



Life Environmentally Optimized

# **Guide for Maritime Bridge Operation Simulators**

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# GENERAL CONDITIONS

## Definitions:

"Administration" means the Government of the State whose flag the Ship is entitled to fly or under whose authority the Ship is authorised to operate in the specific case.

"IACS" means the International Association of Classification Societies.

"Interested Party" means the party, other than the Society, having an interest in or responsibility for the Ship, product, plant or system subject to classification or certification (such as the owner of the Ship and his representatives, the ship builder, the engine builder or the supplier of parts to be tested) who requests the Services or on whose behalf the Services are requested.

"Owner" means the registered owner, the ship owner, the manager or any other party with the responsibility, legally or contractually, to keep the ship seaworthy or in service, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Rules for the Classification of Ships or in the corresponding rules indicated in the specific Rules.

"Rules" in these General Conditions means the documents below issued by the Society:

- (i) Rules for the Classification of Ships or other special units;
- (ii) Complementary Rules containing the requirements for product, plant, system and other certification or containing the requirements for the assignment of additional class notations;
- (iii) Rules for the application of statutory rules, containing the rules to perform the duties delegated by Administrations;
- (iv) Guides to carry out particular activities connected with Services;
- (v) Any other technical document, as for example rule variations or interpretations.

"Services" means the activities described in Article 1 below, rendered by the Society upon request made by or on behalf of the Interested Party.

"Ship" means ships, boats, craft and other special units, as for example offshore structures, floating units and underwater craft.

"Society" or "TASNEEF" means Tasneef and/or all the companies in the Tasneef Group which provide the Services.

"Surveyor" means technical staff acting on behalf of the Society in performing the Services.

## Article 1

1.1. The purpose of the Society is, among others, the classification and certification of ships and the certification of their parts and components. In particular, the Society:

- (i) sets forth and develops Rules;
- (ii) publishes the Register of Ships;
- (iii) issues certificates, statements and reports based on its survey activities.

1.2. The Society also takes part in the implementation of national and international rules and standards as delegated by various Governments.

1.3. The Society carries out technical assistance activities on request and provides special services outside the scope of classification, which are regulated by these general conditions, unless expressly excluded in the particular contract.

## Article 2

2.1. The Rules developed by the Society reflect the level of its technical knowledge at the time they are published. Therefore, the Society, although committed also through its research and development services to continuous updating of the Rules, does not guarantee the Rules meet state-of-the-art science and technology at the time of publication or that they meet the Society's or others' subsequent technical developments.

2.2. The Interested Party is required to know the Rules on the basis of which the Services are provided. With particular reference to Classification Services, special attention is to be given to the Rules concerning class suspension, withdrawal and reinstatement. In case of doubt or inaccuracy, the Interested Party is to promptly contact the Society for clarification.

The Rules for Classification of Ships are published on the Society's website: [www.tasneef.ae](http://www.tasneef.ae).

2.3. The Society exercises due care and skill:

- (i) in the selection of its Surveyors
- (ii) in the performance of its Services, taking into account the level of its technical knowledge at the time the Services are performed.

2.4. Surveys conducted by the Society include, but are not limited to, visual inspection and non-destructive testing. Unless otherwise required, surveys are conducted through sampling techniques and do not consist of comprehensive verification or monitoring of the Ship or of the items subject to certification. The surveys and checks made by the Society on board ship do not necessarily require the constant and continuous presence of the Surveyor. The Society may also commission laboratory testing, underwater inspection and other checks carried out by and under the responsibility of qualified service suppliers. Survey practices and procedures are selected by the Society based on its experience and knowledge and according to generally accepted technical standards in the sector.

## Article 3

3.1. The class assigned to a Ship, like the reports, statements, certificates or any other document or information issued by the Society, reflects the opinion of the Society concerning compliance, at the time the Service is provided, of the Ship or product subject to certification, with the applicable Rules (given the intended use and within the relevant time frame).

The Society is under no obligation to make statements or provide information about elements or facts which are not part of the specific scope of the Service requested by the Interested Party or on its behalf.

