



INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

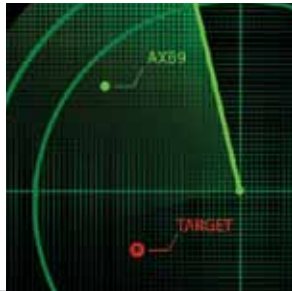
IEC TECHNICAL COMMITTEE 80: MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS

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One of the fundamental trends in the maritime industry over the past decades has been an increasing reliance on electrical and electronic technologies for navigating and communicating. These technologies have moved well out of the mechanical era and fully into the electronic and information age. This is particularly true for equipment on ocean-going cargo and passenger vessels and for industrial fishing fleets but now even applies to the smallest of vessels.

Created in 1980, IEC Technical Committee 80 produces operational and performance requirements together with test methods for maritime navigation and radiocommunication equipment and systems.

The committee provides industry with standards that are also accepted by governments as suitable for type approval where this is required by the International Maritime Organization's SOLAS Convention. TC 80 does this by ensuring that it has representatives from industry, users, governments and test certification bodies. There are currently 20 participating national members in the

committee and liaisons with all the major international maritime bodies.

The committee work programme is associated with that of the IMO by mirroring the performance standards adopted by IMO in its resolutions, with associated relevant ITU recommendations.

TC 80 standards support IMO resolutions and non-SOLAS and shore applications. Its scope is "to prepare standards for maritime navigation and radiocommunication equipment and systems, making use of electrotechnical, electronic, electroacoustic, electro-optical and data processing techniques for use on ships and where appropriate on shore".

By being represented in both IMO and ITU this technical committee can contribute to the performance and technical content of the resolutions and recommendations. This is invaluable to industry, in that the performance and technical standards represent the practical state of current and emerging technology.





ORIGINS



The origins of TC 80 date from the 1970s when electromechanical instruments started to be replaced by electronic instruments. In 1978 the IEC set up a working group to propose a possible work programme on “advanced navigational instruments”. The preferred approach was what today would be called “multi-modal” covering land, sea and air applications and the concept envisaged for navigation included related aspects of radiocommunications. Experts from France, Germany, Japan and Norway formed the working group with contributions from:

- International Radio Consultative Committee (CCIR)
- Comité International Radio-Maritime (CIRM)
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)
- Inter-Governmental Maritime Consultative Organization (IMCO, now IMO)
- European Organisation for Civil Aviation Electronics (EUROCAE)

- International Organization for Standardization (ISO).

The working group identified a need for standards for instruments used on ships and possibly aircraft, noted the complex interrelations between IMCO, EUROCAE and ISO and centres of expertise existing within IEC, particularly in TC 18 (Electrical installations of ships and of mobile and fixed offshore units) and the International Special Committee on Radio Interference (CISPR).

The new Technical Committee held its first meeting in June 1980 in Stockholm with delegates from China, France, Germany, Japan, Netherlands, Sweden, UK, USA and Yugoslavia and observers from TC 18 and CIRM. The top priority task identified was standards to support the carriage requirements of the new SOLAS 1974, particularly automatic radar plotting aids (ARPA). TC 80 subsequently specialised into the activity of maritime instruments and has now produced some 48 standards.

GENERAL REQUIREMENTS



Photo courtesy of P&O Cruises

When IEC TC 80 was formed there were 20 classification societies, together with the International Association of Classification Societies, numerous statutory authorities, regional standards bodies and IMCO – all with different ideas on what the general requirements should be for equipment to be used on ships.

It quickly became clear that general requirements interrelated environmental issues with other issues concerning the design of the equipment, its power supplies, electromagnetic compatibility (EMC) and safety.

In 1991 the IMO, when discussing the changes which would arise with the introduction of the GMDSS, noted that in future, radio equipment would be installed on the bridge alongside the navigation equipment instead of in a special radio room as hitherto and TC 80 standards subsequently took this into account.

Having attained consensus in IMO for the requirements for equipment used on the bridge of a ship, discussions began with classification societies, with TC 18 and

with ISO to align all their general requirements. This resulted in the third edition of IEC 60945 in 1996 which is the industry standard on this subject. This edition also introduced new requirements for software, reflecting the technological changes taking place in equipment design.

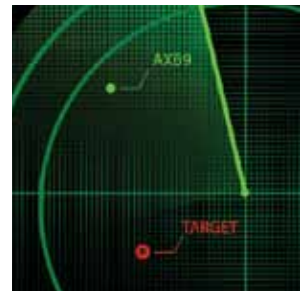
A fourth edition of IEC 60945 appeared in 2002 which extended the detail of operational tests, particularly for equipment which is operated through software menus, to reflect the importance given by IMO to human factors. The EMC tests were also extended to contain the increasing problems experienced by the use of ever more electronic equipment on a ship.

