IMO NAVTEX Manual

Submitted by WWNWS Document Review WG

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| **SUMMARY** |
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| Executive Summary: This document provides the revised NAVTEX |
| Manual for further review at WWNWS2 |
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| Action to be taken: 2 |
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| Related documents: MSC/Circ.1122 |
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1.   Attached to this document is the revised draft of the IMO NAVTEX Manual as prepared by the WWNWS Document Review WG at its March 2010 meeting. The secretary to the WG has included some additional amendments since the date of that meeting and these will be brought to the attention of the Sub-Committee during the consideration of this document.

2.   The Sub-Committee is requested to review this draft document and prepare a final text for submission to IHO member States and the WMO prior to submission to IMO COMSAR 15 in March 2011.

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IMO NAVTEX Manual

PREFACE

SOLAS regulation IV/12.2 states that "Every ship, while at sea, shall maintain a radio watch for broadcasts of maritime safety information on the appropriate frequency or frequencies on which such information is broadcast for the area in which the ship is navigating".

At the request of the IMO Sub-Committee on Radiocommunications, the NAVTEX Manual was first produced in 1988. Three subsequent editions have been produced, with the fourth edition published in 2005 containing amendments endorsed by the Maritime Safety Committee at its seventy-eighth session in May 2004 by MSC/Circ.1122.

At its seventh meeting in September 2005, the IHO's Commission on the Promulgation of Radio Navigational Warnings (CPRNW[1]) established a Working Group to review all World-Wide Navigational Warning Service (WWNWS) documentation. The Working Group included representation from the WMO and prepared at first, revisions to IMO as amended resolutions A.705(17), "Promulgation of Maritime Safety Information" and A.706(17), "World-Wide Navigational Warning Service". The proposed revisions of the resolutions were circulated to IHO Member States under IHB CL 104/2007, endorsed by COMSAR at its twelfth session in April 2008 and subsequently approved by the Maritime Safety Committee at its eighty-fifth session in November/December 2008 by MSC.1/Circ.1287 and MSC.1/Circ.1288 respectfully.

The IHO CPRNW[1] Working Group then prepared the revised Joint IMO/IHO/WMO Manual on Maritime Safety Information incorporating the revised information from resolutions A.705(17), as amended and A.706(17), as amended. The revised text of the Joint IMO/IHO/WMO Manual on Maritime Safety Information was circulated to IHO Member States under cover of IHB CL 70/2008, endorsed by COMSAR at its thirteenth session in January 2009 and subsequently approved by the Maritime Safety Committee at its eighty-sixth session in May/June 2009.

The IHO WWNWS Working Group subsequently prepared the third revision of the International SafetyNET Manual. The revised text of the International SafetyNET Manual was circulated to IHO Member States under cover of IHB CL 68/2009, endorsed by COMSAR at its fourteenth session in March 2010 and subsequently approved by the Maritime Safety Committee at its eighty-seventh session in May 2010 by MSC.1/Circ. 1364.

Continuing with the holistic approach of reviewing all the MSI documents from the top-down, the IHO WWNWS Working Group prepared the fifth revision of the NAVTEX Manual. The revised text of the NAVTEX Manual was circulated to IHO Member States under cover of IHB CL [**/2010], [endorsed by COMSAR at its fifteenth session in March 2011 and subsequently approved by the Maritime Safety Committee at its eighty-ninth session in May 2011].

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[1] CPRNW was renamed the IHO WWNWS Sub Committee (WWNWS) with effect from 1 January 2009

CONTENTS

1 – GENERAL INFORMATION

NAVTEX is an international automated direct-printing service for promulgation of navigational and meteorological warnings and urgent information to ships. It was developed to provide a low-cost, simple and automated means of receiving maritime safety information on board ships at sea in coastal waters. The information transmitted may be relevant to all sizes and types of vessel and the selective message-rejection feature ensures that every mariner can receive a safety information broadcast which is tailored to his particular needs.

NAVTEX fulfils an integral role in the Global Maritime Distress and Safety System (GMDSS) developed by the International Maritime Organization (IMO) and incorporated into the 1988 amendments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, as a requirement for ships to which the Convention applies.

This Manual describes the structure and operation of the NAVTEX Service. It is intended primarily for use by Maritime Administrations and others concerned with the preparation and broadcasting of maritime safety information (MSI). It will also be of interest to seafarers, shipowners and others who need to receive such information in order to safely go about their business at sea. It should be used in conjunction with the Joint IMO/IHO/WMO Manual on Maritime Safety Information and the IHO/IMO World-Wide Navigational Warning Service Guidance Document, IHO Publication S-53, and the S-53, Appendix 1.

2 – NAVTEX SERVICE

2.1   Introduction

2.1.1   NAVTEX provides shipping with navigational and meteorological warnings and other urgent information as listed in Section 5, by automatic display or print-out from a dedicated receiver. It is suitable for use in all sizes and types of ships. **Figure 1** illustrates the way the service is typically structured.

2.1.2   NAVTEX is a component of the IMO/IHO World-Wide Navigational Warning Service (WWNWS) defined by IMO Assembly resolution A.706(17), as amended, and the WMO Manual on Marine Meteorological Services, Part 1*bis*, Provision of warnings and weather and sea bulletins (GMDSS application). It has also been included as an element of the Global Maritime Distress and Safety System (GMDSS).

2.1.3   In the GMDSS, a NAVTEX receiving capability is part of the mandatory equipment which is required to be carried in certain vessels under the provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended.

2.1.4   Authority for co-ordinating the use of the frequencies 518 kHz, 490 kHz and 4209.5 kHz for NAVTEX services world-wide was effectively delegated by ITU to IMO at WRC-95 through Resolution 339. This was re-affirmed at WRC-97. IMO has vested responsibility for the overall management and co-ordination of the global NAVTEX services in its NAVTEX Co-ordinating Panel. The terms of reference for this panel are attached at Annex 1. It shall be noted that the provisions of the NAVTEX manual do not apply when planning a national NAVTEX service on other nationally assigned frequencies.

2.1.5 Details of operational and planned NAVTEX services are published periodically in the various national lists of radio signals, in an annex to the International Telecommunication Union's (ITU) list VI - List of Radiodetermination and Special Service Stations - and in the GMDSS Master Plan published by IMO (GMDSS/Circ.8 and Corrigenda).
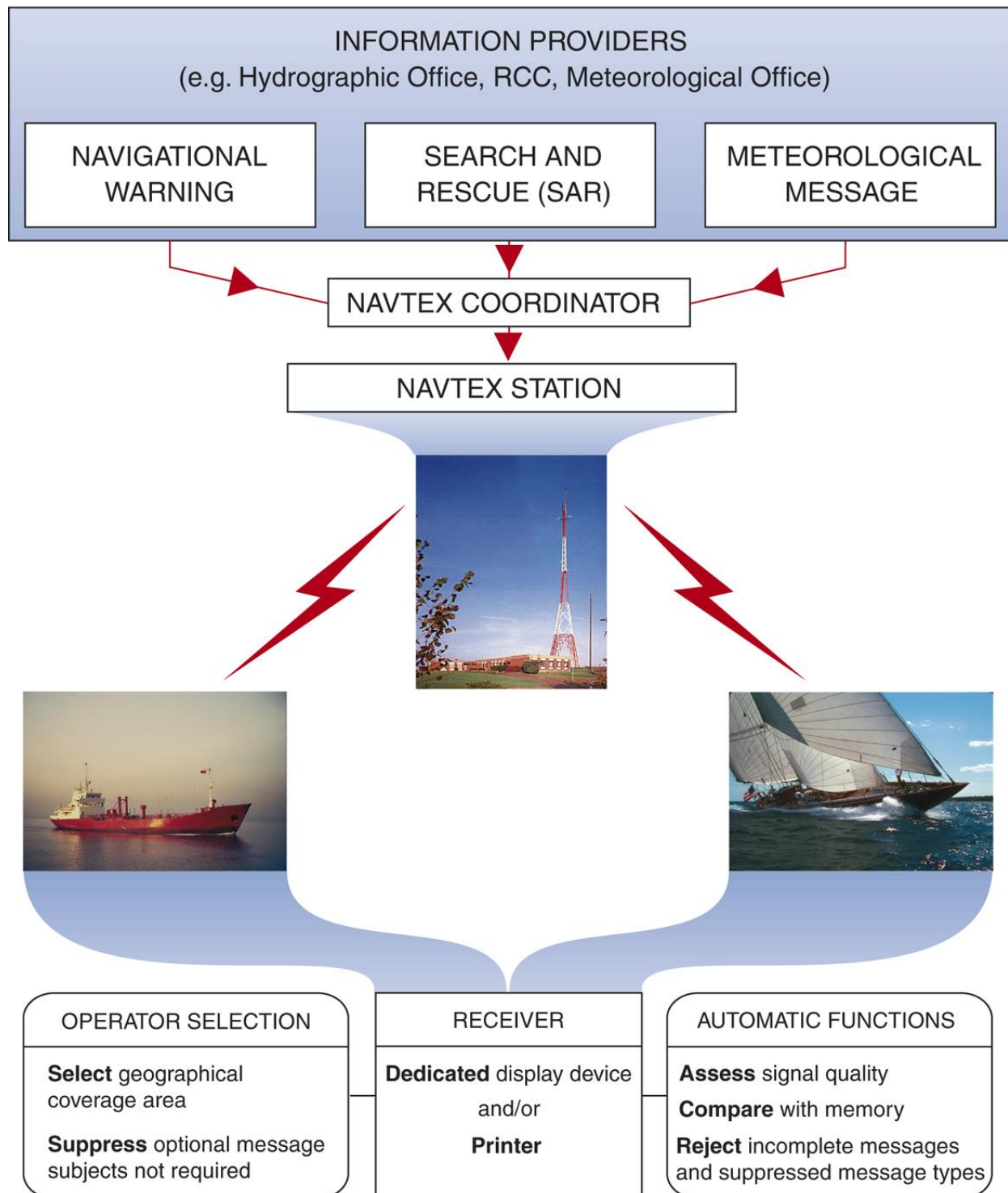

Figure 1 – Basic concept of the NAVTEX system

2.2   Definitions

2.2.1   For the purposes of this manual, the following definitions apply:

~~i.~~**.1**   *Coastal warning* means a navigational warning or in-force bulletin promulgated as part of a numbered series by a National co-ordinator. Broadcast shall be made by the International NAVTEX service to defined NAVTEX service areas and/or by the International SafetyNET service to coastal warning areas. (In addition, Administrations may issue coastal warnings by other means).

~~ii.~~**.2**   *Coastal warning area* means a unique and precisely defined sea area within a NAVAREA/METAREA or Sub-Area established by a coastal state for the purpose of co-ordinating the broadcast of coastal maritime safety information through the SafetyNET service.

~~iii.~~**.3**   *Global Maritime Distress and Safety System (GMDSS)* means the global communications service based upon automated systems, both satellite and terrestrial, to provide distress alerting and promulgation of Maritime Safety Information for mariners.

~~iv.~~**.4**   *HF NBDP* means High Frequency narrow-band direct-printing, using radio telegraphy as defined in Recommendation ITU-R M.688.

