



Recommendation ITU-R M.2010
(03/2012)

**Characteristics of a digital system, named
Navigational Data for broadcasting
maritime safety and security
related information from shore-to-ship
in the 500 kHz band**

M Series
**Mobile, radiodetermination, amateur
and related satellite services**



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Series	Title
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BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R M.2010

**Characteristics of a digital system, named Navigational Data
for broadcasting maritime safety and security
related information from shore-to-ship
in the 500 kHz band**

(2012)

Scope

The Recommendation describes an MF radio system, named Navigational Data (NAVDAT), for use in the maritime mobile service, operating in the 500 kHz band for digital broadcasting of maritime safety and security related information from shore-to-ship. The operational characteristics and system architecture of this radio system are included in Annexes 1 and 2. The two different modes of broadcasting data are detailed in Annexes 3 and 4

The ITU Radiocommunication Assembly,

considering

- a) that high speed data broadcast from shore-to-ships enhances operational efficiency and maritime safety;
- b) that the existing MF Maritime Safety Information system (NAVTEX) has limited capacity;
- c) that the e-Navigation system of the International Maritime Organization (IMO) increases the demand for data transmission from shore-to-ship;
- d) that the 500 kHz band provides good coverage for digital systems,

recognizing

that the Digital Radio Mondiale (DRM) system referenced in Annex 4 has been incorporated in Recommendation ITU-R BS.1514-2,

noting

that Report ITU-R M.2201 provides the basis for NAVDAT system,

recommends

- 1 that the operational characteristics for the broadcasting of maritime safety and security related information should be in accordance with Annex 1;
- 2 that the system architecture of the broadcasting system for maritime safety and security related information should be in accordance with Annex 2;
- 3 that the technical characteristics and modem protocols for digital data transmission from shore-to-ships in the 500 kHz band should be in accordance with Annex 3 or Annex 4.

Annex 1

Operational characteristics

The NAVDAT system uses a time-slot allocation similar to the NAVTEX system which could be coordinated by IMO in the same manner.

That NAVDAT system can also work on Single Frequency Network (SFN) as described in Annex 4. In this case transmitters are frequency synchronized and the transmit data must be the same for all transmitter.

The NAVDAT 500 kHz digital system offers a broadcast transmission of any kind of message from shore-to-ships with possibility of encryption.

1 Type of messages

Any broadcasting message should be provided by a secure and controlled source.

Message types broadcast can include, but are not limited to, the following:

- safety of navigation;
- security;
- piracy;
- search and rescue;
- meteorological messages;
- piloting or harbour messages;
- vessel traffic system files transfer.

2 Broadcast modes

2.1 General broadcast

These messages are broadcasted for the attention of all ships.

2.2 Selective broadcast

These messages are broadcasted for the attention of a group of ships or in a specific navigation area.

2.3 Dedicated message

These messages are addressed to one ship, using the maritime mobile service identity.

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Annex 2

System architecture

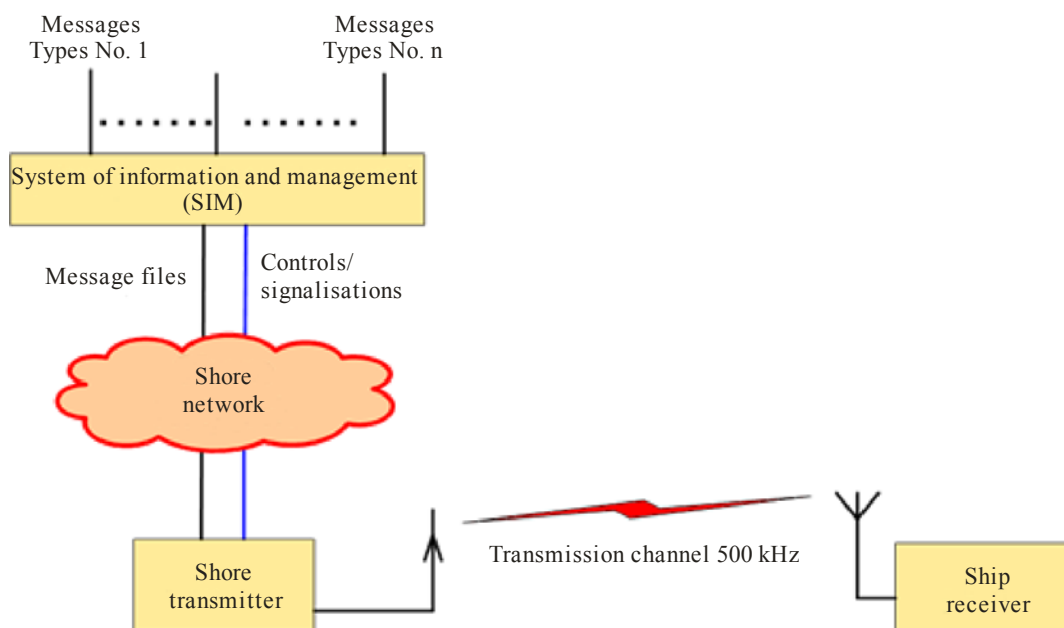
1 The broadcast chain

The NAVDAT system is organized upon five vectors performing the following functions:

