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Ships and marine technology — Software maintenance requirements of shipboard equipment

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 Technonlogy*], 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

Ships have more and more equipment with updateable software on-board. Current unified requirements for on-board use of computer-based systems require a software registry for such equipment (IACS URE22rev2), but these registries are not defined in detail, may be difficult to understand and use, and information within is often not updated. Some of this situation is caused by the increasing quantity of covered equipment combined with the increasing regulations requiring various administrative tasks for crew, shipping companies and other stakeholders. This situation makes staying current on software updates more difficult, which also introduces increased risks of equipment problems. This standard began development based on a 2017 CIRM-BIMCO industry standard for software maintenance procedures.

This standard defines a Ship Software Logging System (SSLS) for shipboard equipment software. Recognizing that maintenance of shipboard software is a major undertaking this standard initially sets base characteristics. The SSLS may be used by various users and log data from various types of equipment. It is expected that this standard will evolve over time together with related regulations and when experience on the use of the introduced concept accumulates.

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Ships and marine technology — Software maintenance requirements of shipboard equipment

1 Scope

The scope of this standard addresses five issues:

1.1 Application

This document defines a Ship Software Logging System (SSLS) for logging and retrieving software version information and current operational status to enable software maintenance for ship operational technology equipment and associated integrated systems, including but not limited to:

- Control and alarm systems;
- Fire and water mist systems;
- Navigation and communication systems;
- Steering control systems;
- Propulsion systems;
- Power generation systems;
- Performance monitoring systems; [ISO/DIS 24060](https://standards.iteh.ai/catalog/standards/sist/e480fd6c-a645-4cf5-990f-c3662e85ac86/iso-dis-24060)
- Auxiliary systems. <https://standards.iteh.ai/catalog/standards/sist/e480fd6c-a645-4cf5-990f-c3662e85ac86/iso-dis-24060>

1.2 Cyber Risk Management

This document stipulates cyber risk management be incorporated into design and use of SSLS.

1.3 Technology Design: Ship Software Logging System (SSLS)

This document sets requirements for the design and usability of Ship Software Logging System (SSLS) software that:

- Records software versions for equipment with updateable software (hereinafter “equipment”)
- Sets an initial log entry when equipment is first installed or detected by SSLS
- Includes a repository of electronic service reports associated with log entries
- Automatically logs reports sent by equipment

1.4 Technology Design: Networks and Hosts

This document specifies that equipment messages pass from equipment to SSLS automatically when possible.

1.5 Technology Design: Equipment

This document specifies that equipment sends standard version messages with software version information on appropriate time intervals.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes 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.

ISO 19847:2018, *Ships and marine technology — Shipboard data servers to share field data at sea*

ISO 19848:2018, *Ships and marine technology — Standard data for shipboard machinery and equipment*

IEC 61162-1:2016, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 1: Single talker and multiple listeners*

IEC 61162-450, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 450: Multiple talkers and multiple listeners — Ethernet interconnection*

3 Terms and definitions

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

3.1

category of update

classification assigned to a software update based upon the reason for undertaking the update, which may be any one of the below or some combination:

- Initial State
- Bug Fix (resolving software bugs);
- Compliance Update (maintaining conformity with regulations);
- Critical Update (critical to restoring proper performance of the shipboard equipment);
- Feature Release (adding additional functionality);
- Obsolescence Update (addressing software and/or hardware that is no longer supported);
- Security Update (protecting against cyber threats);
- Other (requires explanation).

3.2

controlled network

shipboard network that has been designed to operate such that it does not pose any unacceptable safety and security risks to any connected network nodes

3.3

critical update

software update identified as critical to restoring proper performance of the shipboard equipment

3.4

data

the quantities, characters, or symbols on which operations are performed by computers of shipboard equipment

3.5

equipment

devices involved in the operation of a ship. See shipboard equipment and operational technology

3.6

integrated system

interconnected system combining a number of different shipboard equipment

3.7**method of update**

method by which a software update is undertaken, which may be manually or automatically

3.8**operational technology**

operational technology (OT) includes devices, sensors, software and associated networking that monitor and control onboard systems

3.9**removable external data source (REDS)**

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

3.10**ship software logging system (SSLS)**

software maintenance logging system for onboard equipment software

3.11**shipboard equipment**

system comprising a combination of hardware, software and data, performing a specific function on board a ship. See operational technology

3.12**shipowner (a.k.a. shipping company)**

the owner of the ship or any other organization or person such as the Manager, or the Bareboat Charterer who has assumed responsibility for operation of the ship and who is responsible for initiating software maintenance of the shipboard equipment. This term is synonymous with Shipping Company in this document.

3.13**software**

programs and operating instructions used in shipboard operational technology equipment, including any updatable firmware and configuration.

3.14**software maintenance**

checking, updating, re-configuring, or upgrading the software of shipboard equipment in order to prevent or correct faults, maintain regulatory compliance, and/or improve performance.

3.15**system integrator**

the stakeholder that combines shipboard equipment into an integrated system.

3.16**uncontrolled equipment**

device that is not part of a controlled network.

3.17**uncontrolled network**

shipboard data network that does not meet the definition of a controlled network.

3.18**version message**

a message automatically sent by connected equipment containing an indication of the current device software version including operating system (if operating system is updatable) and configuration (if configuration is an updatable part of the device's software). Note: An example of one way to provide compliant information from equipment to SSLS is a data sentence message structure defined as the VER specified in IEC 61162-1 and sent by equipment implementing this standard. (encapsulated in 450 protocols with UDP datagrams)