~~v.~~**.5**   *In-force bulletin* means a list of serial numbers of those NAVAREA, Sub-Area or coastal warnings in force issued and broadcast by the NAVAREA co-ordinator, Sub-Area co-ordinator or National co-ordinator during at least the previous six weeks.

~~vi.~~**.6**   *International NAVTEX service* means the co-ordinated broadcast and automatic reception on 518 kHz or 4209.5 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language[2].

~~vii.~~**.7**   *International SafetyNET service* means the co-ordinated broadcasting and automated reception of maritime safety information via the Inmarsat Enhanced Group Call (EGC) system, using the English language, in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

~~viii.~~**.8**   *Local warning* means a navigational warning which covers inshore waters, often within the limits of jurisdiction of a harbour or port authority.

~~ix.~~**.9**   *Maritime safety information (MSI)*[3] means navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships.

~~x.~~**.10**   *Maritime safety information service* means the internationally and nationally co-ordinated network of broadcasts containing information which is necessary for safe navigation.

~~xi.~~**.11**   *METAREA* means a geographical sea area[3] established for the purpose of co-ordinating the broadcast of marine meteorological information. The term METAREA followed by a roman numeral may be used to identify a particular sea area. The

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[2]   as set out in this Manual.

[3]   as defined in Regulation IV/2 of the 1974 SOLAS Convention, as amended.

delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

~~xii.~~**.12**　　　*METAREA issuing service* means the National Meteorological Service which has accepted responsibility for ensuring that meteorological forecasts and warnings are disseminated through the International NAVTEX service.

~~xiii.~~**.13**　　　*Meteorological information* means the marine meteorological warning and forecast information in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

~~xiv.~~**.14**　　　*National co-ordinator* means the national authority charged with collating and issuing coastal warnings within a national area of responsibility.

~~xv.~~**.15**　　　*National NAVTEX* service means the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies other than 518 kHz or 4209.5 kHz and languages as decided by the Administration concerned.

~~xvi.~~**.16**　　　*National SafetyNET service* means the broadcasting and automated reception of maritime safety information via the Inmarsat EGC system, using languages as decided by the Administration concerned.

~~xvii.~~**.17**　　　*NAVAREA* means a geographical sea area[4] established for the purpose of co-ordinating the broadcast of navigational warnings. The term NAVAREA followed by a roman numeral may be used to identify a particular sea area. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

~~xviii.~~**.18**　　　*NAVAREA co-ordinator* means the authority charged with co-ordinating, collating and issuing NAVAREA warnings for a designated NAVAREA.

~~xix.~~**.19**　　　*NAVAREA warning* means a navigational warning or in-force bulletin promulgated as part of a numbered series by a NAVAREA co-ordinator.

~~xx.~~**.20**　　　*Navigational warning* means a message containing urgent information relevant to safe navigation broadcast to ships in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

~~xxi.~~**.21**　　　*NAVTEX* means the system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy.

~~xxii.~~**.22**　　　*NAVTEX coverage area* means an area defined by an arc of a circle having a radius from the transmitter calculated according to the method and criteria given in IMO Res A.801(19) annex 4.

~~xxiii.~~**.23**　　　*NAVTEX service area* means a unique and precisely defined sea area, wholly contained within the NAVTEX coverage area, for which MSI is provided from a particular NAVTEX transmitter. It is normally defined by a line that takes full account of local propagation conditions and the character and volume of information and maritime traffic patterns in the region, as given in IMO Res A.801(19) annex 4.

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[4]　　　which may include inland seas, lakes and waterways navigable by sea-going ships.

xxiv..24   *NAVTEX co-ordinator* means the authority charged with operating and managing one or more NAVTEX stations broadcasting maritime safety information as part of the International NAVTEX service.

xxv..25   *Other urgent safety-related information* means maritime safety information broadcast to ships that is not defined as a navigational warning, meteorological information or SAR information. This may include, but is not limited to, significant malfunctions or changes to maritime communications systems, and new or amended mandatory ship reporting systems or maritime regulations affecting ships at sea.

xxvi..26   *Rescue Co-ordination Centre (RCC)* means a unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

xxvii..27   *SafetyNET* means the international service for the broadcasting and automatic reception of maritime safety information via the Inmarsat EGC system. SafetyNET receiving capability is part of the mandatory equipment which is required to be carried by certain ships in accordance with the provisions of the International Convention for the Safety of Life at Sea, 1974, as amended.

xxviii..28   *SAR information* means distress alert relays and other urgent search and rescue information broadcast to ships.

xxix..29   *Sea Area A1* means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC[5] alerting is available, as may be defined by a Contracting Government.

xxx..30   *Sea Area A2* means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government.

xxxi..31   *Sea Area A3* means an area, excluding sea areas A1 and A2, within the coverage of an Inmarsat geostationary satellite in which continuous alerting is available.

xxxii..32   *Sea Area A4* means an area outside sea areas A1, A2 and A3.

xxxiii..33   *Sub-Area* means a sub-division of a NAVAREA/METAREA in which a number of countries have established a co-ordinated system for the promulgation of maritime safety information. The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

xxxiv..34   *Sub-Area co-ordinator* means the authority charged with co-ordinating, collating and issuing Sub-Area warnings for a designated Sub-Area.

xxxv..35   *Sub-Area warning* means a navigational warning promulgated as part of a numbered series by a Sub-Area co-ordinator. Broadcast shall be made by the International

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[5]   Digital selective calling (DSC) means a technique using digital codes which enables a radio station to establish contact with and transfer information to another station or group of stations and complying with the relevant recommendations of the International Radio Consultative Committee ((CCIR) – "Radiocommunications Bureau of the International Telecommunication Union (ITU)" from 1 March 1993).

NAVTEX service to defined NAVTEX service areas or by the International SafetyNET service (through the appropriate NAVAREA co-ordinator.)

~~xxxvi.~~**.36** *UTC* means Co-ordinated Universal Time which is equivalent to GMT (or ZULU) as the international time standard

~~xxxvii.~~**.37** *World-Wide Navigational Warning Service (WWNWS)*[6] means the internationally and nationally co-ordinated service for the promulgation of navigational warnings**.**

~~xxxviii.~~**.38** In the operating procedures *co-ordination* means that the allocation of the time for data broadcast is centralized, the format and criteria of data transmissions are compliant as described in the Joint IMO/IHO/WMO Manual on Maritime Safety Information and that all services are managed as set out in IMO Assembly resolutions A.705(17) as amended and A.(706)17, as amended.

2.2.2   Delimitation of NAVAREAS

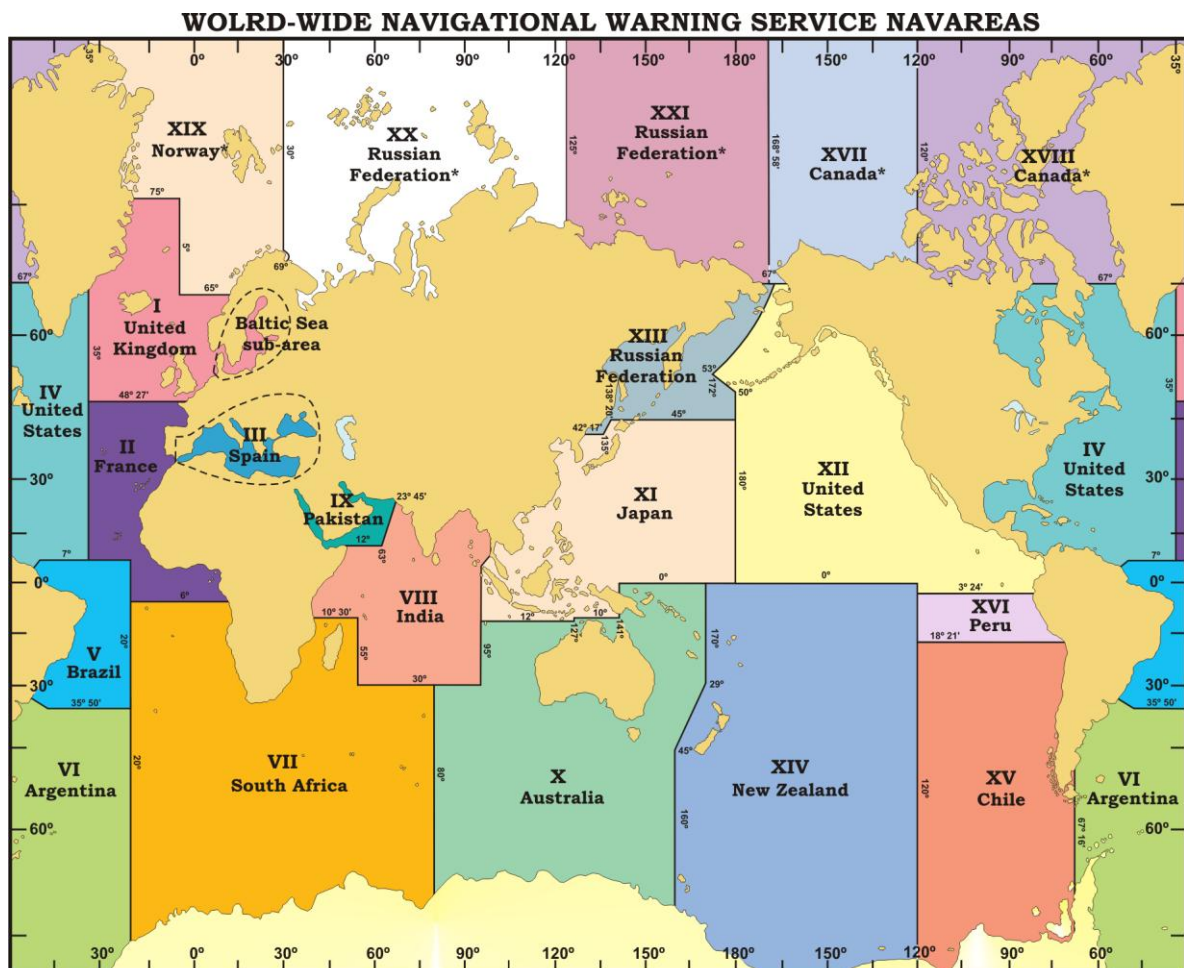**WOLRD-WIDE NAVIGATIONAL WARNING SERVICE NAVAREAS**

Figure 2
NAVAREAS for coordinating and promulgating radio navigational warnings under the World-Wide Navigational Warning Service

