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Electronic record books for ships — Technical specifications and operational requirements

Journaux de bord électroniques — Spécifications techniques et exigences opérationnelles

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 11, *Intermodal and Short Sea Shipping*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document was developed in response to maritime industry demand and International Maritime Organization (IMO) request for a standard providing requirements for the design and testing of electronic record books on ships. The industry momentum towards paperless systems enhances the need of such a standard with technical and operational requirements for electronic record books.

Electronic record books for ships — Technical specifications and operational requirements

1 Scope

This document specifies the minimum technical and operational requirements for electronic record books (ELRB) to be used on ships.

It aims at providing manufacturers, operators, maritime administrations and owners with a technical background for the replacement of paper logbooks.

2 Normative references

The following documents are referred to in the text in such a way that some or all their content constitute requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945, *Maritime navigation and radiocommunication equipment and systems — General requirements — Methods of testing and required results*

IEC 61162-1:2016, *Single talker and multiple listeners*

IEC 61162-2:2016, *Single talker and multiple listeners, high-speed transmission*

IEC 61162-450, *Multiple talkers and multiple listeners — Ethernet interconnection*

IEC 61162-460, *Multiple talkers and multiple listeners — Ethernet interconnection — Safety and Security*

IEC 62923:2018, *Maritime navigation and radiocommunication equipment and systems — Bridge alert management*

IMO Resolution MSC 302(87), *Adoption of performance standards for Bridge Alert Management*

IMO Resolution MSC 333(90), *Adoption of revised performance standards for shipborne voyage data recorders (VDRs)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
administration
government of the State under whose authority the ship is operating

Note 1 to entry: With respect to fixed or floating platforms engaged in exploration and exploitation of the sea-bed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of their natural resources, the administration is the government of the coastal State concerned.

3.2
analytical evaluation
detailed examination of the presentation of information to confirm that a particular condition has been met

Note 1 to entry: Analytical evaluations can be made by a relevant expert with the necessary education, skills and/or experience to make an informed and reliable judgement concerning the presentation of information, its appropriateness, and usability. It is used for the evaluation of properties which can be judged only in the context of other information or knowledge which requires the tester presentation. Compliance is determined by comparing the observed property to the requirement.

3.3
audit logging
logs recording user activities, exceptions, and information security events, where logs are kept for an agreed period to assist in future investigations and access control monitoring

3.4
authorized person
operator with enough clearance to handle an *electronic record book (ELRB)* (3.12) appointed by the ships master

Note 1 to entry: Each authorized person is registered on the *electronic approval system* (3.11), and the authorized person is controlled by the personal name or another personal identification data such as the passport number.

3.5
automatic record
data input generated by any other electronic device integrated to the *electronic record book (ELRB)* (3.12)

3.6
back-up
means to make a duplicate copy of a file, program, etc. as a safeguard against loss or corruption of the original

3.7 data

3.7.1
automatically collected data
data that has been collected and stored by automatic means but has not been approved by a human user

3.7.2
edit history data
history of changes in one record, including the editor, edited content and time and date of the edit

3.7.3
record book data
data entered manually by an authenticated user, or if based on *automatically collected data* (3.7.1) after an authenticated user has verified it

Note 1 to entry: This data must be included in all output, backups, sending to VDR, etc.

3.7.4
signed record book data
data which is closed from editing after having been signed by the master

3.8
bridge
area from which the navigation and control of the ship is exercised, including the wheelhouse and bridge wings

[SOURCE: ISO 8468:2007, 3.1.7]

3.9
bridge configuration
shape of the *bridge* (3.8), comprising the outer bulkheads and windows of the bridge area

[SOURCE: ISO 8468:2007, 3.1.9]

3.10
display
means by which a device presents visual information to the operator, including conventional instrumentation

[SOURCE: ISO 8468:2007, 3.1.20]

3.11
electronic approval system
system which identifies the person by using ID and password or biometrics authentication or an equivalent system such as that recommended in ISO 7498-2 that could ensure a unique private profile for every user

3.12
electronic record book
ELRB
device or system used to electronically record or store events that occur on board such as the state of the ship and its equipment

Note 1 to entry: SOLAS Chapter V Regulation 28 and IMO resolution A.916(22) specify provisions in relation with records of navigational activities and entries for discharge transfers and other operations as required under MARPOL annexes.

