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Maritime navigation and radiocommunication equipment and systems – Track control systems – Operational and performance requirements, methods of testing and required test results

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MARITIME NAVIGATION AND
RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS –
TRACK CONTROL SYSTEMS –****Operational and performance requirements,
methods of testing and required test results**

FOREWORD

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International Standard IEC 62065 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This second edition cancels and replaces the first edition published in 2002 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- alarms and warnings have been brought into line with the requirements for Bridge Alert Management;
- requirements for the category B system have been revised;

- the parameters of the ship models of Annex I have been adjusted to resemble more Newtonian-like behaviour and the tidal current has been modelled;
- a new Annex K has been added with interface requirements.

The text of this standard is based on the following documents:

| | |
|-------------|------------------|
| FDIS | Report on voting |
| 80/716/FDIS | 80/729/RVD |

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

All text of this standard that is identical to that in IMO resolution MSC.74(69), Annex 2, is printed in *italics* and the resolution (abbreviated to – A2) and paragraph numbers are indicated in brackets i.e. (A2/3.3).

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – TRACK CONTROL SYSTEMS –

Operational and performance requirements, methods of testing and required test results

1 Scope

This International Standard specifies the minimum operational and performance requirements, methods of testing and required test results conforming to performance standards adopted by the IMO in resolution MSC.74(69) Annex 2 Recommendation on Performance Standards for Track Control Systems. In addition, it takes into account IMO resolution A.694(17) to which IEC 60945 is associated.

When a requirement of this standard is different from IEC 60945, the requirement in this standard takes precedence. Also it takes into account IMO resolution MSC.302(87) on bridge alert management (BAM).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 test results*

IEC 61162 (all parts), *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*

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

IEC 61162-2, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 2: Single talker and multiple listeners, high-speed transmission*

IEC 61924-2, *Maritime navigation and radiocommunication equipment and systems – Integrated navigation systems – Part 2: Modular structure for INS – Operational and performance requirements, methods of testing and required test results*

IEC 62288, *Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results*

IEC 62616, *Maritime navigation and radiocommunication equipment and systems – Bridge navigational watch alarm system (BNWAS)*

IMO MSC.74(69) Annex 2, *Recommendation on Performance Standards for Track Control Systems*

IMO resolution A.694(17), *General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids*

IMO MSC.302(87), *Performance standards for bridge alert management (BAM)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this standard, the following terms and definitions apply

3.1.1

active track

track activated for track control

3.1.2

alarm

high-priority alert

Note 1 to entry: Condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship.

3.1.3

alert

announcement of abnormal situations and conditions requiring attention

Note 1 to entry: Alerts are divided in four priorities: emergency alarms, alarms, warnings and cautions.

Note 2 to entry: Alerts are additionally classified in two different categories for navigational purposes: category A and category B as described in IMO resolution MSC.302(87).

Note 3 to entry: An alert provides information about a defined state change in connection with information about how to announce this event in a defined way to the system and the operator.

3.1.4

along-track speed control

automatic control of the ship's speed during track control based on a pre-planned track

3.1.5

assisted turn

manoeuvre of a ship automatically controlled by a pre-set radius or rate of turn but not based on the ship's position to perform an approximation of a curved track

3.1.6

back-up navigator

any individual, generally an officer, who has been designated by the ships master to be on call if assistance is needed on the bridge

3.1.7

back-up navigator alarm

signal automatically sent from the TCS to call assistance to the bridge when the officer of the watch fails to acknowledge certain alarms within a defined time period

Note 1 to entry: Note that the back-up navigator alarm does not represent an alarm as defined in 3.1.2.

3.1.8

consistent common reference system

sub-system or function of a TCS for acquisition, processing, storage, surveillance and distribution of data and information providing identical and obligatory reference to sub-

systems and subsequent functions within a TCS and to other connected equipment, if available

3.1.9 course

for marine navigation, horizontal direction in which a vessel is steered or intended to be steered, expressed as angular distance from north, usually 000° at north, clockwise through 360°

Note 1 to entry: 360° is indicated as 000°.

3.1.10 course difference limit

maximum difference between track course and heading before a warning is activated

3.1.11 cross-track distance

cross-track error

perpendicular distance of a predefined point on the ship from the track including direction (negative if the ship is left of the intended track)

3.1.12 cross-track limit

maximum cross-track distance before an alarm is activated

3.1.13 curved track

non-straight track between two legs

3.1.14 fall-back arrangements

automatic reaction of the TCS by using data, function or hardware of degraded quality in relation to the failed one

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EXAMPLE Dead reckoning for position information, heading control in case of a failure of track control.