The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States

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6   as set out in resolution A.706(17), as amended.
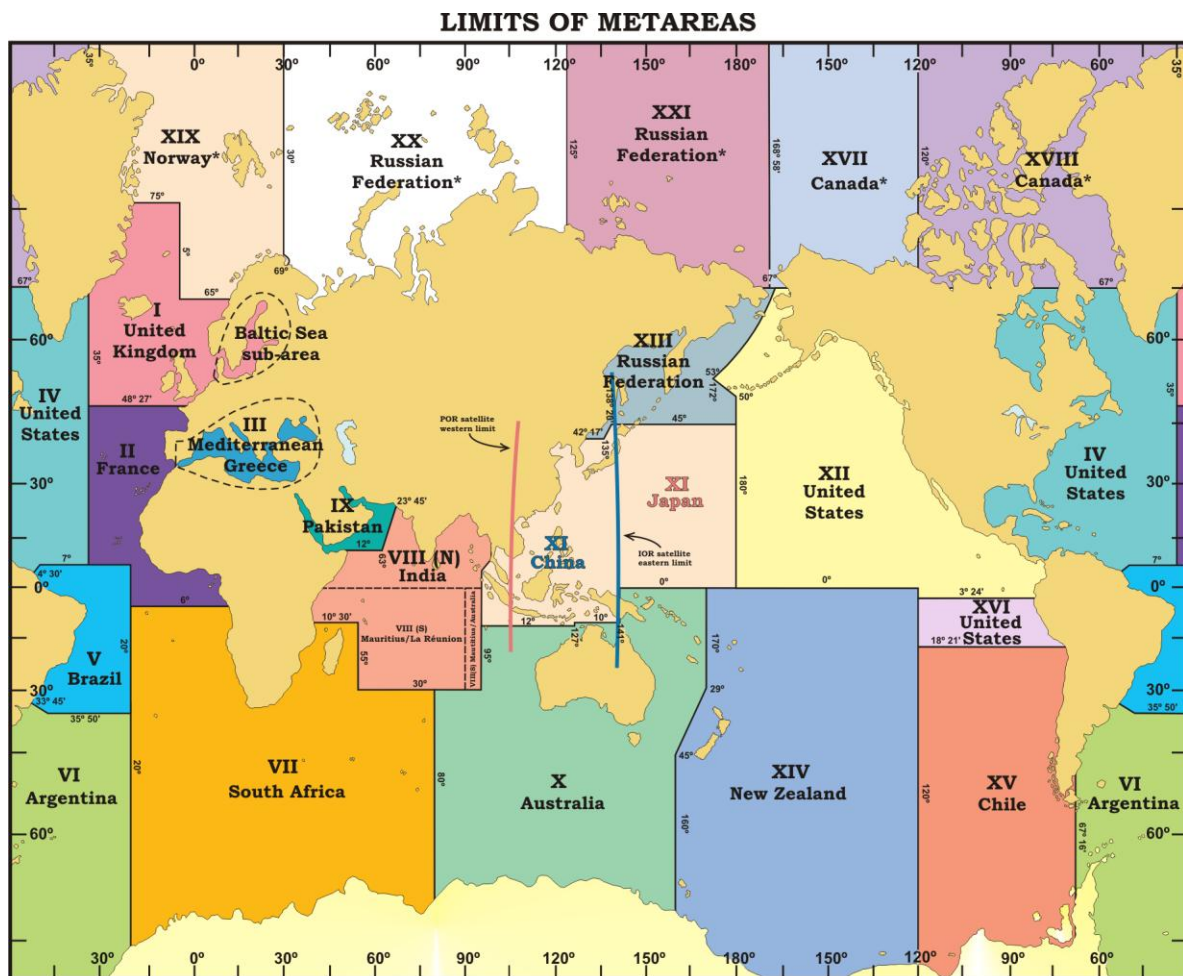
2.2.3   Delimitation of METAREAS

Figure 3
METAREAS for coordinating and promulgating meteorological warnings and forecasts
The delimitation of such areas is not related to and shall not prejudice the delimitation of any boundaries between States.

3 - GENERAL FEATURES OF NAVTEX SYSTEM

3.1   The principal features are:

.1   Coordinated NAVTEX services use a single frequency with transmissions from stations within each NAVAREA/METAREA being coordinated on a time-sharing basis to reduce the risk of mutual interference.

The following frequencies may to be used for NAVTEX broadcasts:

518 kHz

Type of service: International
Content: Information for SOLAS vessels only
Language: English
Coordination: By IMO NAVTEX Co-ordinating Panel

4209.5 kHz

Type of service: International or National
Content: When used as an International Service - information for SOLAS vessels only
                   When used as a National Service - any information selected by the National Administration
Language: When used as an International Service - English only
                   When used as a National Service - any language, selected by the National Administration
Coordination: By IMO NAVTEX Co-ordinating Panel

490 kHz

Type of service: National
Content: Any information selected by the National Administration
Language: Any language, selected by the National Administration
Coordination: By IMO NAVTEX Co-ordinating Panel

Any National frequency allocated by the ITU

Type of service: National
Content: Any information selected by the National Administration
Language: Any language, selected by the National Administration
Coordination: By appropriate National Administration

.2   a dedicated NAVTEX receiver, comprising radio receivers, a signal processor and either:

       a)   an integrated printing device; or
       b)   a dedicated display device with a printer output port and a non-volatile message memory; or
       c)   a connection to an integrated navigation system and a non-volatile message memory;

which has the ability to select messages to be printed, or viewed and stored in a memory according to:

       a)   a technical code ($B_1B_2B_3B_4$), which appears in the preamble of each message; and
       b)   whether or not the particular message has already been printed / received;

.3   the equipment shall be capable of operating on the 518 kHz, and shall also contain a second receiver capable of working at the same time as the first one on at least two other frequencies recognized for the transmission of NAVTEX information. In the case of dual receivers, the first receiver has priority in the display or printing of received information.

3.2   The operational and technical characteristics of the NAVTEX system are contained in Recommendation ITU-R M.540, reproduced in ANNEX 2. Performance standards for shipborne narrow-band direct-printing equipment, if installed before 1 July 2005, are laid down in IMO Assembly resolution A.525(13). If installed on or after 1 July 2005, they should conform to IMO resolution MSC.148(77), reproduced in ANNEX 3.

4 – PLANNING NAVTEX SERVICES

4.1 International NAVTEX Services on 518 kHz or 4209.5 kHz:

When planning an International NAVTEX service it is essential to appreciate the high level of national and international co-ordination required. The central principles which should be borne in mind are as follows:

.1 all NAVTEX stations are part of the strategic infrastructure of both the GMDSS and WWNWS.

.2 it is essential for the efficiency and effectiveness of the service that a minimum number of stations are used. This may require national authorities to either share facilities or promulgate information provided by authorities of other nations.

.3 each station shall contribute to the overall service in a co-ordinated way, bearing in mind the geographical area logically covered by each station and the effective co-ordination and control of information to be transmitted. The information to be transmitted by NAVTEX shall be passed between authorities using established communications channels.

.4 the two basic areas which must be defined when establishing a NAVTEX station are the NAVTEX coverage area and the NAVTEX service area. Each station will provide all the information for a particular NAVTEX service area. The boundaries of the NAVTEX service area must be wholly contained within the coverage area, and must not overlap with adjacent NAVTEX service areas **(Figure 4)**

.5 national authorities seeking to establish NAVTEX services shall undertake preliminary discussions with the NAVAREA Co-ordinator, METAREA Issuing Services and neighbouring authorities prior to formal application to IMO through the IMO NAVTEX Co-ordinating Panel. These discussions shall consider the possible geographical locations for sites to ensure optimal coverage, NAVTEX service area boundaries and links with information providers.

.6 the range of a NAVTEX transmitter depends on the transmitted power and local radio propagation conditions. The actual range achieved shall be adjusted to the minimum required for adequate reception in the specified NAVTEX service area, taking into account the needs of ships approaching from other areas. Experience indicates that the required range of 250 to 400 nautical miles will normally be attained by transmitted power of no more than 1KW during daylight with a 60% reduction during night-time.

.7 after the choice of transmitter sites, the main need for co-ordination lies in the assignment of B_1 characters (time schedules) and the agreement of proposed NAVTEX service areas (if appropriate). Preliminary discussions between national authorities seeking to establish or amend NAVTEX services and neighbouring authorities shall be co-ordinated by the NAVAREA Co-ordinator prior to formal application for a B_1 character. Throughout the process the IMO NAVTEX Co-ordinating Panel is available to advise and liaise on the final limits of NAVTEX service areas if these cannot be agreed locally.

.8 the IMO NAVTEX Co-ordinating Panel will only allocate B_1 characters after the NAVTEX service areas have been agreed.

.9 once a NAVTEX transmitter has been declared operational, if a national authority wishes to:

a) move the transmitter site; and/or
b) amend the limits of its NAVTEX service area

then the whole co-ordination process outlined above must be repeated, keeping the NAVTEX Co-ordinating Panel informed at all times.

.10 a national NAVTEX Co-ordinator shall be established to oversee the operation of the NAVTEX services established by each national authority. The responsibilities of the NAVTEX Co-ordinator are defined in section 12 of this Manual.

4.2 National NAVTEX Services on 490 kHz or 4209.5 kHz

When planning a national NAVTEX service, only paragraphs 4.1.6, 4.1.7, 4.1.9 and 4.1.10 are required, noting particularly that a national NAVTEX service does not require internationally coordinated service areas.

4.3 National NAVTEX Services on other frequencies

The provisions of the NAVTEX manual do not apply when planning a national NAVTEX service on nationally assigned frequencies.

4.4 Guidance on these and the many other factors to be considered when planning NAVTEX services should be obtained at an early stage from IMO, through its NAVTEX Co-ordinating Panel. Details of how to contact the Panel may be found at Annex 1.

4.5 The following diagram provides an example of the delimitation of NAVTEX Service Areas for a specific region. In this example, the Baltic Sea and its approaches has been divided into four individual NAVTEX Service Areas, inside of each, MSI is provided from a separate NAVTEX transmitter which has been allocated a dedicated B_1 character. It is a fundamental requirement that the range of each NAVTEX transmitter is sufficient to include the whole of the NAVTEX Service Area assigned to its B_1 character.
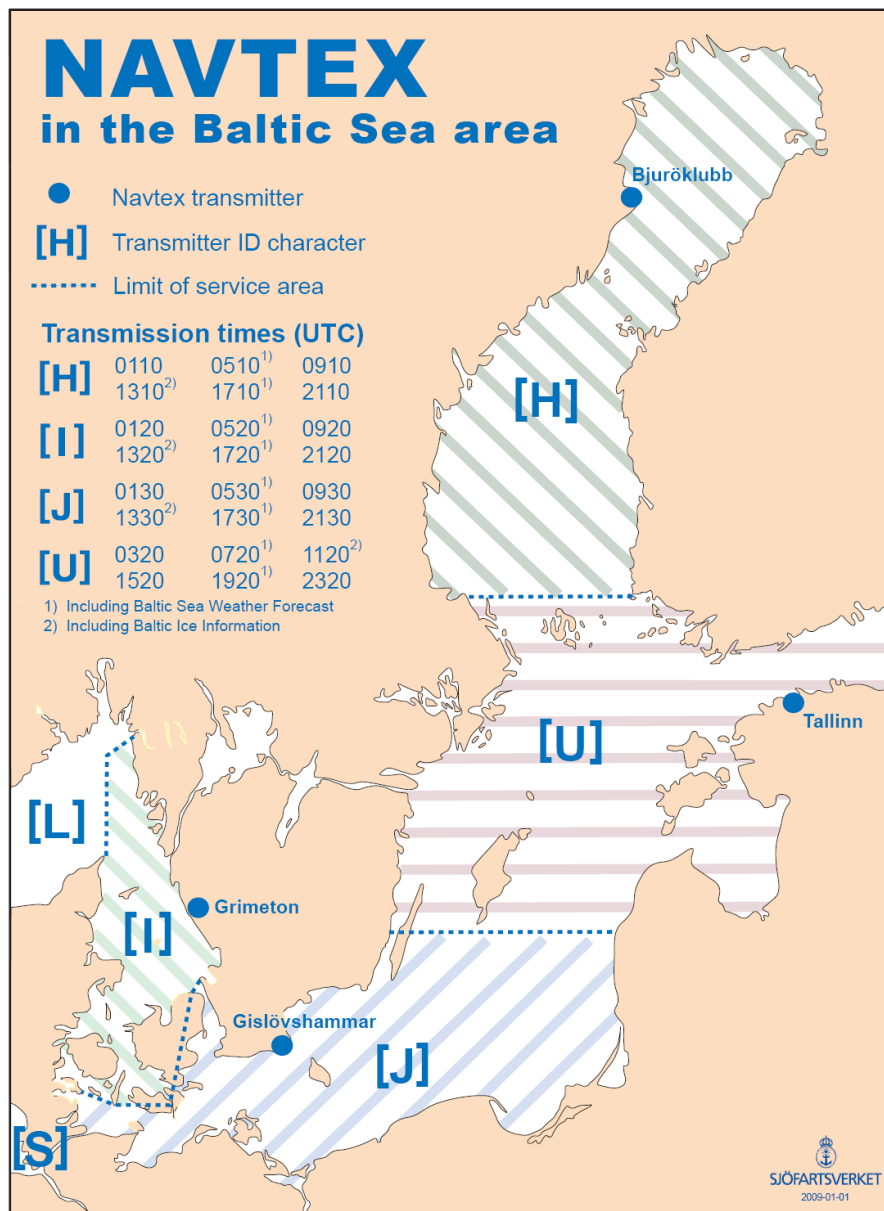
Figure 4 – Example of NAVTEX Service Areas