The work on general requirements was extended in 2008 by the publication of IEC 62288. This standard harmonizes the requirements for the presentation of navigation-related information on the bridge of a ship to ensure that all navigational displays adopt a consistent human machine interface philosophy and implementation. The standard also provides standardized symbology and terminology.





INTERFACES



Interest in standard interfaces to enable navigation equipment to communicate developed in the 1970s. During this decade, CIRM took an interest in standards for gyrocompasses, the National Marine Electronics Association (NMEA) focused on the use of LORAN for controlling an auto-pilot and, later, the IMO became involved during the development of the GMDSS.

By the mid-1980s the interface issue looked like it might polarize into two areas: exchange of navigational information and exchange of radiocommunication information. TC 80 helped to resolve this potential problem by developing standards suitable for all information exchange in the IEC 61162 series which today contains the accepted industry standards.



THE WORK PROGRAMME

IEC TC 80 has produced standards for all the equipment which is required by the Safety of Life at Sea (SOLAS) Convention to be carried on the bridge of a ship. This includes the Automatic Identification System (AIS), the Electronic Chart Display and Information System (ECDIS), the Voyage Data Recorder, the radio installation and the radar.

Where appropriate, such as in the case of the Automatic Identification System, TC 80 has also produced standards for equipment intended for use on small vessels which has to interwork with the SOLAS equipment and also for supporting shore-based equipment.

Current interest in IMO is on reducing the workload of the bridge team through better integrated navigation systems and displays and reducing the workload

of handling alarms deriving from malfunctions of equipment and navigational warnings. TC 80 is developing standards for Integrated Navigation Systems and Bridge Alarm Management to assist in these areas.

IMO

The International Maritime Organization, founded in 1948, is a specialized agency of the United Nations with headquarters in London and known until 1982 as the Inter-Governmental Maritime Consultative Organization (IMCO). It is a technical organization consisting of member states which has drafted some 40 Conventions and 800 supporting Resolutions.



CIRM

The Comité International Radio-Maritime, or International Maritime Radio Committee, promotes use of electronic technology for shipping and the safety of life at sea, and fosters relations between all organizations concerned with electronic aids to marine navigation and marine radiocommunications.

CIRM was accorded consultative status by IMCO in 1961. It is also a Sector Member of the ITU, and is a Liaison Member both of the ISO and of the IEC.

CIRM provides the Secretary of TC 80 under an agreement with the British Standards Institution.

ISO

At ISO, the International Organization for Standardization, TC 8 deals with ships and marine technology and has subcommittee SC 5 (Navigation and ship operation) which has a liaison with IEC TC 80.

ISO TC 8 standards which complement the work of IEC TC 80, or have been produced jointly, include the following:

- Magnetic compass (25862)
- Ship's bridge layout (8468)
- Gyro-compass (8728, 16328)
- Radar reflector (8729)
- Echo sounder (9875)
- Heading controller (11674, 16329)
- Night vision (16273)
- Searchlight (17884)
- Programmable electronic systems (17894)
- ECS database (19379)
- Transmitting heading devices (22090)
- Rate of turn indicator (20672)
- Rudder indicator (20673)
- Propeller indicator (22554, 22555)
- Signal lamp (25861) and
- Wind vane (10596)



ABBREVIATIONS

AIS Automatic Identification Systems

CCIR International Radio Consultative Committee
(now part of ITU-R)

CIRM International Maritime Radio Committee

CISPR International Special Committee on Radio
Interference

ECDIS Electronic Chart Display and Information
System

ECS Electronic Chart System

EMC Electromagnetic Compatibility

GMDSS Global Maritime Distress and Safety System

IALA International Association of Marine Aids to
Navigation and Lighthouse Authorities

IMO International Maritime Organization
(formerly IMCO Inter-Governmental
Maritime Consultative Organization)