3.1.15 FROM-waypoint

last passed waypoint

3.1.16 great circle sailing

sailing on the intersection of the earth surface and a plane containing the points A, B and the centre of the sphere

3.1.17 heading

horizontal direction in which a ship actually points or heads at any instant, expressed in angular units from a reference direction, usually from 000° at the reference direction clockwise through 360°

Note 1 to entry: 360° is indicated as 000°.

3.1.18 heading control

control of the ship's heading

3.1.19

heading monitor function

monitoring of the actual heading sensor by an independent second source

3.1.20

leg

straight line between two waypoints and/or curved track(s)

3.1.21

main conning position

place on the bridge with a commanding view providing the necessary information and equipment for the conning officer to carry out his functions

3.1.22

minimum manoeuvring speed for track control

lowest fore/aft speed through the water at which the track control system is capable of maintaining its performance within the specified accuracy limits

Note 1 to entry: The value depends on the ship's design and loading and on the present environmental conditions.

3.1.23

NEXT-waypoint

waypoint following the TO-waypoint

3.1.24

override facility

control to perform the override function

3.1.25

override function

intentional fast change-over from automatic to temporary manual control

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3.1.26

position monitor function

monitoring of the actual position sensor by an independent second source

3.1.27

primary position-fixing system

electronic position-fixing system (EPFS) used for track control and approved by the International Maritime Organization (see 5.1.1.3)

3.1.28

radius of turn

radius of a curved track

3.1.29

rate of turn

change of heading per time unit

3.1.30

rhumb line sailing

sailing on a line on the surface of the earth making the same angle with each meridian crossed

3.1.31

ship manoeuvring characteristics

range-of-manoeuve possible for the ship

Note 1 to entry: Examples of the range-of-manoeuvres are: maximum rate of turn, minimum radius of turn, maximum turn acceleration and deceleration.

3.1.32

single operator action

procedure achieved by no more than one hard-key or soft-key action, excluding any necessary cursor movements, or voice actuation using programmed codes

3.1.33

speed

absolute value of velocity

Note 1 to entry: May either be the ship's speed through the water, or the speed made good over the ground.

3.1.34

steering mode selector

switch provided for the selection of manual steering modes and automatic steering devices

3.1.35

surge

forward component of ship motion

3.1.36

sway

athwartships component of ship motion (positive to starboard)

3.1.37

temporary track

track that originates at the current position of the ship and joins the pre-planned track

Note 1 to entry: The temporary track may include temporary waypoints which can be identified as different from the waypoints of the pre-planned track.

3.1.38

TO-waypoint

waypoint which the ship is approaching

3.1.39

track

path to be followed over ground

3.1.40

track control

control of the ship's movement along a track, where corrections made by the controller to compensate for wind, drift and other influences, are based on the cross-track error and not only on the bearing to the destination waypoint (TO-waypoint)

3.1.41

track course

direction from one waypoint to the next, a constant course on a rhumb line track and a varying course on a Great Circle track

3.1.42

warning

alert for condition requiring immediate attention, but no immediate action by the bridge team

Note 1 to entry: Warnings are presented for precautionary reasons to make the bridge team aware of changed conditions which are not immediately hazardous, but may become so if no action is taken.

3.1.43

waypoint

geographic position together with its associated data

3.1.44

wheel-over-line

WOL

line where the ship has to initiate a curved track to eliminate the effect of any offset with respect to the new course, taking into consideration the distance required for the ship to build up the necessary rate of turn

3.1.45

wheel-over-time

WOT

point in time when the track control system initiates the planned course change

3.1.46

yaw

rate of turn (positive to starboard)

3.2 Abbreviations

~A Not applicable for category A systems

ACCA Actual course change alarm

ACCW Actual course change warning

BAM Bridge alert management

CCRP Consistent common reference point

CCRS Consistent common reference system

COG Course over ground

DGPS Differential GPS

DR Dead reckoning

ECCA Early course change alarm

ECCW Early course change warning

ENC Electronic navigational chart

EPFS Electronic position fixing system

EUT Equipment under test

GC Great circle

GPS Global positioning system

INS Integrated navigation system

NA (Back up) Navigator alarm

RL Rhumb line

ROT Rate-of-turn

SDME Speed and distance measuring equipment

SWH Significant wave height

TCS Track control system

WOL Wheel-over-line

WOT Wheel-over-time

4 Application of this standard

The application of this standard is as follows.