5 – NAVTEX MESSAGE TECHNICAL CODES

5.1   Overview of technical codes, B_1, B_2, B_3, B_4.

5.1.1   NAVTEX messages include instructions to the NAVTEX receiver for processing MSI in the form of the NAVTEX message identity, which consists of four technical codes made up of alphanumeric characters. The technical codes are referred to as "B" characters. In order for messages to be correctly processed, they must consist of data conforming to these B characters.

B_1 Transmitter Identification Character
B_2 Subject Indicator Character
B_3B_4 Message Numbering Characters

B Characters which make up the full NAVTEX message identity		
B_1 **Transmitter Identification Character**	**B_2** **Subject Indicator Character**	**B_3 B_4** **Message Numbering Characters**
1 letter code	1 letter code	2 digit code
A to X	A = Navigational warnings B = Meteorological warnings C = Ice reports D^7 = Search and rescue information, acts of piracy warnings, tsunamis and other natural phenomena E = Meteorological forecasts F = Pilot service messages G = AIS H = LORAN messages I = currently not used J = SATNAV messages K = Other electronic navigational aid system messages L = Other Navigational warnings – additional to B_2 code A^8 M = N = O = P = Q = currently not used R = S = T = U = V = W = Special services allocation by X = the International NAVTEX Y = Co-ordinating Panel Z = No messages on hand	01 to 99 (message numbering characters "00" are not to be used for routine messages)

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[7] Use of B_2 character D will automatically set off the alarm at the NAVTEX receiver.
[8] On some older NAVTEX receivers it may be possible to deselect B_2 character L (continuation of B_2 subject group A), however, it is also strongly recommended this character is not deselected.
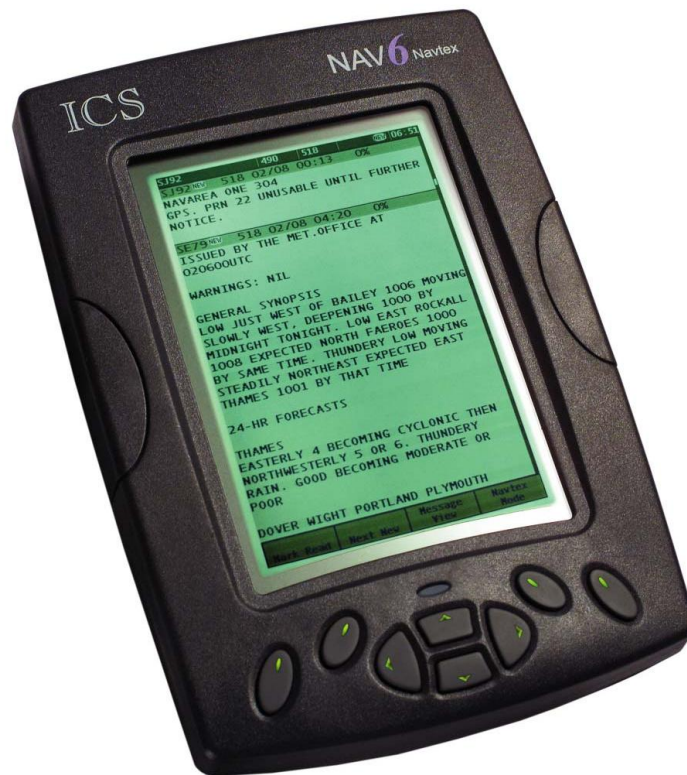
Figure 5 – Example of NAVTEX receiver with LCD Screen

5.2 B_1 - Transmitter Identification Character

5.2.1   The transmitter identification character B_1, is a single letter which is allocated to each transmitter. It is used to identify the broadcasts which are to be accepted by the receiver and those to be rejected, and also the time slot for the transmission.

5.2.2   In order to avoid erroneous reception and interference of transmissions from two stations having the same B_1 character, it is necessary to ensure that such stations have a large geographical separation. Allocation of B_1 characters by alphabetical sequence to adjacent sites can also cause problems; hence B_1 characters are allocated in a random manner with consecutive letters not normally allocated to adjacent stations. Experience has proven that this prevents the impact of when a station overruns its timeslot, which causes its signal to mask the phasing signal of the next station about to begin its transmission.

5.2.3   NAVTEX transmissions have a designed maximum range of about 400 nautical miles. The minimum distance between two transmitters with the same B_1 identifier must, therefore, be sufficient to ensure that a receiver cannot be within range of both at the same time.

5.2.4   Close co-ordination between transmitting stations in adjacent NAVAREAs/METAREAs is necessary to achieve this separation. For this reason, national authorities should request the advice of the IMO NAVTEX Co-ordinating Panel at an early stage in the planning of a new NAVTEX service. The Panel will allocate B_1 characters in such a way as to minimize the risk of interference occurring.

5.2.5 **Table 1** shows the B_1 characters and their associated transmission start times used by the IMO NAVTEX Co-ordinating Panel to evaluate and allocate B_1 characters A to X, regardless of the geographical position of the station anywhere in the world. Each B_1 character is allocated a maximum transmission time of 10 minutes every 4 hours. Because the NAVTEX system always utilises a single frequency, it is **fundamental** to its successful operation that the following time slots are strictly adhered to, so that routine broadcasts do not overrun their allotted 10 minutes.

B_1 code	Scheduled Transmission start times (UTC)					
A	0000	0400	0800	1200	1600	2000
B	0010	0410	0810	1210	1610	2010
C	0020	0420	0820	1220	1620	2020
D	0030	0430	0830	1230	1630	2030
E	0040	0440	0840	1240	1640	2040
F	0050	0450	0850	1250	1650	2050
G	0100	0500	0900	1300	1700	2100
H	0110	0510	0910	1310	1710	2110
I	0120	0520	0920	1320	1720	2120
J	0130	0530	0930	1330	1730	2130
K	0140	0540	0940	1340	1740	2140
L	0150	0550	0950	1350	1750	2150
M	0200	0600	1000	1400	1800	2200
N	0210	0610	1010	1410	1810	2210
O	0220	0620	1020	1420	1820	2220
P	0230	0630	1030	1430	1830	2230
Q	0240	0640	1040	1440	1840	2240
R	0250	0650	1050	1450	1850	2250
S	0300	0700	1100	1500	1900	2300
T	0310	0710	1110	1510	1910	2310
U	0320	0720	1120	1520	1920	2320
V	0330	0730	1130	1530	1930	2330
W	0340	0740	1140	1540	1940	2340
X	0350	0750	1150	1550	1950	2350

Table 1 - NAVTEX routine transmission start times

5.2.6 In some regions, it has become necessary to accommodate a large number of stations. In extreme cases, it has even been necessary to re-use some B_1 characters for a second time within a region. Where this occurs every effort is made to ensure stations with the same character are as far apart as possible to reduce the risk of mutual interference.

5.2.7 In order to increase the effectiveness of the system, the frequency shall remain unused for a high percentage of the time, so as to allow for the immediate broadcast of vital information, e.g. search and rescue information, gale warnings, etc.

5.3 B_2 - Subject Indicator Character

5.3.1   Information is grouped by subject in the NAVTEX broadcast and each subject group is allocated a subject indicator character, B_2.

5.3.2   The subject indicator character is used by the receiver to identify the different classes of messages as listed in the following table:

A = Navigational warnings
B = Meteorological warnings
C = Ice reports
D[9] = Search and rescue information, acts of piracy warnings, tsunamis and other natural phenomena
E = Meteorological forecasts
F = Pilot service messages
G = AIS
H = LORAN messages
I = currently not used

J = SATNAV messages
K = Other electronic navigational aid system messages
L = Other Navigational warnings – additional to B_2 code A[10]
V =
W =   Special services allocation by the International NAVTEX Co-ordinating Panel
X =
Y =
Z =   No messages on hand

5.3.3   Some B_2 characters can be used to reject messages concerning certain subjects which may not be required by the ship (e.g. LORAN messages may be rejected by deselecting the B_2 character H on the NAVTEX receiver onboard a ship which is not fitted with a LORAN receiver).

5.3.4   Reception of messages, transmitted using B_2 characters A, B, D and L, which have been allocated for navigational warnings, meteorological warnings, search and rescue information, acts of piracy warnings, tsunamis and other natural phenomena is mandatory and cannot be deselected on the NAVTEX receiver. This has been designed to ensure that ships using NAVTEX always receive the most vital information.

5.3.5   Messages received which have been transmitted using B_2 character D, will also set off an alarm built into the NAVTEX receiver.

5.3.6   In the International NAVTEX Service, national authorities shall obtain the agreement of IMO for all proposals for the use of special service subject indicator characters. Applications shall be addressed to the IMO NAVTEX Co-ordinating Panel. Such proposals shall meet the following criteria:

> **.1**   The full international service must remain unaffected.

> **.2**   The special service broadcasts shall be transmitted only when time allows, and with due regard to the necessity for the frequency to remain unused for a high percentage of the time.

> **.3**   The special service broadcast shall only be used for its approved purpose.

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[9] Use of B_2 character D will automatically set off the alarm at the NAVTEX receiver
[10] On some older NAVTEX receivers it may be possible to deselect B_2 character L (continuation of B_2 subject group A), however, it is also strongly recommended this character is not deselected.

5.4 $B_3 B_4$ **–Message Numbering Characters**

5.4.1 Each message within each subject group, is allocated a two digit sequential serial number, beginning at 01 and ending at 99. The B_3B_4 Message Numbering Characters together, are often referred to as the "NAVTEX number".

5.4.2 The NAVTEX number is solely allocated as a component of the NAVTEX message identity and should not be confused with (and bears no correlation to), the series identity and consecutive number of the NAVAREA or Coastal warning contained in the message.