3.2. No report, statement, notation on a plan, review, Certificate of Classification, document or information issued or given as part of the Services provided by the Society shall have any legal effect or implication other than a representation that, on the basis of the checks made by the Society, the Ship, structure, materials, equipment, machinery or any other item covered by such document or information meet the Rules. Any such document is issued solely for the use of the Society, its committees and clients or other duly authorised bodies and for no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties on the basis of the statements or information given by the Society. The validity, application, meaning and interpretation of a Certificate of Classification, or any other document or information issued by the Society in connection with its Services, is governed by the Rules of the Society, which is the sole subject entitled to make such interpretation. Any disagreement on technical matters between the Interested Party and the Surveyor in the carrying out of his functions shall be raised in writing as soon as possible with the Society, which will settle any divergence of opinion or dispute.

3.3. The classification of a Ship, or the issuance of a certificate or other document connected with classification or certification and in general with the performance of Services by the Society shall have the validity conferred upon it by the Rules of the Society at the time of the assignment of class or issuance of the certificate; in no case shall it amount to a statement or warranty of seaworthiness,

structural integrity, quality or fitness for a particular purpose or service of any Ship, structure, material, equipment or machinery inspected or tested by the Society.

3.4. Any document issued by the Society in relation to its activities reflects the condition of the Ship or the subject of certification or other activity at the time of the check.

3.5. The Rules, surveys and activities performed by the Society, reports, certificates and other documents issued by the Society are in no way intended to replace the duties and responsibilities of other parties such as Governments, designers, ship builders, manufacturers, repairers, suppliers, contractors or sub-contractors, Owners, operators, charterers, underwriters, sellers or intended buyers of a Ship or other product or system surveyed.

These documents and activities do not relieve such parties from any fulfilment, warranty, responsibility, duty or obligation (also of a contractual nature) expressed or implied or in any case incumbent on them, nor do they confer on such parties any right, claim or cause of action against the Society. With particular regard to the duties of the ship Owner, the Services undertaken by the Society do not relieve the Owner of his duty to ensure proper maintenance of the Ship and ensure seaworthiness at all times. Likewise, the Rules, surveys performed, reports, certificates and other documents issued by the Society are intended neither to guarantee the buyers of the Ship, its components or any other surveyed or certified item, nor to relieve the seller of the duties arising out of the law or the contract, regarding the quality, commercial value or characteristics of the item which is the subject of transaction.

In no case, therefore, shall the Society assume the obligations incumbent upon the above-mentioned parties, even when it is consulted in connection with matters not covered by its Rules or other documents.

In consideration of the above, the Interested Party undertakes to relieve and hold harmless the Society from any third party claim, as well as from any liability in relation to the latter concerning the Services rendered.

Insofar as they are not expressly provided for in these General Conditions, the duties and responsibilities of the Owner and Interested Parties with respect to the services rendered by the Society are described in the Rules applicable to the specific Service rendered.

#### **Article 4**

4.1. Any request for the Society's Services shall be submitted in writing and signed by or on behalf of the Interested Party. Such a request will be considered irrevocable as soon as received by the Society and shall entail acceptance by the applicant of all relevant requirements of the Rules, including these General Conditions. Upon acceptance of the written request by the Society, a contract between the Society and the Interested Party is entered into, which is regulated by the present General Conditions.

4.2. In consideration of the Services rendered by the Society, the Interested Party and the person requesting the service shall be jointly liable for the payment of the relevant fees, even if the service is not concluded for any cause not pertaining to the Society. In the latter case, the Society shall not be held liable for non-fulfilment or partial fulfilment of the Services requested. In the event of late payment, interest at the legal current rate increased by 1.5% may be demanded.

4.3. The contract for the classification of a Ship or for other Services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30 days' notice to be given in writing. Failure to pay, even in part, the fees due for Services carried out by the Society will entitle the Society to immediately terminate the contract and suspend the Services.

For every termination of the contract, the fees for the activities performed until the time of the termination shall be owed to the Society as well as the expenses incurred in view of activities already programmed; this is without prejudice to the right to compensation due to the Society as a consequence of the termination.