3.13
ergonomics
study and design of working environments and their components, work practices, and work procedures for the benefit of the worker's productivity, health, comfort and safety

[SOURCE: ISO 8468:2007, 3.1.25]

3.14
functional unit
entity of hardware, software, or both, capable of accomplishing a specified purpose

[SOURCE: ISO/IEC 2382:2015, 2121310, modified — Notes 1 and 2 to entry were deleted.]

3.15
guideline
non-mandatory information leading to a compliant solution for the related requirement

[SOURCE: ISO 8468:2007, 3.1.29]

3.16
manual input
data input generated by the intervention of a human

3.17
master
ship's captain and the person in overall charge of the ship

Note 1 to entry: Information recorded and stored in the *electronic record book (ELRB)* (3.12) is taken as an official record from which the master is held responsible.

[SOURCE: ISO 8468:2007, 3.1.35, modified — Note 1 to entry has been added.]

3.18
navigation
process of position-finding as well as planning, controlling and recording the movement of a ship from one place to another

[SOURCE: ISO 8468:2007, 3.1.38]

3.19
official record evidence
information considered as real and being legally recognized as a faithful statement of fact

3.20
paper logbook
hard copy book approved by an *administration* (3.1) where a ship is registered, where records of operations, maintenance, safety, security, environmental protection measures and training are permanently saved as required by the administration

3.21
removable external data source
REDS
user removable non-network data source, including, but not limited to compact discs, memory sticks, and Bluetooth devices

Note 1 to entry: Bluetooth is the trademark of a product supplied by Bluetooth Special Interest Group 91.

[SOURCE: IEC 61162-460]

3.22
Role Based Access Control
RBAC
access privileges that are assigned to specific roles

Note 1 to entry: Access users acquire privileges through their assigned role.

Note 2 to entry: Adapted from ISO 16484-5:2017, 3.2.

3.23
server
functional unit that provides services to workstations, personal computers or other functional units in a computer network

3.24
storage
functional unit into which data can be placed, in which they can be retained, and from which they can be retrieved

[SOURCE: ISO/IEC 2382:2015, 2121280 modified – The preferred term, storage device, and the Notes to entry have been deleted.]

3.25
update
immediate or planned activity to update the *electronic record book (ELRB)* (3.12) used onboard a vessel to ensure that the ELRB remains compliant with the most recent international conventions

4 System requirements

4.1 General requirements

The ELRB shall allow storage of events such as the state of the ship either by means of manual or automatic input. The automatic input may be based on connection to other equipment on board. The

implementation of ELRBs is highly encouraged as it offers improvement in the reliability of recording of events, offers improved redundancy in the storage of required records and reduces seafarer's workload.

Information recorded and stored in the ELRB is taken as an official record and is equivalent to the information recorded to a paper logbook as admissible evidence. An automatic record is recognized as official if it has been approved by an authorized person.

When the information is recorded and stored by both means of ELRB and paper logbook, the administration judges which takes precedence.

If the ELRB is unable to record and store the events and states due to a malfunction they shall be recorded in an official paper logbook.

The ELRB shall comply with IEC 60945 regarding environmental requirements for electromagnetic compatibility (EMC).

4.1.1 Power supply

It shall be possible to supply the ELRB with electrical power from both main and emergency power supply. The ELRB shall be capable of automatically switching the power supply between the main and emergency.

The recorded and stored data shall be protected from damage when electronic power supply from main power supply and/or emergency power supply to ELRB is lost.

4.2 Functional requirements

4.2.1 Data storage

The information recorded and stored in the ELRB shall be the same as those of the paper logbooks. The information shall be recorded and stored with Coordinated Universal Time (UTC) and the location (latitude and longitude) from approved source.

