical assistance. In almost all situations is useful to transmit the position of the vessel requesting urgent assistance in *Urgency announcements*.

While safety calls are usually originated from MRCC or coast station, they can be issued by vessels at sea when reporting navigational hazards they have encountered. In such cases, the transmission of the position of the vessel could be useful in *Safety announcements*.

A further improvement and possible simplification of the DSC calling procedures would be the automatic inclusion (unless deactivated) of position data and time in all DSC calls. This would make the proper use of position data a familiar and transparent for the operator.

2.2 Initiate Distress alerts by the Distress button, not by menu tree navigation

There is a concern that DSC menus are too complicated and there are significant variations between different manufacture's equipment. This is particularly important in distress situations, so common actuating arrangements for the dedicated distress button are vital.¹

While most or probably all marine radio equipped with the red DISTRESS button would send an undesignated distress alert if the button kept pressed for at least 3 or 5 seconds, there are endless variations, how the operator can send a designated distress alert by entering into menu tree.

Instead of navigating inside of the DSC menu structures to find the options to select the nature of the distress in the GMDSS (sometime called as *Distress setting*), the simple solution is to press the DISTRESS button briefly and immediately select the nature of distress displayed (and possibly the frequency band for MF/HF) on the screen. Then press and hold down the button for 5 seconds to transmit a designated *Distress alert*.

After the transmission of the distress alert, the transceiver should be setting the appropriate RT frequency automatically in the same frequency band, not manually (as on several type of radio on the market).

2.3 Define proper new Class H for portable VHF-DSC radio

IMO COMSAR stated that a handheld DSC device compatible with the GMDSS could be of benefit on all vessels – SOLAS ships and non-SOLAS ships alike². Such VHF radios, when equipped with GPS, increase the probability of successful search in an emergency by providing an accurate location.

The maritime community anticipates that the use of portable VHF–DSC radios will significantly increase over the next few years. These handheld VHF radios are now replacing the earlier models based on the SC-101 specifications and have a dedicated watch receiver continuously monitors channel 70.

¹ IMO performance standards for GMDSS equipment, MSC/Circ. 862.

² Document 5B/191, 6 February 2009.

The set of DSC functions for Class H handheld VHF radio have to be specified by taking into account, that they can be moved from vessel to vessel, they have a reduced range compared with fix mounted equipment and limited autonomy (typically 6 or 10 hours) and only a subset of DSC calls are relevant. To avoid confusion with fix mounted Class D devices, a separate Class H is needed for handheld VHF–DSC. An integrated GPS should be made mandatory.

Possible functions are: send undesignated distress alert, send all stations urgency and safety announcement, test call, group call and individual routine call.

2.4 Define standard DSC menu structures for VHF and MF/HF radios

While navigating a DSC menu structure might involve pressing soft keys, turning rotary knobs or up and down keys, there should be a common menu structure for all classes of VHF and MF/HF radios with Digital selective-calling. As an example, see Attachment A for a diagram of VHF–DSC Class D menu structure.

In good logic, the first level of standard menu tree should allow selection of DSC calls in order of priority: *routine* (default, to a ship station or a coast station), *security*, *urgency* and *distress* related. At the next level should be the choice of *All stations* (not *All ships*), *Geographical area* or *individual* as appropriate. (There should be no *All ships Routine call*, as you can find on some marine VHF radio today.)

Other functions, which are not related to communication, should be in a separate area of the menu (or should be activated by dedicated keys), not mixed with DSC functions. For example hailer, fog horn, intercom, ATIS setting, scrambler, transmit time-out, time zone setting, etc. should be in a different area of the menu tree.

2.5 Summarise the DSC functions by each class for VHF and MF/HF radios

A table summarising the DSC functions by each class of equipment would be helpful to better understand the definition of different classes of equipments. Attachment B is a provisional summary of DSC functions by each class of VHF radios and each class of MF/HF radios.