With particular reference to Ship classification and certification, unless decided otherwise by the Society, termination of the contract implies that the assignment of class to a Ship is withheld or, if already assigned, that it is suspended or withdrawn; any statutory certificates issued by the Society will be withdrawn in those cases where provided for by agreements between the Society and the flag State.

#### **Article 5**

5.1. In providing the Services, as well as other correlated information or advice, the Society, its Surveyors, servants or agents operate with due diligence for the proper execution of the activity. However, considering the nature of the activities performed (see art. 2.4), it is not possible to guarantee absolute accuracy, correctness and completeness of any information or advice supplied. Express and implied warranties are specifically disclaimed.

Therefore, except as provided for in paragraph 5.2 below, and also in the case of activities carried out by delegation of Governments, neither the Society nor any of its Surveyors will be liable for any loss, damage or expense of whatever nature sustained by any person, in tort or in contract, derived from carrying out the Services.

5.2. Notwithstanding the provisions in paragraph 5.1 above, should any user of the Society's Services prove that he has suffered a loss or damage due to any negligent act or omission of the Society, its Surveyors, servants or agents, then the Society will pay compensation to such person for his proved loss, up to, but not exceeding, five times the amount of the fees charged for the specific services, information or opinions from which the loss or damage derives or, if no fee has been charged, a maximum of AED5,000 (Arab Emirates Dirhams Five Thousand only). Where the fees charged are related to a number of Services, the amount of the fees will be apportioned for the purpose of the calculation of the maximum compensation, by reference to the estimated time involved in the performance of the Service from which the damage or loss derives. Any liability for indirect or consequential loss, damage or expense is specifically excluded. In any case, irrespective of the amount of the fees charged, the maximum damages payable by the Society will not be more than AED5,000,000 (Arab Emirates Dirhams Five Millions only). Payment of compensation under this paragraph will not entail any admission of responsibility and/or liability by the Society and will be made without prejudice to the disclaimer clause contained in paragraph 5.1 above.

5.3. Any claim for loss or damage of whatever nature by virtue of the provisions set forth herein shall be made to the Society in writing, within the shorter of the following periods: (i) THREE (3) MONTHS from the date on which the Services were performed, or (ii) THREE (3) MONTHS from the date on which the damage was discovered. Failure to comply with the above deadline will constitute an absolute bar to the pursuit of such a claim against the Society.

#### **Article 6**

6.1. These General Conditions shall be governed by and construed in accordance with United Arab Emirates (UAE) law, and any dispute arising from or in connection with the Rules or with the Services of the Society, including any issues concerning responsibility, liability or limitations of liability of the Society, shall be determined in accordance with UAE law. The courts of the Dubai International Financial Centre (DIFC) shall have exclusive jurisdiction in relation to any claim or dispute which may arise out of or in connection with the Rules or with the Services of the Society.

6.2. However,

- (i) In cases where neither the claim nor any counterclaim exceeds the sum of AED300,000 (Arab Emirates Dirhams Three Hundred Thousand) the dispute shall be referred to the jurisdiction of the DIFC Small Claims Tribunal; and
- (ii) for disputes concerning non-payment of the fees and/or expenses due to the Society for services, the Society shall have the

right to submit any claim to the jurisdiction of the Courts of the place where the registered or operating office of the Interested Party or of the applicant who requested the Service is located.

In the case of actions taken against the Society by a third party before a public Court, the Society shall also have the right to summon the Interested Party or the subject who requested the Service before that Court, in order to be relieved and held harmless according to art. 3.5 above.

#### **Article 7**

**7.1.** All plans, specifications, documents and information provided by, issued by, or made known to the Society, in connection with the performance of its Services, will be treated as confidential and will not be made available to any other party other than the Owner without authorisation of the Interested Party, except as provided for or required by any applicable international, European or domestic legislation, Charter or other IACS resolutions, or order from a competent authority. Information about the status and validity of class and statutory certificates, including transfers, changes, suspensions, withdrawals of class, recommendations/conditions of class, operating conditions or restrictions issued against classed ships and other related information, as may be required, may be published on the website or released by other means, without the prior consent of the Interested Party.

Information about the status and validity of other certificates and statements may also be published on the website or released by other means, without the prior consent of the Interested Party.