All time information recorded by the ELRB shall be referred to UTC.

Therefore, the internal ELRB clock shall be synchronized with time from the UTC source (e.g. GPS).

When the time from UTC source is not available, the time of the internal ELRB clock shall be used and ELRB shall clearly indicate loss of synchronization to UTC, and also display which time source is in use.

ELRB recorded and stored data shall at least be written in the English language.

All information shall be presented by the ELRB in a clear and legible font.

The recorded and stored data shall be categorized into the following four types and each of them shall be recorded in chronological order:

— automatically collected data;

— record book data;

— signed record book data;

— edit history data.

The approved source to ELRB should be approved by the IMO.

4.2.1.1 Tampering avoidance

The data recorded and stored in the ELRB are considered as official records and shall be protected against tampering.

The automatic data value inputs shall be protected by measures aimed at preventing attempts at manipulation or falsification. Any detectable attempt to manipulate or falsify any data shall be automatically recorded by the system. Digital signatures shall be used as a counter measurement to help preventing data manipulation, unauthorized access and detect possible fraud.

The ELRB shall adopt an electronic approval system which identifies the person using ELRB by means of an ID and password, biometrics authentication or an equivalent system as recommended in ISO 7498-2 that could ensure a unique private profile for every user.

The recorded and stored data can be operated by an authorized person, only after the user's authorization is approved by an electronic approval system. An operational permission for an authorized person differs depending on their access level. When editing the record book data and signed record book data including manual inputs, users shall be identified by the electronic approval system. The recording and storing of the contents and the data and time shall be edited independently as part of the edit history data.

The ELRB shall be protected by proper information security techniques, e.g. IEC 61162-460, that ensure the prevention of unauthorized access to the system and data.

4.2.1.2 REDSs

a) Physical protection

The number of connection points, e.g. USB ports, disc drives, shall be limited to the absolute minimum required for the operation of the system and its lifetime maintenance and support. All other points shall be physically blocked from easy access by a user without a tool or key.

b) Operational protection

Every single USB connection port shall be blocked from easy access by connecting to other devices.

Connection points used for access to data storage shall be configured to permit connection only to data sources identified as USB device class 08h (USB mass storage).

For other operations with other USB device classes and non-USB REDS, the manufacturer shall provide information about the technology used and how the connection point fulfils the requirement to limit connection to only data storage devices or sources.

c) Executable program file verification

All automatic execution from REDS including auto-run shall be prohibited. Manual execution of any type of file from REDS shall only be possible after passing authentication for accessing the executable content of the REDS. Manual execution shall be possible only for the files which are verified before execution, using a digital signature or special keys.

NOTE 1 A digital signature method is based on a private/public key pair. Typically, a hash function is used, e.g. the SHA-2 family. Use of MD5 and SHA-1 are now discouraged, see ISO/IEC 10118-3.

NOTE 2 Special keys can be values calculated from the delivered data using a specified function and compared against a known and expected value, both the function and the value being specified by the trusted source or sender.

d) Non-executable data verification

All non-executable data in REDS shall be verified before it is used in equipment.

The ELRB shall limit opening files from REDS according to the extension of the file.

4.2.1.3 System database backup and recovery

The storage medium for recording and storing the automatically collected data, record book data, signed record book data and edit history data in the ELRB shall be primary. Another medium in the ELRB or the other storage medium onboard outside of the ELRB shall be secondary.

The automatically collected data, record book data, signed record book data and edit history data shall be recorded in the primary medium in the ELRB.

The signed record book data and edit history data shall be recorded in the secondary medium in the ELRB or outside the ELRB as well as in the primary medium. The contents, the recording interval, and the recording method shall be equivalent to those of the primary storage medium in the ELRB.

Recording to a storage medium ashore (e.g. server) is permitted as an option for additional storage.