The Category (defining the priority of the DSC call) of several type of calls should be revised. *Test calls* and *Position request* and *Position report calls* should be of *Routine* category.

The class of equipment should be indicated in the manufacturer's specification of marine radios.

2.6 Allow Position request and Position report calls for all classes of DSC equipment

Position request call and *Position report call* by DSC became very popular among users of marine VHF radios by operators onboard of non-SOLAS vessels. Equipment manufacturers are responded to the user's need to be able make such calls on any VHF-DSC radio, however presently not allowed on the simplified Class D and Class E equipment.

Making a *Position request call* and *Position report call* by DSC available for any class of equipment, including Class H for handheld VHF-DSC radios would be appropriate.

Another simple but powerful function is currently reserved for coast stations, is the *Pooling request call*, which is not allowed for any class of ship stations. Making available *Pooling request call* would be appropriate for Class A equipment.

These functions could be simplified and their usage made compatible with data received from AIS transmitters.

2.7 Remove all redundant telecommands

The set of *First telecommands* and *Second telecommands* defined in Recommendation ITU-R M.493-13 contains unused and obsolete items. An example of this is *Ships and aircraft of States not parties to an armed conflict* means little if anything for a marine radio operator. A serious cleanup is needed.

The remaining telecommands should be made meaningful names in Recommendation ITU-R M.493, and used in the user interface instead of the technical terms, like *F1B/J2B TTY-ARQ* and alike.

2.8 Update and harmonise the terminology to make it consistent with the RR

There are no two brand of marine radio equipment using the same terms for the same thing or action. Terminology and concepts defined by Radio Regulations and the ITU-R Recommendations are not used systematically. For example: “9 digits ID” or “the 9-digit identity” should be called as “MMSI”.

The terminology of the Radio Regulations should be used consistently for *Distress alert*, for *Urgency announcement* (not alert) and for *Safety announcement* (not alert). The category of *routine* calls could be simply *Routine call*, *Position request call* or *Test call*.

2.9 Mandatory user interface specifications and standard automated procedures

Since 2007 a description of a generalized user interface as well as an automated procedures for operation of shipborne equipment are included in Recommendation ITU-R M.493.

It was recognized as a progress in the direction toward a common User interface (in Annex 3) and in the definition of DSC procedures (in Annex 4) in both VHF and MF/HF radio equipment. These two annexes do not fit well into the rest of the Recommendation, use different style and terminology and it do require a serious editorial consolidation.

Nevertheless, the specification of a common, consistent user interface and description of the underlying concepts would be important not only for equipment designers, but also for users of marine radios (as there are common user interfaces for most aviation equipments).

This part of the Recommendation should be also mandatory, not only “examples of good practice”. Many details of Annex 3 or Annex 4 are to be integrated into other parts of the Recommendation for readability, for example “The operator should only be able to compose the types of DSC messages which are specified in Tables 4.1-4.10.2.” should be stated in the beginning of the set of tables. Paragraphs such as “Handling Individually addressed relays” should be moved to in the section of Distress relays (Table 4.3).

3 Conclusion

In 2008, IMO advised the ITU-R³ that the “proposed changes should be confirmed by sufficient studies and testing, which could include field trials of equipment, before the changes to the system are recommended”.

The above proposals are largely based upon best practice of the marine radio industry, years of experience in radio operator training and results of evaluation of real or simulated equipments.

³ Document 5B/62, 12 May 2008.

Recommendation ITU-R M.493 should be updated after a major consolidation, modernization and editorial cleanup, not by an incremental revision, to help to make Digital Selective Calling (DSC) more effective.

Working Party 5B is invited to consider incorporating these proposals into the preliminary draft revision of Recommendation ITU-R M.493-13.