**7.2.** Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 above, the Society's clients hereby accept that the Society may participate in the IACS Early Warning System which requires each Classification Society to provide other involved Classification Societies with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and used to facilitate the proper working of the IACS Early Warning System. The Society will provide its clients with written details of such information sent to the involved Classification Societies.

**7.3.** In the event of transfer of class, addition of a second class or withdrawal from a double/dual class, the Interested Party undertakes to provide or to permit the Society to provide the other Classification Society with all building plans and drawings, certificates, documents and information relevant to the classed unit, including its history file, as the other Classification Society may require for the purpose of classification in compliance with the applicable legislation and relative IACS Procedure. It is the Owner's duty to ensure that, whenever required, the consent of the builder is obtained with regard to the provision of plans and drawings to the new Society, either by way of appropriate stipulation in the building contract or by other agreement.

In the event that the ownership of the ship, product or system subject to certification is transferred to a new subject, the latter shall have the right to access all pertinent drawings, specifications, documents or information issued by the Society or which has come to the knowledge of the Society while carrying out its Services, even if related to a period prior to transfer of ownership.

#### **Article 8**

**8.1.** Should any part of these General Conditions be declared invalid, this will not affect the validity of the remaining provisions.

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### 1 AIM AND PURPOSE

The aim of this guide is to provide indications and evaluation criteria for the functionality and performance of maritime bridge operation simulation systems.

The purpose is to ensure that the level of realism provided by such simulation systems, relevant equipment and environment, fits for the purposes of the IMO Standard of Training, Certification and Watchkeeping (STCW) Code, Section A-I/12, and to provide a way to carry out a verification thereof.

### 2 SCOPE OF APPLICABILITY

This guide applies to maritime simulation systems for bridge operation that could be used for the purposes of training, demonstration of competence and/or demonstration of continued proficiency according to the STCW Code, Section A-I/12.

### 3 CAPABILITY OF SIMULATORS

The bridge operation simulators considered in this guide can have:

- a) full capability to simulate a total shipboard bridge operation situation, or
- b) limited capability to simulate shipboard bridge operation situations.

Simulators with limited capability should provide mandatory functionality as per Annex I, but may have restrictions in non-mandatory functionality, e.g. the capability for advanced maneuvering in restricted waterways, or be otherwise limited to specific operations such as collision avoidance or maintenance of particular bridge instruments, and/or operation in defined navigation/maneuvering scenarios.

### 4 COMPETENCIES ADDRESSED BY SIMULATORS

The bridge operation simulators with full capability [3]a) are expected to provide means for addressing competences according to Table 1.

Simulators with limited capability [3] b) are expected to provide means for addressing a subset of competences, according to their specific purpose. The simulator’s documentation should clearly indicate the subset of competences addressed.

### 5 FUNCTIONALITY AND PERFORMANCE FOR SIMULATORS

The bridge operation simulator should demonstrate functionality and performance according to the checklist provided in Annex 1.

### 6 STATEMENT OF COMPLIANCE

In order to obtain a Statement of Compliance to this guide, the simulator should fulfil the requirements of interest as per paragraph [5].

In addition to the above, the user’s manual(s) and design, implementation and test documentation for hardware, software and mathematical models used in the simulator can also be requested by the Society.

Compliance shall be assessed by means of:

- test sessions to be carried out on the simulator fully assembled and functioning in its final configuration, witnessed by the Society
- examination of documentation.

The Statement of Compliance has validity of 3 years. If significant modifications are carried out on the simulator after the issue of the Statement of Compliance, either in hardware or in software, a new Statement of Compliance is to be issued. The procedure for renewal has to be agreed with the Society, depending on the extent and impact of modification.