5.4.3 Messages broadcast using NAVTEX number $B_3B_4 = 00$ cannot be rejected and will automatically override any selection of B_1 Transmitter Identification Characters as well as any B_2 Subject Indicator Characters at the NAVTEX receiver.

5.4.4 Use of NAVTEX number $B_3B_4 = 00$ must therefore be **strictly controlled,** since messages carrying it will always be printed or displayed every time they are received. Routine messages and service messages must never be allocated $B_3B_4 = 00$. It should be borne in mind that the correct use of B_2 characters A, B, D and L, will ensure that messages containing safety information will always be printed or displayed on first receipt.

6 - MESSAGE IDENTITY

6.1 The individual NAVTEX message identity is the amalgamation of all four technical Codes $B_1B_2B_3B_4$ (Transmitter Identification Character / Subject Indicator Character / Message Numbering Characters).

6.2 When a message is received for the first time by a NAVTEX receiver, the message identity is recorded and stored in the memory for 72 hours. This ensures that subsequent transmissions of the same message are not re-printed or repeated in the display, unless they are re-received over 72 hours later. In the unlikely event that all 99 NAVTEX numbers for a particular subject group, from a particular transmitter, are in use at the same time, or have been allocated within the past 72 hours, an alternative B_2 character must be utilised; for example, $B_2 = L$ has been set aside to be used for additional navigational warnings, should all 99 NAVTEX numbers for subject group $B_2 = A$ be unavailable.

6.3 Each NAVTEX message identity shall be allocated by the relevant NAVTEX Co-ordinator, who is the authority responsible for the selection of information to be broadcast by each transmitter within each subject group. A single NAVTEX Co-ordinator may have more than one transmitter under their control. Specific advice on the use of alternative B_2 characters as mentioned in **6.2** above can be provided by the IMO NAVTEX Co-ordinating Panel.

7 – MESSAGE FORMAT

7.1 NAVTEX messages must be composed in accordance to the guidelines contained in the Joint IMO/IHO/WMO Manual on Maritime Safety Information and IHO Publication S-53. The format of all messages shall be in strict accordance with **Figure 6**. This defines the essential elements of the messages which influence the operation of the receiver. Great care is required to avoid errors of syntax in the groups ZCZC $B_1B_2B_3B_4$ and NNNN as they will cause receivers to operate incorrectly, and may well result in messages not being received.
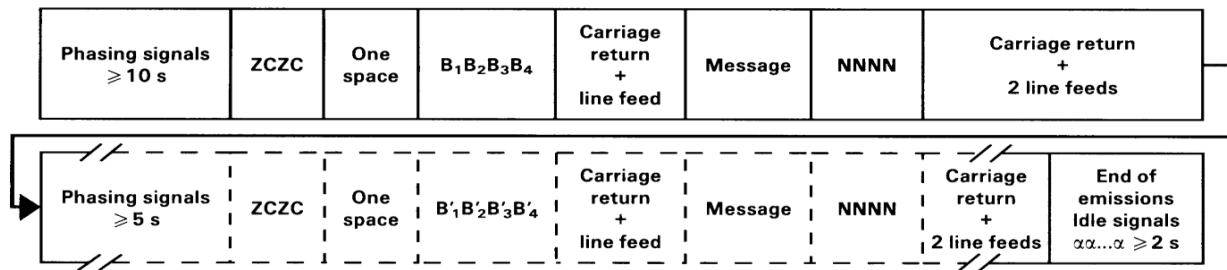
Figure 6 - Standard format for NAVTEX messages

7.2 The phasing signal is automatically transmitted by the NAVTEX transmitter at the beginning of each message and is critical to the effective operation of the system. It is this signal which enables a receiver to lock-on to a particular station's transmission, providing the frequency is not already in use.

7.3 If another station within transmitting range and with a timeslot prior to the station selected overruns its time slot (regardless of the B_1 character in use), its transmission will blank the phasing signal of the subsequent transmitter. It will then seem to the receiver as if the second station is off the air and its broadcast will not be received, possibly denying the user significant safety information. This is the primary reason behind the importance of each station adhering to its allocated time slots. Similarly if the phasing signal for a particular station is too short, some receivers will be unable to lock on to the transmission.

7.3.1 Basic message elements:

Element	Example	Input
Phasing signal		Automatic
Start of message group	ZCZC	Manual
One space		Manual
NAVTEX message identity	FA01	Manual
Carriage return + line feed		Manual
Message content	NAV I 020/10 SOUTHERN NORTH SEA, UK SECTOR, Viking Gasfield. Platform 49/17-HD, 53-29.8N 002-19.4E, all navaids inoperative.	Manual
End of message instruction	NNNN	Manual
Carriage return + two line feeds		Manual
Phasing signal		Automatic

7.3.2 When a message has been received error-free, a record is made by the receiver of the NAVTEX message identity. This unique identifier is used to suppress the printing or display of repeated transmissions of the same message.

7.3.3 On national NAVTEX services it is important to keep to the same basic message format as that required for the International NAVTEX service. It is also important to ensure that the full broadcast does not overrun the allocated time slot, particularly when using 490 kHz or 4209.5 kHz. However, in order to meet national requirements, message content may deviate from the guidelines provided for the International Service if required.

Figure 7 – Examples of Navigational Warnings on 518 kHz and 490 kHz

Figure 8 – Examples of Meteorological Warnings on 490 kHz

8 - LANGUAGE AND NATIONAL BROADCAST OPTIONS

8.1   International NAVTEX Service messages on 518 kHz or 4209.5 kHz shall be broadcast only in English.

8.2   There is often a requirement for broadcasts to be made in national languages in addition to English and for subject matter other than that listed in Section 5. This is achieved by the provision of a national NAVTEX service.

8.3   National NAVTEX services allow the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies other than 518 kHz and languages as decided by the Administrations concerned. These services may simply repeat the messages broadcast over the International NAVTEX service but in the national language, or they may be tailored to meet particular national requirements, for example by providing different or additional information to that broadcast on the International NAVTEX service targeted at recreational vessels or fishing fleets. These National NAVTEX services may be broadcast on 490 kHz or 4209.5 kHz or on an alternative nationally assigned frequency.

9 – INFORMATION CONTROL

9.1   The time-shared nature of NAVTEX services imposes the need for strict discipline in controlling the information flow of the broadcast. To achieve this, it is necessary to co-ordinate the messages in each B_2 category at each transmitter. In general, all messages shall be brief and clear and avoid duplication. Strict adherence to relevant guidelines such as those in IMO Assembly resolution A.706(17), as amended, the Joint IMO/IHO/WMO Manual on Maritime Safety Information and the WMO Manual on Marine Meteorological Services, Part 1*bis*, Provision of warnings and weather and sea bulletins (GMDSS application) is recommended, but certain additional operating procedures have also been found necessary:

    .1   messages in each category shall be broadcast in reverse order of receipt by the NAVTEX Co-ordinator, with the latest being broadcast first; and

    .2   cancellation messages shall be broadcast once only. The cancelled message shall not be transmitted on the broadcast in which its cancellation message appears or in any subsequent transmissions.

10 – MESSAGE CONTENT

10.1   It is important that national authorities operating or planning NAVTEX services are quite clear what sort of information shall or shall not be included in the messages.

10.2   The International NAVTEX service shall be used for transmitting Maritime Safety Information only and shall NOT be used as a medium for providing Notices to Mariners or for broadcasting Local Warnings. NAVTEX is essentially a medium for broadcasting information that is **needed** by vessels to safely navigate through the NAVTEX service area of the appropriate station, particularly those vessels engaged in coastal passages. More detailed guidance in respect to different classes of messages is given below. Examples of the content and layout of NAVTEX messages are shown in the Joint IMO/IHO/WMO Manual on Maritime Safety Information. This publication shall be available to all personnel responsible for the drafting of messages to be broadcast by NAVTEX stations.

10.2.1　Navigational warnings

.1　coastal warnings and NAVAREA warnings (B_2 = A or L) issued under the guidance of IMO Assembly resolution A.706(17), as amended, which would be of concern to ships in the NAVTEX service area allocated to the transmitter shall be included in the broadcast. Relevant Coastal warnings shall normally be repeated at every scheduled transmission for as long as they remain in force; however, if they are readily available to mariners by other official means, for example in notices to Mariners, then after a period of six weeks they may no longer be broadcast. NAVTEX Co-ordinators should arrange to receive NAVAREA warnings appropriate to their area for inclusion in their broadcasts. These shall be broadcast at least twice each day - to avoid overloading the broadcast time slot, they shall normally be scheduled for transmission during slots that do not include weather forecasts (see also paragraph **10.2.2.2**);

.2　a summary of navigational warnings remaining in force shall normally be broadcast each week; and

.3　local warnings shall not be broadcast on NAVTEX, i.e. information relating to the sea area inshore of the fairway buoy/pilot station, as defined by IMO Assembly resolution A.706(17), as amended.

10.2.2　Meteorological messages

.1　meteorological warnings (B_2 = B) e.g. gale warnings, which are raised by nominated Meteorological authorities, shall be placed on the broadcast immediately on receipt by the NAVTEX Co-ordinator and repeated at the next routine scheduled transmission only. These messages shall contain **only** the appropriate warnings and shall be separate from the weather forecasts;

.2　weather forecasts (B_2 = E) shall be broadcast at least twice each day. This service shall be carefully co-ordinated where transmitters are geographically close together. It is important that such forecasts only appertain to the appropriate NAVTEX service area for each transmitter;

.3　routine ice reports shall normally be broadcast on NAVTEX once a day; and

.4　ice accretion warnings shall normally be included in the routine ice report but, when separately issued, they are to be treated as a meteorological warning using B_2 = B and transmitted immediately on receipt and at the next routine scheduled transmission.

10.2.3　Search and rescue information

.1　the NAVTEX broadcast is not suitable for distress traffic. Therefore, **only** the initial distress message shall be retransmitted on NAVTEX, using B_2 = D, in order to alert mariners to a distress situation, by setting off an audio alarm.

.2   a single authority, which will normally be a Maritime Rescue Co-ordination Centre (MRCC), should be designated SAR Co-ordinator to input information via the NAVTEX Co-ordinator, for a NAVTEX message. The initial shore-to-ship distress-related message should have previously been broadcast on the appropriate distress frequency prior to any related NAVTEX message being broadcast.

10.2.4 Piracy attack warnings

Piracy attack warnings shall be transmitted under $B_2 = D$, in order to alert mariners by setting off an audio alarm. They shall be broadcast immediately on receipt and at subsequent scheduled transmissions;

10.2.5 Tsunami and other natural phenomena warning messages

Tsunami warnings, and negative tidal surge shall be transmitted under $B_2 = D$, in order to alert mariners by setting off an audio alarm. They shall be broadcast immediately on receipt and at subsequent scheduled transmissions;

10.2.6 Pilotage service messages

Category $B_2 = F$ is to be used only for broadcasting temporary alterations to the pilot service. This can include messages which notify the temporary movement or suspension of a pilot service due to stress of weather, etc. This category is for the information of all ships approaching a port and is not to be used for specific instructions to individual ships or pilots.