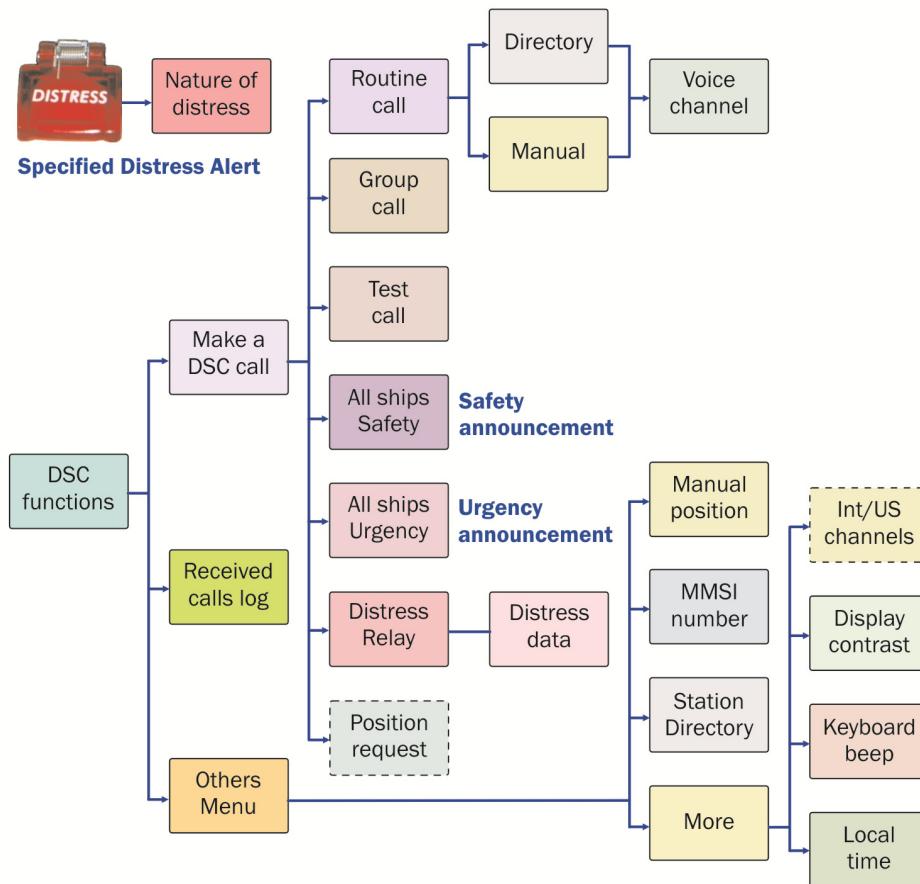
Attachments:

- A. Diagram of VHF–DSC Class D menu structure
- B. Summary of DSC functions by each class of marine VHF radio and marine MF/HF radio

ATTACHMENT A

Diagram of VHF-DSC Class D menu structure

DSC functions of a marine VHF radio with Class D controller



Please note that the nature of distress for specified (designated) distress alert can be selected without entering into the DSC menu tree.

All types of DSC calls are accessible from the first level of DSC calls, by scrolling through the different types of calls in order of priority. Defaults to routine category as individual DSC call.

Class A controllers are a slightly extended version of the menu structure above.

The terminology should be changed to *All stations* instead of *All ships*.