**Table 1: Competencies addressed by bridge operation simulators**

IMO STCW Code Ref.	Competence
Table A-II/1.1	Plan and conduct a passage and determine position
Table A-II/1.2	Maintain a safe navigational watch
Table A-II/1.3	Use radar and ARPA to maintain safety of navigation
Table A-II/1.4	Use of ECDIS to maintain safety of navigation
Table A-II/1.5	Respond to emergencies
Table A-II/1.6	Respond to a distress signal at sea
Table A-II/1.8	Transmit and receive information by visual signalling
Table A-II/1.9	Maneuver the ship
Table A-II/2.1	Plan a voyage and conduct navigation
Table A-II/2.2	Determine position and the accuracy of resultant position fix by any means
Table A-II/2.3	Determine and allow for compass errors
Table A-II/2.4	Co-ordinate search and rescue operations
Table A-II/2.5	Establish watchkeeping arrangements and procedures
Table A-II/2.6	Maintain the safety of navigation through the use of information from navigation equipment and systems to assist command decision making

<b>IMO STCW Code Ref.</b>	<b>Competence</b>
Table A-II/2.7	Maintain the safety of navigation through the use of ECDIS and associated navigation systems to assist command decision making
Table A-II/2.10	Maneuver and handle a ship in all conditions
Table A-II/2.11	Operate remote controls of propulsion plant and engineering systems and services
Table A-II/3.1	Plan and conduct a coastal passage and determine position
Table A-II/3.2	Maintain a safe navigational watch
Table A-II/3.3	Respond to emergencies
Table A-II/3.4	Respond to a distress signal at sea
Table A-II/3.5	Maneuver the ship and operate small ship power plants
Table A-II/5.2	Contribute to berthing, anchoring and other mooring operations



**Annex 1**

**ANNEX 1 – CHECKLIST FOR FUNCTIONALITY AND PERFORMANCE FOR SIMULATORS**

**A.1 General**

The bridge operation simulators should:

- have sufficient behavioral realism to allow a candidate to exhibit the skills appropriate to the assessment objectives;
- provide a controlled operating environment, capable of producing a variety of conditions, which may include emergency, hazardous or unusual situations;
- permit an assessor to control, monitor and record exercises for the effective assessment of the performance of candidates.

Navigation and watchkeeping simulation equipment should be capable of simulating navigational equipment and bridge operational controls which meet all applicable performance standards adopted by the International Maritime Organization, incorporate facilities to generate soundings and:

- create a real-time operating environment, including navigation control and communications instruments and equipment

appropriate to the navigation and watchkeeping tasks to be carried out and the maneuvering skills to be assessed;

- provide a realistic visual scenario by day or by night, including variable visibility, or by night only as seen from the bridge, with a minimum horizontal field of view available to the trainee in viewing sectors appropriate to the navigation and watchkeeping tasks and objectives;
- realistically simulate “own ship” dynamics in open-water conditions, including the effects of weather, tidal stream, currents and interaction with other ships;
- realistically simulate VTS communication procedures between ship and shore.

**A.2 Checklist**

Legenda:

- C. Compliant
- N.C. Not Compliant
- N.A. Not Applicable

		EVALUATION		
		C.	N.C.	N.A.
1. Layout				
1.1	Equipment, consoles and workstations shall be installed, mounted, and arranged in a ship-like manner that would physically resemble a ship’s navigating bridge. These hardware panels should have operational resemblance to actual shipboard equipment.			
Evidence / note				
		EVALUATION		
		C	N.C.	N.A.
2. Simulator capabilities				
2.1	The simulation of own ship shall be based on a mathematical model with 6 degrees of freedom.			
2.2	The model shall realistically simulate own ship hydrodynamics in open water conditions, including the effects of wind forces, wave forces, tidal stream and currents.			
2.3	The model shall realistically simulate own ship hydrodynamics in restricted waterways, including shallow water and bank effects, interaction with other ships and direct, counter and sheer currents.			
2.4	The simulator shall include mathematical models of at least the types of own ship relevant to the training objectives.			
2.5	The target ships shall be equipped with navigational — lights, shapes and sound signals, according to the “Rules of the Road”. The signals shall be individually controlled by the instructor and the sound signals shall be directional and fade with range.			
2.6	The simulator shall provide an own ship engine sound reflecting the power output.			
2.7	The simulator shall be capable of providing environmental sound (e.g. wind) according to conditions simulated.			
2.8	The simulation shall include the depth according to charts used, reflecting water level according to tidal water situation.			
2.9	The simulator shall provide waves, variable in direction and strength.			