If the ELRB has a function of the automatic input, the function of raising indication and manual input shall be provided in case the automatically collected data is not automatically recorded in the primary storage medium. In such case, the user is responsible for continuing to make a record as per the configurated automatic recording schedule.

In the case of system failure, the data shall be recorded manually as the record book data in the primary storage medium. If the ELRB is not able to record the data, it shall present a permanent indication that data shall be recorded in an official paper logbook.

4.2.1.4 Monitoring

The following status shall be monitored to verify adequate recording:

— failure to access storage device;

— failure of recording function;

— loss of UTC synchronization;

— storage device full or having insufficient capacity for storing configured records up to 30 days;

— detected tampering.

The ELRB shall monitor the operation and cautions according to IEC 62923.

4.2.1.5 VDR

If VDR is provided, the signed record book data shall be recorded in the VDR according to MSC. 333(90).

With regards to the interface between ELRB and VDR, ELRB output shall be in accordance with the binary image data transfer procedure which is described in IEC 61162-450. For example, data forms are JPEG, PNG, PDF or XML.

It is important to note that the VDR is not the exclusive backup for ELRB. Their interface mission is only to review the last events and record as stored in ELRB. When the master has to stop the VDR, the ELRB is capable of continuing to store the information in one of the regular back-ups as specified in the standard.

4.2.1.6 Status reporting

The ELRB shall provide an alert management interface compliant with the requirements of Bridge Alert Management (BAM) as intended in IMO resolution MSC.302 (87).

Alert management requires:

a) classification of all alerts available in the ELRB;

b) presentation of the alerts;

c) reporting of the alerts.

The interface shall support the output in accordance with IEC 61162-1 and/or IEC 61162-2 and/or IEC 61162-450.

Alert Sentence (ALF) shall be provided with ELRB for status report.

Talker Identifier for ELRB is recognized as: ***RB***.

For specific contents, alert identifiers, and normative Annex A should be referred to.

4.2.2 Record management

Information recorded and stored in the ELRB is taken as an official record for which the master is held responsible.

Only authorized persons on board are allowed to make ELRB entries.

Automatically collected data and edit history data shall not be revisable and modifiable. The record book data can only be revised or modified by the authorized person, while the signed record book data can be revised or modified only by the master.

Furthermore, an authorization for the record book data to be regarded as the signed record book data is allowed only by the master, who has full access to view, modify or sign ELRB data.

The storage period for the automatically collected data shall be 720 h, whereas the storage periods for the signed record book data and edit history data shall be minimum two years. The record book data shall be stored until being authorized as the signed record book data by the master.

The data is permitted to be compressed when being stored.

When the recorded data is stored for longer periods than required above, the data may be permanently moved from the primary or secondary medium to other electronic or paper medium. The permanently moved data shall be secured against tampering.

Any change(s) to the entry by the same authorized person or a different authorized person should be automatically recorded and made visible both in the system and in any output presentation of ELRB. The entry shall appear in the list of entries in a format that makes it clear that the entry has been amended. To create transparency of changes to saved or verified entries, it is essential that the system is designed to retain both the original entry and the amendment(s).

Any amendment shall also indicate the editor, date and time when the amendment was made.

If an entry requires amendment, it is recommended that the reason and authorized person who makes the amendment, be recorded for verification by the master. The original entries and all amendments shall be retained and visible.

Records and entries shall be protected by measures aimed at preventing and detecting attempts of unauthorized deletion, destruction or amendment. After an entry is saved by the authorized person, the system shall secure the information against unauthorized or untraceable changes.

NOTE When a server is used as the recording medium of ISO 19847:2018, 5.1 and 5.2 (Shipboard data servers) on shipboard data server is referred to.

4.2.2.1 Record book events

The contents recorded and stored in the ELRB, as well as those used as output from the ELRB, are deemed to meet the requirements mandated by the administration.

The ELRB shall be capable of inputting, recording, storing and outputting the following vessel particulars as the basic information.

