

REPORT 1160

OPERATIONAL AND TECHNICAL CHARACTERISTICS OF THE SYSTEM
FOR THE PROMULGATION OF MARITIME SAFETY INFORMATION
USING HF NARROW-BAND DIRECT-PRINTING SYSTEMS

(Question 5/8)

(1990)

Introduction

The World Administrative Radio Conference for the Mobile Services (MOB-87) allocated eight frequencies (one in each of the HF maritime mobile-service bands) on an exclusive basis for the transmission of maritime safety information (MSI).

It is important that continuity should be maintained in setting up the new system for the dissemination of MSI and that the system should be derived logically from the existing system for the transmission of NAVAREA warnings; the system should also facilitate the work of the personnel on board ships and should permit standardized equipment to be used.

Operational procedures for the use of the allocated frequencies are needed as the system evolves.

1. Technical standards

In accordance with Recommendation 688 the format of messages and the technical characteristics of the equipment for the transmission and reception of maritime safety information should be standardized in line with the technical standards of the international NAVTEX system contained in CCIR Recommendation 540.

If the MSI is simultaneously transmitted on a number of HF frequencies, it would be possible to improve the operational reliability of the system by using a multi-channel receiver with frequency diversity capabilities and subsequent two-stage processing of the received signals.

* The Director of the CCIR is requested to bring this report to the notice of IMO, IHO and WMO.

Provided that the information is transmitted simultaneously using the technical format set forth in Recommendation 540, the information received in each channel could first be processed in accordance with the method described in Recommendations 476 and 625 for the collective B-mode. Only the outputs of those channels on which the phasing is maintained are subject to secondary processing.

Both DX and RX signals received from various outputs are used for secondary processing, under which all DX and RX signals are compared and a decision to "print a character" is made either:

- when only one character is received in any of the DX or RX positions;
- or, on the first occasion that at least two identical combinations either on the DX or RX positions for the same character are received.

An "error-character" (asterisk) is printed if no unutilized combinations are received.

Extensive experience with NAVTEX-type transmissions indicate that it is possible to fully satisfy users' requirements regarding the quality and reliability of the reception of MSI when multi-frequency transmission is used.

2. Operational standards

In view of the need to ensure continuity and to provide for continued development within the framework of the World-Wide Navigational Warning Service it is necessary to review the current system and to define the basic principles for the future system.

NAVAREA warnings can be promulgated using different methods, e.g. voice transmission, facsimile and NBDP. This, as well as the fact that these transmissions are carried out on a variety of national frequencies, complicates the problem of automating reception.

2.1 Possible methods of organizing MSI transmissions and a comparative analysis of such methods

Eight frequencies are dedicated for the MSI transmission system. Basically there are two ways in which a transmission system using these frequencies can be designed:

- parallel mode (simultaneous transmission on a number of frequencies (from 2 to 8)) to ensure coverage of the service area;
- sequential mode (sequential transmission at various frequencies (from 2 to 8)).

Since the eight dedicated frequencies may be used by all area coordinators, the main problem is to avoid mutual interference. This can be done by establishing a coordinated transmission schedule in the light of propagation characteristics.

The sequential transmission method requires practically no additional equipment and can easily be implemented using a shipboard radio receiver or a NAVTEX-type receiver. With this method, however, there is a danger of losing information because of poor propagation, affecting one or more channels.

The parallel transmission mode has the advantage that the probability of reception can be increased by processing the signals received via the different channels, or by simply selecting, on the basis of a specific criterion (e.g., the signal/noise ratio or the BER), the best channel for reception.

3. Conclusion

Possible technical and operational standards are given in Annex I. Further study is still required for the introduction of an MSI system. The main areas of study needed are:

- the world-wide coordination of the use of the frequencies for the transmission of MSI;
- the definition of the areas to be covered by the different coast stations;
- the definition of the basic functions to be performed by automated shipboard equipment including the collection, storage and use of the MSI.

BIBLIOGRAPHY

CCIR Documents

[1986-1990]: 8/85 (USSR).

ANNEX I

BASIC TECHNICAL AND OPERATIONAL STANDARDS FOR A SYSTEM FOR THE PROMULGATION OF MARITIME SAFETY INFORMATION ON THE SPECIALLY ALLOCATED HF FREQUENCIES

1. This annex describes general procedures which may be used as a basis in setting up a system for the promulgation of maritime safety information (MSI) on the special HF frequencies allocated by the World Administrative Radio Conference for the Mobile Services (MOB-87) for this purpose.
2. The basis of the system is that the area coordinators in the present World-Wide Navigational Warning Service, which covers all ocean areas (NAVAREA I-XVI), are responsible for the transmission of navigational and meteorological warnings for the benefit of ships on the high seas using the newly allocated HF frequencies.
3. The existing transmission area arrangement applicable to the World-Wide Navigational Warning Service (I-XVI) would remain in force during the period of transition to the new frequencies.

4. Navigational warnings should be transmitted on the present frequencies and also, with the entry into force of the Final Acts of MOB-87, on the new frequencies allocated by MOB-87 for navigation areas which have chosen that option. This would allow all ships to receive MSI via the current or the new system.
5. To save time for ship station radio operators and to increase the probability of reception of MSI, transmissions on the specially allocated international frequencies should be carried out simultaneously in parallel on groups of frequencies in accordance with a schedule. In the first stage the corresponding receive frequencies (1992-1996) could be selected manually by the ship's radio operator on the basis of the ship's location and the anticipated quality of reception. In the second stage, the selection of frequencies and the subsequent reception of MSI could be effected automatically.
6. General coordination of the use of all the new frequencies, including the schedule and the duration of transmissions, should be carried out by a specialized working group consisting of representatives of the IMO, IHO and WMO, taking into account Resolution No. 329 (MOB-87). (Note 1)
7. The transmission and reception of MSI should be effected by a narrow-band direct-printing system on the basis of CCIR Recommendation 688, using NBDP equipment in conformity with Recommendations 476 or preferably 625.
8. The ship's equipment for the reception, processing and printing of MSI could include a remotely controlled HF NBDP receiver and a NAVTEX-type receiver.
9. Each coast station transmitting MSI on the special HF frequencies should transmit the complete information for its area in accordance with a 12-hour interval schedule. The transmission schedule of each coast station should include in the middle of the silence interval a 5-minute period for the transmission of urgent information which cannot be delayed until the next scheduled transmission period.
10. For the automatic reception of MSI, the receiving unit should have a timer. A detailed operating schedule of all coast stations transmitting MSI could then be stored in memory. Reception can then be programmed in line with the transmission time.

Note 1 - The IMO is invited to take the lead in developing a schedule for all transmissions including trial operational transmissions.