- System of information and management (SIM):
 - collects and controls all kinds of information;
 - creates message files to be transmitted;
 - creates transmitting programme according to message files priority and need of repetition.
- Shore network:
 - assures the transportation of the message files from sources to the transmitters.
- Shore transmitter:
 - receives the message files from SIM;
 - translates message files to orthogonal frequency division multiplexing (OFDM) signal;
 - transmits RF signal to the antenna for broadcast to ships.
- Transmission channel:
 - Transports the 500 kHz RF signal.
- Ship receiver:
 - demodulates the RF OFDM signal;
 - reconstructs the message files;
 - sorts and makes the message files available for the dedicated equipment according to the message files applications.

Figure 1 shows the diagram of the broadcast chain.

FIGURE 1

NAVDAT 500 kHz broadcast chain block diagram

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1.1 System of information and management

The SIM term includes:

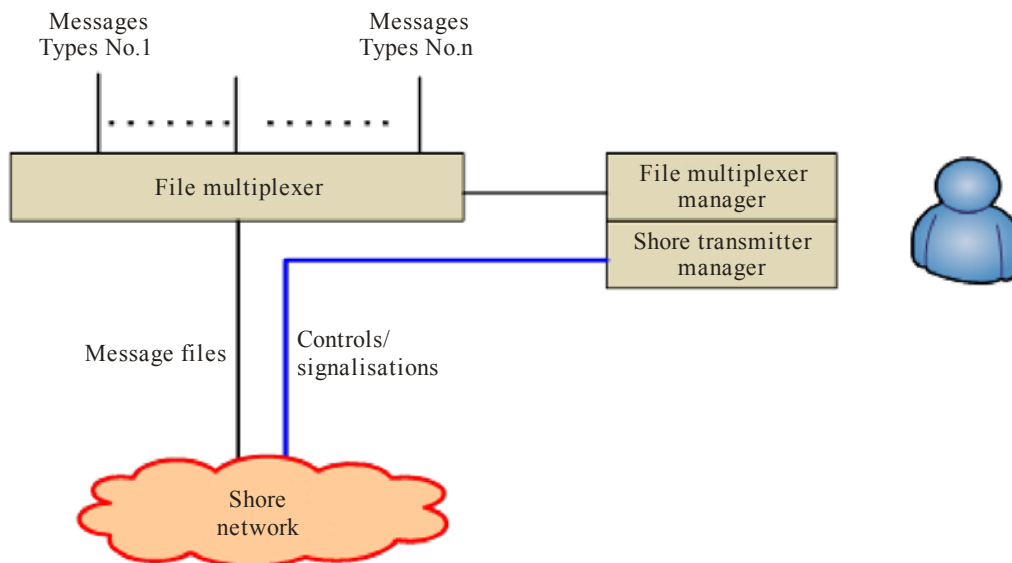
- all the sources that deliver file messages (e.g. meteorological office, safety and security organizations, etc.);
- the file multiplexer which is an application running on a server;
- the file multiplexer manager;
- the shore transmitter manager.

All the sources are connected to the file multiplexer through a network.

Figure 2 shows the general diagram of the SIM.

FIGURE 2

NAVDAT system of information and management block diagram



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1.1.1 File multiplexer

The file multiplexer:

- takes delivery of the message files from the data sources;
- encrypts the message files if asked;
- formats the file messages with recipient information, priority status and time validity;
- sends the message files to the transmitter.

1.1.2 File multiplexer manager

The file multiplexer manager is a man machine interface that enables the user to, among other tasks:

- have a look at the message files coming from any source;
- specify the priority and periodicity of the any message file;
- specify the recipient of any message file;
- manage the file message encryption.

Some of these functionalities may be automated. As an example, the priority and the periodicity of a message may be selected according to the source it comes from or the source may specify the priority in the message.

1.1.3 Shore transmitter manager

The shore station manager is a man machine interface connected to the transmitter through the network; it makes it possible to supervise the transmitter status indications such as:

- transmit acknowledgment;
- alarms;
- effective transmit power;
- synchronization report;

and to change the transmitter parameters, such as:

- transmit power;