4.2.2.2 Particulars of the vessel

— Name of the State whose flag the ship is entitled to fly;

— Date on which the ship was registered with that State;

— Ship's identification number;

— Name of the ships;

— Port at which the ship is registered;

— Name of the registered owner(s) and their registered address(es);

— Registered owner's unique identification number (after 1 January 2009);

— Name of the registered bareboat charterer(s) and their registered address(es), if applicable;

— Name of the company, specified in the ISM code as defined in regulation IX/l, its registered address and the address(es) from where it carries out the safety-management activities;

— Unique company identification number (after 1 January 2009);

— Name of all classification society(ies) with which the ship is classed;

— Name of the administration or of the contracting government or of the recognized organization which has issued the document of compliance (or the interim document of compliance), specified in the ISM Code as defined in regulation IX/l, to the company operating the ship and the name of the body which has carried out the audit on the basis of which the document was issued, if other than that issuing the document;

— Name of the administration or of the contracting government or of the recognized organization that has issued the safety management certificate (or the interim safety management certificate), specified in the ISM Code as defined in regulation IX/l, to the ship and the name of the body which has carried out the audit on the basis of which the certificate was issued, if other than that issuing the certificate;

— Name of the administration or of the contracting government or of the recognized security organization that has issued the international ship security certificate (or the interim international ship security certificate), specified in part A of the ISPS Code as defined in regulation XI-2/1, to the ship and the name of the body which has carried out the verification on the basis of which the certificate was issued, if other than that issuing the certificate; and

— Date on which the ship ceased to be registered with that State.

The history of changes in vessel particulars shall be recorded and stored for the same period as signed record book data and edit history data.

In this case, the edit history of the continuous synopsis shall be discerned in the edit history data.

4.2.2.3 Modification of recorded entries

For editing and verification of the record book data and the signed record book data including manual input as well as for the authorization to submit a signed record book data, users shall be identified by the electronic authorization system. The editor, the contents and date and time of the modification shall be recorded and stored as the edit history data.

Automatically collected data and edit history data shall not be revisable and modifiable. The record book data can only be revised or modified by authorized person, while the signed record book data can be revised or modified only by the master.

4.2.2.4 Data synchronization between ship and shore

The data recorded and stored onboard can be transferred to a storage medium ashore.

When data synchronisation is performed, no changes of content of electronic records from shore side shall be possible.

4.2.3 System output

4.2.3.1 Output file

The output contents from the ELRB shall meet the requirements mandated by the flag state.

The output data shall be presented in a file format which prevents the data from being modified or edited.

It is recommended that the document is presented in PDF; however, an alternative format that can assure that tampering is avoided may be used. Alternative formats shall allow the exchange and view of electronic documents independent of the environment in which they were created and the environment in which they are viewed or printed in a simple way with a good resolution.

4.2.4 Validation

A paper logbook requires the signature of the relevant officer entering a record. As such, the ELRB shall implement audit logging.

The ELRB shall either mention the authorized person by name or other official personal identification data that has performed the logged action.

Each logged action shall describe what has been done by which authorized person at what date and time (UTC).

The audit logging shall record at least these actions:

— A data entry has been created;

— A data entry has been edited or amended;

— A data entry has been deleted; or

— A data entry has been verified.

The ELRB shall provide access to or an export of the audit log for investigations. The log entries shall by filterable by at least:

— actions done by a specific authorized person;

— actions done in a specific time window.

4.2.4.1 Users and authentication

At a minimum, all access to the application shall use a unique personal login identifier and password for each user or equivalent. This level of security ensures that the user making entries into the application is accountable for any false entries or omissions.

4.2.4.1.1 Role Based Access Control (RBAC)

RBAC may be used as an authorization scheme and to identify different personnel. For verification of a single or series of saved entries by the master, the electronic record book shall have an additional authentication factor to allow verification. This additional authentication factor shall be in the form of additional credentials supplied by the master at the time of verification.