10.2.7 Electronic navaid messages

B_2 categories are provided for the principal electronic navaids, which are suitable for use in NAVTEX coverage areas. They shall be used to advise mariners of significant degradation of a particular service. Short periods of transmission failure are seldom appropriate since they do not affect prudent navigation. The following thresholds have been found to be appropriate for the majority of users:

.1   LORAN - off air > 1 hour;

.2   SATNAV - off air > 4 hours; and

.3   AIS attached to Aids to Navigation – off air > [24] hours

.4   AIS stations – off air > [1] hour

10.2.8   No messages on hand

When there are no NAVTEX messages to be disseminated at a scheduled broadcast time, a brief message shall be transmitted to advise the mariner that there is no message traffic on hand. Category $B_2 = Z$ is to be used to announce "NO MESSAGES ON HAND".

10.2.7 Use of abbreviations

Use of abbreviations shall be strictly in accordance with internationally accepted usage as contained in **Table 2**.

Terminology in full	NAVTEX Abbreviation	Terminology in full	NAVTEX Abbreviation
North or Northerly	**N**	Moving/Move	**MOV or MVG**
Northeast or Northeasterly	**NE**	Veering	**VEER**
East or Easterly	**E**	Backing	**BACK**
Southeast or Southeasterly	**SE**	Slowly	**SLWY**
South or Southerly	**S**	Quickly	**QCKY**
Southwest or Southwesterly	**SW**	Rapidly	**RPDY**
West or Westerly	**W**	Knots	**KT**
Northwest or Northwesterly	**NW**	Km/h	**KMH**
Decreasing	**DECR**	Nautical miles	**NM**
Increasing	**INCR**	Metres	**M**
Variable	**VRB**	HectoPascal	**HPA**
Becoming	**BECMG**	Meteo…	**MET**
Locally	**LOC**	Forecast	**FCST**
Moderate	**MOD**	Further outlooks	**TEND**
Occasionally	**OCNL**	Visibility	**VIS**
Scattered	**SCT**	Slight	**SLGT or SLT**
Temporarily/Temporary	**TEMPO**	Quadrant	**QUAD**
Isolated	**ISOL**	Possible	**POSS**
Frequent/Frequency	**FRQ**	Probability/Probable	**PROB**
Showers	**SHWRS or SH**	Significant	**SIG**
Cold Front	**C-FRONT or CFNT**	No change	**NC**
Warm Front	**W-FRONT or WFNT**	No significant change	**NOSIG**
Occlusion Front	**O-FRONT or OFNT**	Following	**FLW**
Weakening	**WKN**	Next	**NXT**
Building	**BLDN**	Heavy	**HVY**
Filling	**FLN**	Severe	**SEV or SVR**
Deepening	**DPN**	Strong	**STRG**
Intensifying/Intensify	**INTSF**	From	**FM**
Improving/Improve	**IMPR**	Expected	**EXP**
Stationary	**STNR**	Latitude/Longitude	**LAT/LONG**
Quasi-Stationary	**QSTNR**		

Table 2 - Common abbreviations for International NAVTEX Service

11 - MESSAGE PRIORITIES AND BROADCAST PROCEDURES IN THE INTERNATIONAL NAVTEX SERVICE

11.1   Message priorities

11.1.1 The message originator is responsible for assessing the urgency of the information and inserting the appropriate priority marking. One of three message priorities is used to dictate the timing of the first broadcast of a new warning in the NAVTEX service. In descending order of urgency, they are:

    .1 VITAL   -   for immediate broadcast;

    .2 IMPORTANT -   for broadcast at the next available period when the frequency is unused; and

    .3 ROUTINE   -   for broadcast at the next scheduled transmission.

11.1.2 Both **VITAL** and **IMPORTANT** messages shall be repeated, at least once at the next scheduled transmission time slot, if the situation is still extant.

11.1.3 The message priority is a procedural instruction for the NAVTEX Co-ordinator or the transmitting station and shall **not** be included in the message. By selecting the appropriate priority of **VITAL**, **IMPORTANT** or **ROUTINE** at the transmission terminal, the message will be broadcast with the correct priority.

11.1.4 In order to avoid unnecessary disruption to the service, the priority marking **VITAL** is to be used only in cases of **extreme urgency**, i.e. to relay an initial shore-to-ship distress-related message or acts of piracy warnings, tsunamis and other natural phenomena warnings. In addition, **VITAL** messages are to be kept as brief as possible. The information provider is responsible for ensuring that the NAVTEX Co-ordinator is fully and immediately aware when a message shall be broadcast with the priority of **VITAL**.

11.1.5 **VITAL** messages will normally be broadcast using NAVTEX number $B_3B_4 = 00$.

11.2 Broadcast procedures

    .1   **VITAL** messages.
           On receipt of a message with a **VITAL** priority, the NAVTEX Co-ordinator will commence monitoring the NAVTEX frequency. If the frequency is clear, the VITAL message is to be transmitted immediately. If the frequency is in use, the Co-ordinator is to determine which other station is transmitting, and contact that station by any other means at his disposal with a request that they break their transmission to allow the sending of the **VITAL** message. As soon as the frequency is clear, the **VITAL** message is to be transmitted. Once the **VITAL** message has been transmitted, the former station is free to resume scheduled transmissions;

    .2   **IMPORTANT** messages.
           Messages bearing the priority marking **IMPORTANT** are to be broadcast during the next available period when the NAVTEX frequency is unused. This is to be identified by monitoring the frequency. It is expected that this level of priority will be sufficient for the majority of urgent information; and

    .3   **ROUTINE** messages.
           ROUTINE messages are to be broadcast at the next scheduled transmission after receipt at the NAVTEX transmitting station. This level of priority will be appropriate for almost all messages broadcast on NAVTEX and is always to be used unless special circumstances dictate the use of a higher priority.

11.2.1 The broadcast procedures concerning differing message priorities, are the same for both the International and National NAVTEX services.

12 – RESPONSIBILITIES OF A NAVTEX CO-ORDINATOR

12.1   NAVTEX Co-ordinators exercise control of messages transmitted by each station according to the information contained in each message and the geographical coverage required. Thus a user may choose to accept messages, as appropriate, either from the single transmitter which serves the

sea area around his position or from a number of transmitters. Ideally, the user should select the station within whose coverage area his vessel is currently operating and the station into whose coverage area his vessel will transit next.

12.2   The NAVTEX Co-ordinator must:

.1   act as the central point of contact on matters relating to NAVTEX transmissions for a given transmitter or number of transmitters;

.2   be responsible for continuously ensuring quality-control for the operation of the NAVTEX transmitting stations under its jurisdiction. This shall be achieved with the co-operation of the information providers to ensure that:

a)   messages are always concise and remain within the designated 10 minute time slots assigned by the IMO NAVTEX Co-ordinating Panel;
b)   **MINIMUM** power is used to achieve satisfactory range performance; and
c)   the co-ordinated service is operating satisfactorily;

.3   assess all requests for NAVTEX messages immediately upon receipt;

.4   schedule each message for broadcast in accordance with the requested priority of VITAL, IMPORTANT or ROUTINE;

.5   monitor the international NAVTEX frequency along with any other National frequency used by the transmitters under their jurisdiction in order to ensure that the messages have been correctly broadcast;

.6   monitor the international NAVTEX frequency along with any other National frequency used in order to identify vacant transmission periods required for VITAL or IMPORTANT messages;

.7   pass MSI which warrants promulgation outside of their NAVTEX service area directly to the appropriate authority, using the quickest possible means;

.8   allocate a message identity to each message, including the sequential NAVTEX number;

.9   ensure that NAVTEX messages which have been cancelled are removed from the broadcast schedule at the same time as the cancellation message is promulgated;

.10   promote and oversee the use of established international standards and practices with respect to the format and protocols associated with NAVTEX messages;

.11   maintain records of source data relating to NAVTEX messages in accordance with the requirement of the National Administration of the NAVAREA coordinator;

.12   be aware of the responsibilities of a NAVAREA, Sub-area and National Co-ordinator contained in IMO resolution A.706(17), as amended, paying particular attention to the specific guidance for the promulgation of internationally co-ordinated MSI provided there-in; and

.13   take into account the need for contingency planning

12.3 Management of the service - Data priority and formatting

.1   most information broadcast on NAVTEX services relates to either Navigational Warnings or Meteorological Information. These types of information often originate from different organizations within a country and it is not until they arrive with the NAVTEX Co-ordinator that an assessment can be made whether there is too much information for the relevant broadcast time slot. Each data provider may consider their data to be more important and therefore for transmission in full. However, the NAVTEX Co-ordinator needs to control the overall volume of data broadcast and may need to refer back to data providers to prioritize their information and reduce the amount of data to be broadcast. Some NAVTEX Co-ordinators utilize digital systems which include software that provides a readout of predicted transmission times for data held ready for broadcast. This enables the Co-ordinator to anticipate any problems and take action before the scheduled broadcast;

.2   transmission times shall be kept to a minimum by strictly formatting messages and avoiding the use of free text whenever possible;

.3   data to meet purely national requirements shall not be broadcast on the International NAVTEX service, but should be migrated to a national NAVTEX service (see Annex 5 - COMSAR/Circ.28).

12.4   Balancing the volume of data to be broadcast throughout the daily transmission cycle

For many categories of message there is no option with regards to when they shall be transmitted. However, in order to minimize the risk of over-running the allocated 10 minute time slot, it is possible to balance the overall length of transmissions by broadcasting NAVAREA warnings at different times to sea area weather forecasts and the weekly summary of navigation warnings in force. An example of how this may be managed is given below for a station with a B_1 character of C:

Timeslot	Content
0020 - 0030	coastal navigational warnings NAVAREA warnings
0420-0430	coastal navigational warnings summary of navigational warnings in-force (once/week only)
0820-0830	coastal navigational warnings sea area weather forecast
1220-1230	coastal navigational warnings NAVAREA warnings
1620-1630	coastal navigational warnings ice reports
2020-2030	coastal navigational warnings sea area weather forecast

13 - BEST PRACTICE FOR THOSE USING THE SERVICE

13.1　In order to ensure that all necessary MSI has been received, the NAVTEX receiver should be switched on at least 12 hours before sailing, or left on at all times.

13.2　**Logging.** The reception of weather forecasts or navigational warnings on NAVTEX does not require to be noted in the radio log. The NAVTEX printout replaces the log entries required by chapter IV of the 1974 SOLAS Convention, as amended in 1988. Where a printer is not provided, a log shall be maintained electronically.

14 - MUTUAL INTERFERENCE BETWEEN NAVTEX STATIONS

14.1　The two principal causes of interference are:

> a)　transmission overruns; and
> b)　excessive power output.

14.1.1　Although NAVTEX continues to be generally reliable and an effective medium for the promulgation of Maritime Safety Information, the world-wide infrastructure continues to expand and the volume of information that each Administration disseminates through the international NAVTEX service continues to increase.　There is now a real danger that in some geographical areas, without firm management, both the system and system users may become overloaded with information on the single frequency used.