ATTACHMENT B

Summary of DSC functions by each class for marine VHF radio

Category	Type of DSC call	Ship station Class A/B		Ship station Class D		Ship station Class H		Coast station	
		Tx	Rx	Tx	Rx	Tx	Rx	Tx	Rx
Distress	Distress alert	●	●	●	●	○	●	—	●
	Distress alert acknowledgement	●	●	—	●	—	●	●	●
	All stations Distress alert Relay	●	●	—	●	—	—	●	●
	All stations Distress alert Relay acknowledgement	—	●	—	●	—	—	●	●
	Individual Distress alert Relay	●	●	●	●	—	—	●	●
	Individual Distress alert Relay acknowledgement	●	●	—	●	—	—	●	●
Urgency	All Stations Urgency announcement	●	●	●	●	●	●	●	●
	Individual Urgency announcement	●	●	—	●	—	—	●	●
	Individual Urgency announcement acknowledgement	●	●	●	—	—	—	●	●
Safety	All Stations Safety announcement	●	●	●	●	●	●	●	●
	Individual Safety announcement	●	●	—	●	—	—	●	●
	Individual Safety announcement acknowledgement	●	●	●	—	—	—	●	●
	Individual Test call	●	●	●	●	●	●	●	●
	Individual Test call acknowledgement	●	●	●	●	●	●	●	●
	Position request	●	●	●	●	●	●	●	—
	Position acknowledgement	●	●	●	●	●	●	—	●
Routine	Individual Routine call	●	●	●	●	●	●	●	●
	Individual Routine call acknowledgement	●	●	●	●	●	●	●	●
	Group Routine call	●	●	●	●	●	●	●	●
	Request Phone call via Coast Station (optional)	●	●	●	●	—	—	●	●
	Phone call acknowledgement (optional)	●	●	●	●	—	—	●	●
	End of phone call request (optional)	●	—	●	—	—	—	—	●
	End of phone call acknowledgement (optional)	—	●	—	●	—	—	●	—
	Individual Data	●	●	●	●	—	—	●	●
	Individual Data acknowledgement	●	●	●	●	—	—	●	●
	Individual Pooling by coast station	—	●	—	—	—	—	●	—
	Individual Polling acknowledgement by ship station	●	—	—	—	—	—	—	●

Legend (and comments):

- required Tx transmit functions
- required Rx receive functions
- undesignated distress alert only.

Please note, that *Test calls* and *Position request calls* should be moved to *Routine* category, if the proposed revision (2.8) in this paper is accepted.

Summary of DSC functions by each class for marine MF/HF radio

Category	Type of DSC call	Ship station Class A/B		Ship station Class E		Coast station	
		Tx	Rx	Tx	Rx	Tx	Rx
Distress	Distress alert	●	●	●	●	—	●
	Distress alert acknowledgement	●	●	—	●	●	●
	Geographic area Distress alert Relay	●	●	—	●	●	●
	Geographic area Distress alert Relay acknowledgement	—	●	—	●	●	●
	Individual Distress alert Relay	●	●	●	●	●	●
	Individual Distress alert Relay acknowledgement	●	●	—	●	●	●
Urgency	Geographic area Urgency announcement	●	●	●	●	●	●
	Individual Urgency announcement	●	●	—	●	●	●
	Individual Urgency announcement with position	●	●	—	●	●	●
	Individual Urgency announcement acknowledgement	●	●	●	—	●	●
Safety	Geographic area Safety announcement	●	●	●	●	●	●
	Individual Safety announcement	●	●	—	●	●	●
	Individual Safety announcement with position	●	●	—	●	●	●
	Individual Safety announcement acknowledgement	●	●	●	—	●	●
	Individual Test call	●	●	●	●	●	●
	Individual Test call acknowledgement	●	●	●	●	●	●
	Position request	●	●	●	●	●	—
	Position acknowledgement	●	●	●	●	—	●
Routine	Individual Routine call	●	●	●	●	●	●
	Individual Routine call acknowledgement	●	●	●	●	●	●
	Group Routine call	●	●	●	●	●	●
	Request Phone call via Coast Station (optional)	●	●	●	●	●	●
	Phone call acknowledgement (optional)	●	●	●	●	●	●
	End of phone call request (optional)	●	—	●	—	—	●
	End of phone call acknowledgement (optional)	—	●	—	●	●	—
	Individual Data	●	●	●	●	●	●
	Individual Data acknowledgement	●	●	●	●	●	●
	Individual Pooling by coast station	—	●	—	—	●	—
	Individual Polling acknowledgement by ship station	●	—	—	—	—	●

Legend (and comments):

- required Tx transmit functions
- required Rx receive functions

Please note, that *Test calls* and *Position request calls* should be moved to *Routine* category, if the proposed revision (2.8) in this paper is accepted.