ISO International Organization for
Standardization

ITU International Telecommunication Union

LORAN Long Range Radio-Navigation System

NMEA National Marine Electronics Association

SOLAS International Convention for the Safety of
Life at Sea

RTCM Radio Technical Commission for Maritime
Services





CURRENT PUBLICATIONS ISSUED BY TC 80 WITH THE REFERENCE TO THE IMO PERFORMANCE STANDARDS WHERE APPLICABLE

IEC PUBLICATION	IMO RESOLUTION	TITLE
IEC 60945 Ed. 4.0	A.694(17)	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results
IEC 61023 Ed. 3.0	MSC.96(72)	Maritime navigation and radiocommunication equipment and systems - Marine speed and distance measuring equipment (SDME) - Performance requirements, methods of testing and required test results
IEC 61075 Ed. 1.0	A.818(19)	Loran-C receivers for ships - Minimum performance standards - Methods of testing and required test results
IEC 61097-1 Ed. 2.0	A.802(19) amended by MSC.247(83)	Global maritime distress and safety system (GMDSS) - Part 1: Radar transponder - Marine search and rescue (SART) - Operational and performance requirements, methods of testing and required test results
IEC 61097-2 Ed. 3.0	A.810(19) amended by MSC.56(66) and MSC.120(74)	Global maritime distress and safety system (GMDSS) - Part 2: COSPAS-SARSAT EPIRB - Satellite emergency position indicating radio beacon operating on 406 MHz - Operational and performance requirements, methods of testing and required test results
IEC 61097-3 Ed. 1.0	A.803(19) A.804(19), A.806(19) amended by MSC.68(68)	Global maritime distress and safety system (GMDSS) - Part 3: Digital selective calling (DSC) equipment - Operational and performance requirements, methods of testing and required testing results
IEC 61097-4 Ed. 2.0	A.807(19) amended MSC.68(68) Annex 4	Global maritime distress and safety system (GMDSS) - Part 4: INMARSAT-C ship earth station and INMARSAT enhanced group call (EGC) equipment - Operational and performance requirements, methods of testing and required test results
IEC 61097-6 Ed. 2.0	MSC.148(77)	Global maritime distress and safety system (GMDSS) - Part 6: Narrowband direct-printing telegraph equipment for the reception of navigational and meteorological warnings and urgent information to ships (NAVTEX)
IEC 61097-7 Ed. 1.0	A.803(19) amended MSC.68(68) Annex 1	Global maritime distress and safety system (GMDSS) - Part 7: Shipborne VHF radiotelephone transmitter and receiver - Operational and performance requirements, methods of testing and required test results
IEC 61097-8 Ed. 1.0	A.803(19) A.804(19), A.806(19)	Global maritime distress and safety system (GMDSS) - Part 8: Shipborne watchkeeping receivers for the reception of digital selective calling (DSC) in the maritime MF, MF/HF and VHF bands - Operational and performance requirements, methods of testing and required test results
IEC 61097-9 Ed. 1.0	A.806(19) amended MSC.68(68) Annex 3	Global maritime distress and safety system (GMDSS) - Part 9: Shipborne transmitters and receivers for use in the MF and HF bands suitable for telephony, digital selective calling (DSC) and narrow band direct printing (NBDP) - Operational and performance requirements, methods of testing and required test results
IEC 61097-12 Ed. 1.0	A.809(19)	Global maritime distress and safety system (GMDSS) - Part 12: Survival craft portable two-way VHF radiotelephone apparatus - Operational and performance requirements, methods of testing and required test results



IEC PUBLICATION	IMO RESOLUTION	TITLE
IEC 61097-13 Ed 1.0		Global maritime distress and safety system (GMDSS) - Part 13: Inmarsat F77 ship earth station equipment - Operational and performance requirements, methods of testing and required test results
IEC 61097-14 Ed 1.0	MSC.246(83)	Global maritime distress and safety system (GMDSS) - Part 14: AIS search and rescue transmitter (AIS-SART) - Operational and performance requirements, methods of testing and required test results
IEC 61108-1 Ed. 2.0	MSC.112(73)	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 1: Global positioning system (GPS) - Receiver equipment - Performance standards, methods of testing and required test results
IEC 61108-2 Ed. 1.0	MSC.113(73)	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 2: Global navigation satellite system (GLONASS) - Receiver equipment - Performance standards, methods of testing and required test results
IEC 61108-3 Ed. 1.0	MSC.233(82)	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 3: Galileo receiver equipment - Performance requirements, methods of testing and required test results
IEC 61108-4 Ed. 1.0	MSC.114(73)	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 4: Shipborne DGPS and DGLONASS maritime radio beacon receiver equipment - Performance requirements, methods of testing and required test results
IEC 61162-1 Ed. 4.0		Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners
IEC 61162-2 Ed. 1.0		Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 2: Single talker and multiple listeners, high-speed transmission
IEC 61162-3 Ed.1.1		Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 3: Serial data instrument network
IEC 61162-450 Ed. 1		Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 450: Multiple talkers and multiple listeners - Ethernet interconnection
IEC 61174 Ed. 3.0	MSC.232(82)	Maritime navigation and radiocommunication equipment and systems - Electronic chart display and information system (ECDIS) - Operational and performance requirements, methods of testing and required test results
IEC 61209 Ed. 1.0	MSC.64(67) Annex 1	Maritime navigation and radiocommunication equipment and systems - Integrated bridge systems (IBS) - Operational and performance requirements, methods of testing and required test results
IEC 61993-1 Ed. 1.0		Maritime navigation and radiocommunication equipment and systems - Part 1: Shipborne automatic transponder system installation using VHF digital selective calling (DSC) techniques - Operational and performance requirements, methods of testing and required test results