14.1.2　Many stations are filling their allotted 10 minute time slots and an increasing number are over-running.　Instances of interference with neighbouring stations, as a result of over-running the time allocation, are also increasing.　Where adjacent stations have B_1 characters which follow alphabetically (i.e. time slots abut), if the first station over runs, it may mask the phasing signal of the second station such that, to the user, it seems as if the second station is off the air. Safety-critical information from the second station, although broadcast, may not be received by the system users.　Over-run is usually caused by one or more of the following and should be avoided at all costs, preferably by controlling the volume of data broadcast:

> .1　a significant increase in safety-critical activity such as cable laying.　Navigational warnings promulgating such activity often include numerous waypoints which are listed by Latitude and Longitude;
>
> .2　meteorological information provided in a manner which is not concise and easily assimilated by the system user or for a much wider area than is covered by the NAVTEX station;
>
> .3　additional information provided for non-SOLAS system users e.g. longer-range weather forecasts for fishing and recreational vessels and
>
> .4　information to meet specific national requirements.　This includes national language broadcasts and other information which is sometimes required to be broadcast by national statute rather than IMO resolutions.

14.1.3 As the GMDSS spreads to non-SOLAS mariners, their requirements for information are often different from the SOLAS ships and may be determined at a national level. SOLAS ships trading internationally usually pass through the area of coverage of a NAVTEX transmitter in a day; for them a 24-hour weather forecast usually suffices. However, fishing vessels and recreational vessels often remain in the same vicinity for several days and may require much longer range forecasts which take up more transmission time.

14.1.4 In order to keep the quantity of information that is broadcast on 518 kHz to manageable levels and to reduce avoidable interference on this frequency, it is recommended that:

> **.1** Administrations monitor the volume of data broadcast and, together with adjacent Administrations, actively manage the system to ensure that interference caused by over-running allocated time slots is minimized; and

> **.2** Administrations migrate non-English language broadcasts, and broadcasts of information provided specifically for non-SOLAS vessels from 518 kHz to a national broadcast on 490 kHz or 4209.5 kHz as required. B_1 characters for these frequencies will be allocated by the International NAVTEX Co-ordinating Panel, on request.

14.1.5 Excessive power output also causes interference between stations with the same B_1 character/time slot, but located in different regions. This has, particularly been identified at night, as the number of operational NAVTEX stations increases. Occasionally, this can be caused by atmospheric conditions, but is generally caused by excessive power output from one of the stations. It is recommended that Administrations restrict the power output from their transmitters to that required to cover the designated NAVTEX service area, particularly at night, in order to avoid interference. As a general rule, transmitter power should never exceed 1 kW by day and 300 watts by night; use of as much as 7 kW has been noted in extreme cases of reported interference.

14.2 When interference is detected, particularly when it affects the service to system users, the matter shall be addressed immediately. When the interference is with adjacent stations, attempts shall be made to resolve the problem locally. Advice may also be sought from the NAVAREA Co-ordinator. If this is unsuccessful, the IMO NAVTEX Co-ordinating Panel shall be alerted to the problem and their advice sought. Occasionally it may be necessary to change the B_1 character/time slot of one of the stations to introduce more time separation between the broadcasts. However this shall be viewed as a last resort as this may have a significant impact on data providers, particularly providers of meteorological information, as they may have to reschedule their services. When the interference is from a station with the same B_1 character in a different area, the NAVTEX Co-ordinating Panel must be contacted and they will initiate any necessary investigation/action.

15 - INFORMATION FOR MARINERS AND PUBLICITY

15.1 The widest publicity should be given to the establishment of a NAVTEX service within those countries concerned and within their respective NAVAREA.

15.2 National Administrations shall ensure that mariners are informed of the establishment of a NAVTEX service by inclusion of full details in Notices to Mariners and lists of radio signals. In addition, full details of the service finally agreed shall be forwarded to:

> • International Maritime Organization

4 Albert Embankment
London SE1 7SR
United Kingdom

- International Telecommunication Union
Radiocommunication Bureau
Place des Nations
1211 Genève 20
Switzerland

- Those authorities known to produce international lists of radio signals

Annex 1

IMO SUB-COMMITTEE ON RADIOCOMMUNICATIONS AND SEARCH AND RESCUE (COMSAR) Co-ordinating Panel on NAVTEX services

1   Terms of reference

.1   advise Government Administrations planning to implement a NAVTEX service on the frequencies 518 kHz, 490 kHz or 4209.5 kHz, on the operational aspects of the system. In particular, advise on the optimum number of stations, the allocation of identifying characters (B_1), broadcast times and broadcast message criteria;

.2   co-ordinate the operational aspects of NAVTEX in the planning stages to minimize the risk of mutual interference between States or regions owing to the number of stations, transmitter power, time of broadcasts, or B_1 character assignment;

.3   remain aware of system problems which arise, through reports from sea and correspondence with operational NAVTEX Co-ordinators. When problems are identified, liaise with appropriate national Administrations involved, NAVAREA/METAREA Co-ordinators, the Sub-Committee, IHO or WMO, as appropriate, recommend solutions or mitigating measures and, when agreed, co-ordinate their implementation; and

.4   prepare documentation supporting the system for the Sub-Committee, including both that needed by the broadcasting Authority to guide its operations, and that needed to inform the user of the service (mariner, shipowner and operator).

2   Contact addresses

The NAVTEX Co-ordinating Panel can be contacted at the following addresses:

The Chairman
IMO NAVTEX Co-ordinating Panel
International Maritime Organization
4 Albert Embankment
London SE1 7SR
United Kingdom

Telephone: +44 (0)20 7735 7611
Telefax: +44 (0)20 7587 3210
Email: info@imo.org

3   Panel membership and participation

3.1   The membership of the NAVTEX Co-ordinating Panel should include experts designated by Administrations willing to participate in the Panel and representatives of concerned international organizations. Anyone with the necessary qualifications and experience who is interested in becoming a member of the Panel should contact the Chairman.

3.2   The work of the Panel is conducted mainly by correspondence, but it has been found useful to hold occasional meetings to discuss current issues. These meetings are usually scheduled to be held in the margins of IMO, WMO or IHO meetings when Panel members are in attendance. This also allows attendance by other experts in order to provide advice on specific matters.

ANNEX 2

RECOMMENDATION ITU-R M.540*

Operational and Technical Characteristics for an Automated Direct-Printing Telegraph System for Promulgation of Navigational and Meteorological Warnings and Urgent Information to Ships

(Question 5/8)

The CCIR,[†]   (1978-1982-1990)

CONSIDERING

(a)   that the availability of navigational and meteorological warnings and urgent information on board ships is of great importance for safety;

(b)   that the existing radiocommunication system for promulgation of navigational and meteorological warnings and urgent information to ships can be improved by use of modern techniques;

(c)   that the IMO has established the following definitions on the promulgation of maritime safety information:

- *NAVTEX* means the system for the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy;

- *international NAVTEX service* means the co-ordinated broadcast and automatic reception on 518 kHz of maritime safety information by means of narrow-band direct-printing telegraphy using the English language, as set out in the NAVTEX manual, published by the IMO;

- *national NAVTEX service* means the broadcast and automatic reception of maritime safety information by means of narrow-band direct-printing telegraphy using frequencies and languages as decided by the Administrations concerned;

(d)   that the 1988 Amendments to the International Convention for the Safety of Life at Sea, 1974, require that every ship to which the Convention applies shall be provided with a receiver capable of receiving international NAVTEX service broadcasts;

(e)   that several countries are operating a co-ordinated international NAVTEX service based on narrow-band direct-printing in accordance with Article 14A of the Radio Regulations;

(f)   that the system should be applicable to the maritime mobile service (both international and national);

[†]   The name "CCIR" was changed to "Radiocommunication Bureau" by the reorganization of the International Telecommunication Union on 1 March 1993

(g)   that it is desirable that the service fulfils the requirements of all types of ships desiring to use it;

(h)   that although each area may need specific guidance, the use of standard technical and operational characteristics would facilitate the extension of the service,

UNANIMOUSLY RECOMMENDS

1.   that the operational characteristics for the promulgation of navigational and meteorological warnings and urgent information using NBDP should be in accordance with Annex I;

2.   that the technical characteristics for the promulgation of navigational and meteorological warnings and urgent information using NBDP should be in accordance with Annex II.

ANNEX I

OPERATIONAL CHARACTERISTICS

1 Narrow-band direct-printing techniques should be used for an automated telegraph system for promulgation of navigational and meteorological warnings and urgent information to ships. Common frequencies for such transmissions should be internationally agreed upon and the frequency 518 kHz has been designated for world-wide use in the international NAVTEX service (see Radio Regulations Nos. 474, 2971B and N2971B).

1.1 For national NAVTEX services Administrations should also utilize the format of this Recommendation on the appropriate frequencies as defined in the Radio Regulations.

2 The radiated power from the coast station transmitter should only be that sufficient to cover the intended service area of that coast station. The range extension occurring during night hours should also be considered.

3 The information transmitted should primarily be of the type used for coastal waters preferably using a single frequency (Resolution No. 324 (Mob-87)).

4 The transmission time allocated to each station should be restricted to that which is adequate for the anticipated messages to be broadcast to the area concerned.

5 Scheduled broadcasts should take place at intervals not exceeding eight hours and be co-ordinated, to avoid interference with broadcasts from other stations.

6 *Message priorities*

6.1 Three message priorities are used to dictate the timing of the first broadcast of a new warning in the NAVTEX service. In descending order of urgency they are:

> VITAL: for immediate broadcast, subject to avoiding interference to ongoing transmissions;

> IMPORTANT: for broadcast at the next available period when the frequency is unused; and

> ROUTINE: for broadcast at the next scheduled transmission period.

Note: Both VITAL and IMPORTANT warnings will normally need to be repeated, if still valid, at the next scheduled transmission period.

6.2 In order to avoid unnecessary disruption to the service, the priority marking VITAL is to be used only in cases of extreme urgency, such as some distress alerts. In addition, VITAL messages are to be kept as brief as possible.

6.3 Periods should be scheduled between the regular transmission periods permitting immediate/early transmission of VITAL messages.

6.4   By use of the message serial number 00 in the preamble of a message (see also Annex 11 § 6) it is possible to override any exclusion of coast stations or of message types which might have been made in the receiving equipment.

7   Initial shore-to-ship distress-related messages should first be broadcast on the appropriate distress frequency by coast stations in whose SAR area distress cases are handled.

8   Participating transmitting stations should be provided with monitoring facilities to enable them to:

- monitor their own transmissions as to signal quality and transmission format;
- confirm that the channel is not occupied.

9   In case a message is repeated by more than one transmitting station within the same NAVTEX region (e.g. for better coverage) the original preamble $B_1 \sim B_4$ (see annex II) should be used.

10   In order to avoid overloading of the channel it is desirable to use a single language and where a single language is used it shall be English.

11   Dedicated on-board equipment is recommended.

12   Other operational characteristics and detailed guidance are given in the NAVTEX Manual developed by the International Maritime Organization.

ANNEX II

TECHNICAL CHARACTERISTICS

1   The signals transmitted should be in conformity with the collective B-mode of the direct-printing system specified in Recommendations 476 and 625.