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2.10	It shall be possible to simulate usage of at least 4 tugs having different characteristics and response times for the purpose of mooring the vessel with the capability to control the power and orientation of the tugs (push and pull).			
2.11	It shall be possible to berth and unberth a vessel using mooring lines with the capability to control run out, heave, slack, stop, let go the various mooring lines bearing in mind their breaking stress.			
2.12	It shall be possible for Own ship to let go the bower anchors and control is pay-out as per the strain on the cable. The simulator shall have the capability to read the number of shackles out and the strain at any time			
Evidence / note				
3. Visualization		<b>EVALUATION</b>		
		<b>C</b>	<b>N.C.</b>	<b>N.A</b>
3.1	The visual system shall show objects with sufficient realism (detailed enough to be recognized as in real life).			
3.2	The simulator shall provide a realistic visual scenario by day, dusk or by night, including variable meteorological visibility, changing in time. It shall be possible to create a range of visual conditions, from clear to dense fog.			
3.3	It shall be possible to take accurate bearings of objects seen on the screen.			
3.4	It shall be possible to use magnified view for observations			
3.5	The visual system shall present at least 25 degrees of vertical field view. In addition by any method, it shall be possible to observe the ship's side and the dock during mooring operations			
3.6	There should be a proper correspondence between the visual picture, radar and ECDIS			
3.7	The view shall be updated with a frequency of at least 30 Hz measured in a typical visual scene for the intended exercises and have an angular resolution of $\leq 2.5$ arc minutes.			
3.8	The projection of the view shall be placed at such a distance and in such a manner from the bridge windows that accurate visual bearings may be taken to objects in the scene. It shall be possible to use binocular systems for observations.			
3.9	The visual system shall present the outside world by a view around the horizon (360 degrees). The horizontal field of view may be obtained by a view of at least 240 degrees and where the rest of the horizon may be panned (to move the camera).			
3.10	The visual system shall present a vertical view from the workstations for navigation, traffic surveillance and maneuvering enabling the navigator to detect and monitor objects visually on the sea surface up to the horizon within the required horizontal field of view when the ship is pitching and rolling.			
3.11	The visual system shall present all navigational marks according to charts used.			
3.12	The visual system shall show mooring and towing lines with sufficient realism in accordance with the forces effecting the tension and orientation.			
3.13	The visual system shall provide a realistic set of bow wave, sea spray and wakes in accordance with ships power output, speed and weather conditions.			
3.14	The visual system shall provide a realistic set of flue gas emission and waving flag effect in accordance with ships power output, speed and weather conditions.			
Evidence / note				

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4. Navigation and watchkeeping simulation		EVALUATION		
		C	N.C.	N.A
4.1	The navigated waters shall include a current pattern, changeable in time, according to the charts used. Tidal waters shall be reflected.			
4.2	The simulator shall provide at least two different wave spectra, variable in direction height and period.			
4.3	The visual system shall provide a realistic set of wind waves including white caps according to the Beaufort wind force scale. A ship under way shall provide relevant bow- and stern wave.			
4.4	The simulator shall provide capabilities for realistically simulate the function of mooring and tug lines and how each line functions as part of an overall system taking into account the capacities, safe working loads, and breaking strengths of mooring equipment including mooring wires, synthetic and fiber lines, winches, anchor windlasses, capstans, bitts, chocks and bollards.			
The simulator shall be equipped with targets enabling search and rescuing persons from the sea, assisting a ship in distress and responding to emergencies which arise in port. Such targets shall be at least:				
4.5	<ul style="list-style-type: none"> <li>• rocket parachute flares</li> </ul>			
4.6	<ul style="list-style-type: none"> <li>• hand flares</li> </ul>			
4.7	<ul style="list-style-type: none"> <li>• buoyant smoke signals</li> </ul>			
4.8	<ul style="list-style-type: none"> <li>• Search And Rescue Transponder (SART)</li> </ul>			
4.9	<ul style="list-style-type: none"> <li>• satellite Emergency Position-Indicating Radio Beacon (EPIRB)</li> </ul>			
4.10	<ul style="list-style-type: none"> <li>• lifeboat</li> </ul>			
4.11	<ul style="list-style-type: none"> <li>• life raft</li> </ul>			
4.12	<ul style="list-style-type: none"> <li>• rescue helicopter</li> </ul>			
4.13	<ul style="list-style-type: none"> <li>• rescue aircraft</li> </ul>			
4.14	<ul style="list-style-type: none"> <li>• people in water.</li> </ul>			
Evidence / note				
5. Ship handling and maneuvering		EVALUATION		
		C	N.C.	N.A
5.1	The simulator shall include mathematical models of at least 10 types of own ship. The models shall resemble accurately the behavioural characteristics of an actual ship of that size, power and type, and realistically behave as per the hydrodynamic effects of wind, current and swell.			
5.2	The simulator shall be able to present at least 20 different types of target ships, each equipped with a mathematical model, which accounts for motion, drift and steering angles including forces induced by current, wind and wave, where the instructor shall be able to program voyage routes for each target ship individually.			
5.3	The simulator should be able to provide at least 8 international geographical visual areas for exercises which include open sea and high density traffic areas.			
5.4	The simulator shall include exercise areas including correct data for landmass, depth, buoys tidal streams and visuals as appropriate to the nautical charts and publications used for the relevant training objectives.			
5.5	The simulator shall provide capabilities for realistically conduct anchoring operations by any method. The model shall realistically simulate own ship hydrodynamics in interaction with applicable anchor and chain dimensions with different bottom holding grounds, including the effects of wind forces, wave forces, tidal stream and currents.			
Evidence / note				