IEC PUBLICATION	IMO RESOLUTION	TITLE
IEC 61993-2 Ed. 1.0	MSC.74(69) Annex 3	Maritime navigation and radiocommunication equipment and systems - Automatic identification systems (AIS) - Part 2: Class A shipborne equipment of the universal automatic identification system (AIS) - Operational and performance requirements, methods of test and required test results
IEC 61996-1 Ed. 1.0	A.861(20) amended by MSC.214(81)	Maritime navigation and radiocommunication equipment and systems - Shipborne voyage data recorder (VDR) - Part 1: Voyage data recorder (VDR) - Performance requirements, methods of testing and required test results
IEC 61996-2 Ed. 2.0	MSC.163(78) amended by MSC.214(81)	Maritime navigation and radiocommunication equipment and systems - Shipborne voyage data recorder (VDR) - Part 2: Simplified voyage data recorder (S-VDR) - Performance requirements, methods of testing and required test results
IEC 62065 Ed. 1.0	MSC.74(69) Annex 2	Maritime navigation and radiocommunication equipment and systems - Track control systems - Operational and performance requirements, methods of testing and required test results
IEC 62238 Ed. 1.0		Maritime navigation and radiocommunication equipment and systems - VHF radiotelephone equipment incorporating Class «D» Digital Selective Calling (DSC) - Methods of testing and required test results
IEC 62252 Ed. 1.0		Maritime navigation and radiocommunication equipment and systems - Radar for craft not in compliance with IMO SOLAS Chapter V - Performance requirements, methods of test and required test results
IEC 62287-1 Ed. 2.0		Maritime navigation and radiocommunication equipment and systems - Class B shipborne equipment of the automatic identification system (AIS) - Part 1: Carrier-sense time division multiple access (CSTDMA) techniques
IEC 62288 Ed. 1.0	MSC.191(79)	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 62320-1 Ed. 1.1		Maritime navigation and radiocommunication equipment and systems - Automatic identification system (AIS) - Part 1: AIS Base Stations - Minimum operational and performance requirements, methods of testing and required test results
IEC 62320-2 Ed. 1.0		Maritime navigation and radiocommunication equipment and systems - Automatic identification system (AIS) - Part 2: AIS AtoN Stations - Operational and performance requirements, methods of testing and required test results
IEC 62376 Ed. 1.0		Maritime navigation and radiocommunication equipment and systems - Electronic chart system (ECS) - Operational and performance requirements, methods of testing and required test results
IEC 62388 Ed. 1.0	MSC.192(79)	Maritime navigation and radiocommunication equipment and systems - Shipborne radar - Performance requirements, methods of testing and required test results
IEC 62616 Ed. 1.0	MSC.128(75)	Maritime navigation and radiocommunication equipment and systems - Bridge navigational watch alarm system (BNWAS)

THE IEC

The IEC, headquartered in Geneva, Switzerland, is the world's leading organization that prepares and publishes International Standards for all electrical, electronic and related technologies – collectively known as “electrotechnology”. IEC standards cover a vast range of technologies from power generation, transmission and distribution to home appliances and office equipment, semiconductors, fibre optics, batteries, flat panel displays and solar energy, to mention just a few. Wherever you find electricity and electronics, you find the IEC supporting safety and performance, the environment, electrical energy efficiency and renewable energies. The IEC also administers international conformity assessment schemes in the areas of electrical equipment testing and certification

(IECEE), quality of electronic components, materials and processes (IECQ) and certification of electrical equipment operated in explosive atmospheres (IECEX).

The IEC has served the world's electrical industry since 1906, developing International Standards to promote quality, safety, performance, reproducibility and environmental compatibility of materials, products and systems.

The IEC family, which now comprises more than 160 countries, includes all the world's major trading nations. This membership collectively represents about 85 % of the world's population and 95 % of the world's electrical generating capacity.

FURTHER INFORMATION

Please visit the IEC website at www.iec.ch for further information. In the «About the IEC» section, you can contact your local IEC National Committee directly. Alternatively, please contact the IEC Central Office in Geneva, Switzerland or the nearest IEC Regional Centre.

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