4.2.4.2 Approval route

To provide for different stages of the data entry and approval process, the electronic record book shall provide a status field for each entry and/or an entry field background color indication for each status that clearly determines the verification stage of the entry. For example, when an entry has been saved in the system by the authorized person, the entry shall reflect a term such as "pending" or "awaiting verification". Once the master has verified an entry, a term such as "verified" shall be automatically reflected.

To ensure that entries are verified in a timely manner, the system shall provide a reminder that verification by the master is required. It is recommended that where possible, verifications occur prior to arrival in port. Entries not verified shall be accompanied by comments advising of the reason for non-verification. When an entry has not been verified, but amended by a comment/reason, both together shall be recorded as signed data in secondary medium, but with clear indication this entry is not verified.

4.2.4.2.1 Automatic triggering

The contents to be recorded in the ELRB may be input either automatically or manually.

The record book data and automatically collected data that has been unsaved shall be stored every interval of not more than 15 min automatically. The timer shall reset when the deck/engine officer saves the data manually.

Furthermore, the modification of the setting for the interval time shall be recorded as edit history data.

4.2.5 System availability

Two independent storage mediums shall be provided to ensure that stored records are available at any time. The system shall be designed such to allow access to previous records and making new records upon failure of the single storage media.

4.3 Human-machine interface

4.3.1 Ergonomic criteria

If ELRB physical equipment is installed as a part of a navigational bridge configuration, the equipment shall take into account the applicable ergonomic requirements described in IEC 60945.

4.4 System updates

4.4.1 Updates to the electronic record book

If an international convention amendment affects the requirements/format of the information to be included in an electronic record book, an update to the system shall be done prior to the entry into force of the relevant amendment.

Any updates shall not cause loss of existing records, nor make them unreadable, and the system shall continue to present all records in the form specified by this document.

ELRB shall provide means to display on demand the current software version. Means shall be provided to replace or install updates to software in systems aboard ship.

5 Test methods and required results

5.1 General

Environmental requirements for EMC shall be tested according to relevant test methods described in IEC 60945. Other tests shall be applied in accordance with 5.2 to 5.4.

5.1.1 Power supply

Main power supply and emergency power supply are switched off for 1 minute. Then the main power supply is switched on again.

Confirm by observation that the recorded and stored data and software are not corrupted or lost.

If not connecting to emergency power supply, there is no need to switch off emergency power supply.

5.2 Functional requirements

5.2.1 Data storage

Confirm by inspection of manufacturer's documentation and observation that ELRB associates data with UTC, records and stores the data as prescribed in 4.2.1.

Verify that the data is recorded and stored in at least English.

Reproduce the data recorded and stored in ELRB.

Confirm by observation that automatically collected data, signed record book data and edit history data shall be presented by the ELRB in a clear and legible font.

Operate ELRB with no connection to UTC time reference.

Change the simulated UTC time and connect the UTC time reference to the ELRB. Confirm by observation that the ELRB system clock becomes synchronized to UTC.

Disconnect UTC time reference. Confirm by observation that ELRB indicates loss of UTC synchronization.

Confirm by observation that the data recorded and stored in the ELRB is associated with UTC and the position information from the external source, e.g. GPS.

Confirm by inspection of documentation that the installation manual contains a requirement to connect the ELRB to an Electronic Position Fixing System (EPFS) or Inertial Navigation System (INS) approved in accordance with the requirements of IMO.

Confirm by observation that ELRB uses an internal clock as a time reference for recorded and stored events even when connection to external time reference is lost.

Confirm by inspection of documentation that the installation manual contains a requirement to connect the ELRB to an ENS or INS approved in accordance with the requirements of the IMO.

5.2.1.1 Tampering avoidance

5.2.1.1.1 Access to the ELRB

Confirm by inspection of manufacturer's documentation and by observation that ELRB has a function of electronic approval system as defined by 4.2.1.1.

Confirm by an analytical evaluation that the electronic approval system allows only authorized persons to operate the ELRB.