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6. Propulsion Controls		EVALUATION		
		C	N.C.	N.A
6.1	Controls of propulsion plant operations, including engine telegraph, pitch-control and thrusters. There shall be indicators for shaft(s) revolutions and pitch of propeller(s). There shall be controls for at least one propeller and one bow thruster.			
Evidence / note				
7. Steering Console		EVALUATION		
		C	N.C.	N.A
7.1	Steering console, including recognized facilities for hand steering and automatic steering with controls for switch over. There shall be indicators of rudder angle and rate of turn.			
There shall be provision for the following, at or near the console:				
7.2	<ul style="list-style-type: none"> <li>Steering wheel</li> </ul>			
7.3	<ul style="list-style-type: none"> <li>Steering motors (at least two)</li> </ul>			
7.4	<ul style="list-style-type: none"> <li>Hand, auto-pilot and non-follow up steering.</li> </ul>			
7.5	<ul style="list-style-type: none"> <li>Compass Repeater able to depict gyro and/or magnetic heading.</li> </ul>			
7.6	<ul style="list-style-type: none"> <li>Gyro failure alarm</li> </ul>			
7.7	<ul style="list-style-type: none"> <li>Auto-pilot</li> </ul>			
The Auto-Pilot should have the following capabilities :				
7.8	<ul style="list-style-type: none"> <li>Weather adjustment (yawing and course control)</li> </ul>			
7.9	<ul style="list-style-type: none"> <li>Rudder limit setting</li> </ul>			
7.10	<ul style="list-style-type: none"> <li>Counter Rudder</li> </ul>			
7.11	<ul style="list-style-type: none"> <li>Off-course alarm</li> </ul>			
7.12	<ul style="list-style-type: none"> <li>Setting of constant rate of turn</li> </ul>			
Evidence / note				
8. Engine Alarm Panel		EVALUATION		
		C	N.C.	N.A
The Engine Alarm Panel should give audible and visual alarm in case of:				
8.1	<ul style="list-style-type: none"> <li>Start fail</li> </ul>			
8.2	<ul style="list-style-type: none"> <li>Shutdown</li> </ul>			
8.3	<ul style="list-style-type: none"> <li>Slow down</li> </ul>			
8.4	<ul style="list-style-type: none"> <li>Overspeed</li> </ul>			
8.5	<ul style="list-style-type: none"> <li>Overload</li> </ul>			
Evidence / note				
9. Radar simulation		EVALUATION		
		C	N.C.	N.A
9.1	The radar simulation equipment shall be capable of model weather, tidal streams, current, shadow sectors, spurious and false echoes and other propagation effects, and generate coastlines, navigational buoys and search and rescue transponders (see STCW Section A-1/12.4.2).			