2   The technical format of the transmission should be as follows:
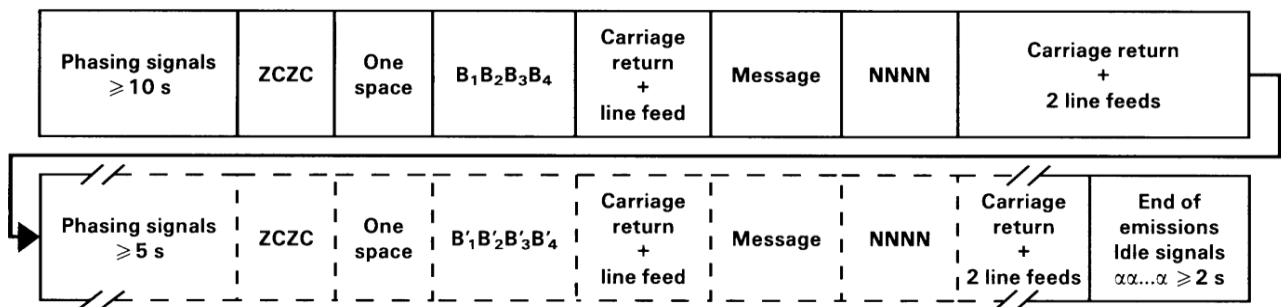
in which ZCZC defines the end of the phasing period,

the B_1 character is a letter (A-X) identifying the transmitter coverage area,

the B_2 character is a letter (A-Z) for each type of message.

2.1   Both the B_1 characters identifying the different transmitter coverage areas and the B_2 characters identifying the different types of messages are defined by IMO and chosen from Table I of Recommendations 476 and 625, combination numbers 1-26.

> **2.1.1** Ship equipment should be capable of automatically rejecting unwanted information using character B_1.
>
> **2.1.2** Ship equipment should be capable of disabling print-out of selected types of messages using character B_2 with the exception of messages with B_2 characters A, B, D and L (see also § 2.1).
>
> **2.1.3** If any facility is rejected or disabled in § 2. 1.1 and 2.1.2 above, the extent of any such limitation must be clearly indicated to the user.

2.2 B_3B_4 is a two-character serial number for each B_2, starting with 01 except in special cases where the serial number 00 is used (see § 6 below).

2.3   The characters ZCZC $B_1B_2B_3B_4$ need not be printed.

3   The printer should only be activated if the preamble B_1~B_4 is received without errors.

4   Facilities should be provided to avoid printing of the same message several times on the same ship, when such a message has already been satisfactorily received.

5   The necessary information for the measures under § 4 above should be deduced from the sequence $B_1B_2B_3B_4$ and from the message.

6   A message should always be printed if $B_3B_4 = 00$.

7   Extra (redundant) letter and figure shifts should be used in the message to reduce garbling.

8   In case a message is repeated by another transmitting station (e.g. for better coverage) the original preamble $B_1 \sim B_4$ should be used.

9   The equipment on board ships should be neither unduly complex or expensive.

10   The transmitter frequency tolerance for the mark and the space signals should be better than $\pm$ 10 Hz.

ANNEX 3

RESOLUTION MSC.148(77)
(adopted on 3 June 2003)

Adoption Of The Revised Performance Standards For Narrow-Band Direct-Printing Telegraph Equipment For The Reception Of Navigational And Meteorological Warnings And Urgent Information To Ships (NAVTEX)

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

NOTING the carriage requirement in SOLAS chapter IV/7.1.4 for a receiver capable of receiving International NAVTEX narrow-band direct-printing (NBDP) broadcasts for the promulgation of navigational and meteorological warnings to shipping,

NOTING FURTHER the success of the International NAVTEX service in the promulgation of Maritime Safety Information (MSI),

NOTING ALSO with regard to the enhanced storage, processing and display possibilities offered by recent technical advances,

CONSIDERING that further growth in information promulgated to ships will be constrained by the capacity of the International NAVTEX service and the increasing importance of National NAVTEX services,

HAVING CONSIDERED the recommendations on the revision of resolution A.525(13) made by the Sub-Committee on Radiocommunications and Search and Rescue at its seventh session,

1.　　ADOPTS the revised Recommendation on Performance Standards for Narrow-Band Direct-Printing Telegraph Equipment for the Reception of Navigational and Meteorological Warnings and Urgent Information to Ships (NAVTEX), set out in the Annex to the present resolution;

2.　　RECOMMENDS Governments to ensure that NAVTEX receiver equipment:

　　(a)　　if installed on or after 1 July 2005, conforms to performance standards not inferior to those specified in the Annex to the present resolution;

　　(b)　　if installed before 1 July 2005, conforms to performance standards not inferior to those specified in the Annex to resolution A.525(13).

ANNEX

Revised recommendation on performance standards for Narrow-band direct-printing telegraph equipment for The reception of navigational and meteorological Warnings and urgent information to ships (NAVTEX)

1 INTRODUCTION

1.1 The equipment, in addition to meeting the requirements of the Radio Regulations, the provisions of Recommendation ITU-R M.540 applicable to shipborne equipment and the general requirements set out in resolution A.694(17), should comply with the following performance standards.

2 GENERAL

2.1 The equipment should comprise radio receivers, a signal processor and:

either

.1 an integrated printing device; or

.2 a dedicated display device[1], printer output port and a non-volatile message memory; or

.3 a connection to an integrated navigation system and a non-volatile message memory.

3 CONTROLS AND INDICATORS

3.1 Details of the coverage areas and message categories which have been excluded by the operator from reception and/or display should be readily available.

4 RECEIVERS

4.1 The equipment should contain one receiver operating on the frequency prescribed by the Radio Regulations for the International NAVTEX System. The equipment should contain a second receiver capable of working at the same time as the first one on at least two other frequencies recognized for the transmission of NAVTEX information. The first receiver should have priority in the display or printing of received information. Printing or displaying of messages from one receiver should not prevent reception by the other receiver.

4.2 The receiver sensitivity should be such that for a source with an e.m.f. of $2\mu V$ in series with a non-reactive impedance of $50\,\Omega$, the character error rate is below 4%.

5 DISPLAY DEVICE AND PRINTER

5.1 The display device and/or printer should be able to display a minimum of 32 characters per line.

5.2 If a dedicated display device is used, the following requirements should be met:

.1 an indication of newly received unsuppressed messages should be immediately displayed until acknowledged or until 24 hours after receipt; and

.2 newly received unsuppressed messages should also be displayed.

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[1] Where there is no printer, the dedicated display device should be located in the position from which the ship is normally navigated.

5.3 The display device should be able to display at least 16 lines of message text.

5.4 The design and size of the display device should be such that displayed information is easily read under all conditions by observers at normal working distances and viewing angles.

5.5 If automatic line feed entails division of a word, this should be indicated in the displayed/printed text.

5.6 When displaying received messages on a display device, a clear indication of the end of a message should be given by automatically adding line feeds after the message or including some other form of delineation. The printer or printer output should automatically insert line feeds after completing print of the received message.

5.7 The equipment should display/print an asterisk if the character is received corrupted.

5.8 Where the printer is not integrated, it should be possible to select the following data to be output to a printer:

    .1 all messages as they are received;

    .2 all messages stored in the message memory;

    .3 all messages received on specified frequencies, from specified locations or having specified message designators;

    .4 all messages currently displayed; and

    .5 individual messages selected from those appearing on the display.

6 STORAGE

6.1 Non-volatile message memory

6.1.1 For each receiver fitted it should be possible to record at least 200 messages of average length 500 characters (printable and non-printable) in non-volatile message memory. It should not be possible for the user to erase messages from memory. When the memory is full, the oldest messages should be overwritten by new messages.

6.1.2 The user should be able to tag individual messages for permanent retention. These messages may occupy up to 25% of the available memory and should not be overwritten by new messages. When no longer required, the user should be able to remove the tag on these messages which may then be overwritten in normal course.

6.2 Message identifications

6.2.1 The equipment should be capable of internally storing at least 200 message identifications for each receiver provided.

6.2.2   After between 60 h and 72 h, a message identification should automatically be erased from the store. If the number of received message identifications exceeds the capacity of the store, the oldest message identification should be erased.

6.2.3   Only message identifications which have been satisfactorily received should be stored; a message is satisfactorily received if the error rate is below 4%.

6.3   Programmable control memories

6.3.1   Information for location (B1)[2] and message (B2)[2] designators in programmable memories should not be erased by interruptions in the power supply of less than 6 h.

7   ALARMS

7.1   The receipt of search and rescue information, acts of piracy warnings, tsunamis and other natural phenomena warnings (B2 = D) should give an alarm at the position from which the ship is normally navigated. It should only be possible to reset this alarm manually.

8   TEST FACILITIES

8.1   The equipment should be provided with a facility to test that the radio receiver, the display device/printer and non-volatile message memory are functioning correctly.

9   INTERFACES

9.1   The equipment should include at least one interface for the transfer of received data to other navigation or communication equipment.

9.2   All interfaces provided for communication with other navigation or communication equipment should comply with the relevant international standards.[3]

9.3   If there is no integrated printer, the equipment should include a standard printer interface.

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[2]   Refer to Recommendation ITU-R M.540
[3]   Refer to publication IEC 61162

ANNEX 4

Extract from IMO RESOLUTION A.801(19), annex 4

Criteria for use when providing a NAVTEX service

1   There are two basic areas which must be defined when establishing a NAVTEX service. They are:

Coverage area: An area defined by an arc of a circle having a radius from the transmitter calculated according to the method and criteria given in this annex.

Service area: A unique and precisely defined sea area, wholly contained within the coverage area, for which MSI is provided from a particular NAVTEX transmitter. It is normally defined by a line that takes full account of local propagation conditions and the character and volume of information and maritime traffic patterns in the region.

2   Governments desiring to provide a NAVTEX service should use the following criteria for calculating the coverage area of the NAVTEX transmitter they intend to install, in order to:

- determine the most appropriate location for NAVTEX stations having regard to existing or planned stations;
- avoid interference with existing or planned NAVTEX stations;
- establish a service area for promulgation to seafarers.

3   The ground-wave coverage may be determined for each coast station by reference to Recommendation ITU-R P.368-9 and Recommendation ITU-R P.372-10 for the performance of a system under the following conditions:

Frequency	- 518 kHz
Bandwidth	- 500 Hz
Propagation	- ground-wave
Time of day[1]	
Season[1]	
Transmitter power[2]	
Antenna efficiency[2]	
RF S/N in 500 Hz bandwidth	- 8 db[3]
Percentage of time	- 90

4   Full coverage of NAVTEX service area should be verified by field strength measurements.

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[1] Administrations should determine time periods in accordance with NAVTEX time transmission table (NAVTEX Manual, figure 3) and seasons appropriate to their geographic area based on prevailing noise level.

[2] The range of a NAVTEX transmitter depends on the transmitter power and local propagation conditions. The actual range achieved should be adjusted to the minimum required for adequate reception in the NAVTEX area served, taking into account the needs of ships approaching from other areas. Experience has indicated that the required range of 250 to 400 nautical miles can generally be attained by transmitter power in the range between 100 and 1,000 W during daylight with a 60% reduction at night.

[3] Bit error rate 1 x 10^{-2}

ANNEX 5

PROCEDURE FOR AMENDING THE NAVTEX MANUAL

1   Proposals for amendments to the NAVTEX Manual should be examined in substance by the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR). Amendments will only be adopted after the approval of the Maritime Safety Committee.

2   Amendments to the Manual should normally be adopted at intervals of approximately two years or at such longer periods as may be determined by the Maritime Safety Committee. Amendments adopted by the Maritime Safety Committee will be notified to all concerned, will provide at least 12 months' notification and will come into force on 1 January of the following year.

3   The agreement of the International Hydrographic Organization and World Meteorological Organization, and the active participation of other bodies, should be sought according to the nature of the proposed amendments.