5.2.1.1.2 Edit history

Confirm by observation that modified content together with date and time of modification are recorded and stored. The contents of edit history data are verified after the following process:

a) accessing the ELRB;

b) editing the signed record book data and/or record book data; and

c) changing the particulars of the vessel prescribed in 4.2.2.1.

The following histories shall be recorded as the edit history data:

a) access history: the date and time of access to the ELRB;

b) edit history: edit history described in 4.2.1.1; and

c) revision history of the particulars of the vessel prescribed in 4.2.2.1.

5.2.1.1.3 Preventing unauthorized access

Refer to manufacturer's documentation. Confirm by an analytical evaluation that ELRB provides sufficient means to avoid unauthorized access to operating system, software, configuration, stored records and edit history through any of the ELRB interfaces.

5.2.1.1.4 REDS security

a) Physical protection

Refer to the device, the manufacturer's documentation and confirm by inspection of the documented evidence that the number of connection points for REDS, e.g. USB ports, disc drives, are limited to the absolute minimum required for the operation of the system and its lifetime maintenance and support.

Confirm by observation that any other connection points are blocked from easy access by a user without a tool or key.

b) Operational protection

Confirm by analytical evaluation that every single USB connection port shall be blocked from easy access by a user, e.g. by means of a tool or key or password protection (disable/enable) in the device set-up.

For connection points to access the database, attach one by one a keyboard or mouse device, i.e. USB device class other than 08h, to the port and confirm by analytical evaluation that the ELRB both refuses to recognize the attached device and refuses to perform any functionality with the attached device.

Confirm with manufacturer's documentation about the technology used and how the connection point fulfils the requirement to limit the connection to data only.

c) Non-executable data verification

Refer to the manufacturer's documentation about non-executable files which can be used by ERB.

Confirm by analytical evaluation that all non-executable files are verified as described in the manufacturer's documentation before use by the ELRB.

Refer to the manufacturer's documentation for file extensions that can be opened with ELRB.

Confirm by analytical evaluation that files except extension of openable files cannot be opened.

5.2.1.2 System database backup and recovery

5.2.1.2.1 Data storage in the primary medium

Store continuously automatically collected data, record book data, signed record book data in the primary medium.

Confirm by observation that the automatically collected data, record book data, signed record book data and edit history data is stored in the primary medium of the ELRB.

5.2.1.2.2 Data storage in the secondary medium

Store continuously automatically corrected data, record book data, signed record book data in the secondary medium.

The signed record book data and edit history data shall be continuously stored in the secondary medium. Furthermore, the data shall be completely consistent with the data stored at the synchronized time in the primary medium.

5.2.1.2.3 Function of automatic input

Refer to manufacturer's documentation. Confirm by observation that ELRB is able to indicate if any data configured for automatic recording is not available for ELRB.

Stop any input of automatically collected data. Confirm by observation that ELRB provides manual input capability for user to manually substitute the missing automatic records.

Confirm by observation that ELRB is capable of indicating whether a data record is input automatically or manually.

5.2.1.3 Monitoring

Confirm by inspection of manufacturer's documentation and observation that ELRB is capable of monitoring the system statuses as required in 4.2.1.4 and indicate the state of the statuses for the user in the human machine interface.

Create 2 abnormal status of 4.2.1.4 with inspection of manufacturer's documentation.

Confirm by inspection of manufacturer's documentation that the user manual provides adequate guidance for the user for handling the situation.

5.2.1.4 BAM interface

Perform the following test using a simulator for BAM: Test of alert reporting.

Create 2 caution of Category B with inspection of manufacturer's documentation.

Confirm by observation that ALF sentences are transmitted from the ELRB to the BAM interface.

5.2.1.5 Connection to miscellaneous devices

If ELRB provides serial interfaces for connection to other equipment or systems, confirm by inspection of manufacturer's documentation and observation that the interfaces for this purpose complies with IEC 61162-1, IEC 61162-2 or IEC 61162-450 as applicable.

Refer to manufacturer's documentation. Input in turn or parallel all implemented sentences containing valid information to ELRB.