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9.2	Radar simulation equipment shall be capable of simulating the operational capabilities of navigational radar equipment which meets all applicable performance standards adopted by the Organization and incorporate facilities to:			
9.3	<ul style="list-style-type: none"> <li>operate in the stabilized relative-motion mode and sea- and ground-stabilized true-motion modes;</li> </ul>			
9.4	<ul style="list-style-type: none"> <li>model weather, tidal streams, current, shadow sectors, spurious echoes and other propagation effects, and generate coastlines, navigational buoys and search and rescue transponders; and</li> </ul>			
9.5	<ul style="list-style-type: none"> <li>create a real-time operating environment incorporating at least two own-ship stations with ability to change own ships course and speed, and include parameters for at least 20 target ships and appropriate communication facilities</li> </ul>			
Evidence / note				
10. Radar set with Automatic Radar Plotting Aids (ARPA)		<b>EVALUATION</b>		
		<b>C</b>	<b>N.C.</b>	<b>N.A</b>
	ARPA simulation equipment shall be capable of simulating the operational capabilities of ARPAs which meet all applicable performance standards adopted by the International Maritime Organization, and shall incorporate the facilities for:			
10.1	<ul style="list-style-type: none"> <li>manual and automatic target acquisition;</li> </ul>			
10.2	<ul style="list-style-type: none"> <li>past track information;</li> </ul>			
10.3	<ul style="list-style-type: none"> <li>use of exclusion areas;</li> </ul>			
10.4	<ul style="list-style-type: none"> <li>vector/graphic time-scale and data display; and</li> </ul>			
10.5	<ul style="list-style-type: none"> <li>trial maneuvers.</li> </ul>			
10.6	It shall be possible to simulate both 3 cms and 10 cms radar. The radar shall be capable of being operated in the sea stabilized relative motion mode and sea and ground stabilized true motion modes.			
10.7	The radar simulation equipment shall be capable of generation of interference, noise, Radar/ARPA failure, yawing, clutter, spurious echoes, blind sector, parallel index lines.			
Evidence / note				
11. ECDIS		<b>EVALUATION</b>		
		<b>C</b>	<b>N.C.</b>	<b>N.A</b>
11.1	Vector charts should be available for the exercise areas. It should be possible to edit existing areas and be able to generate chart database of any area and scale if desired at a later stage. Normal features for ECDIS system should be available including cart scaling and zooming, review, selectable layer, route planning and monitoring.			
	The ECDIS simulation equipment shall incorporate the facilities for:			
11.2	<ul style="list-style-type: none"> <li>integration with other navigation systems</li> </ul>			
11.3	<ul style="list-style-type: none"> <li>own position</li> </ul>			
11.4	<ul style="list-style-type: none"> <li>sea area display</li> </ul>			
11.5	<ul style="list-style-type: none"> <li>mode and orientation</li> </ul>			
11.6	<ul style="list-style-type: none"> <li>chart data displayed</li> </ul>			
11.7	<ul style="list-style-type: none"> <li>route monitoring</li> </ul>			
11.8	<ul style="list-style-type: none"> <li>user-created information layers</li> </ul>			

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11.9	<ul style="list-style-type: none"> <li>contacts (when interfaced with AIS and/or radar tracking)</li> </ul>			
11.10	<ul style="list-style-type: none"> <li>radar overlay functions (when interfaced).</li> </ul>			
Evidence / note				
12. GMDSS		<b>EVALUATION</b>		
		<b>C</b>	<b>N.C.</b>	<b>N.A</b>
12.1	Communication equipment in accordance with Global Maritime Distress Safety System(GMDSS) framework, covering at least the requirements for relevant area.			
Evidence / note				
13. VHF Communication System		<b>EVALUATION</b>		
		<b>C</b>	<b>N.C.</b>	<b>N.A</b>
13.1	Communication between ships and port VTS shall be simulated on VHF sets which will have at least the following channels: 16, 6, 8, 9, 10, 12, 13, 14, 75, 77, 69, 67.			
13.2	The following realism should be depicted:			
13.3	<ul style="list-style-type: none"> <li>Volume control</li> </ul>			
13.4	<ul style="list-style-type: none"> <li>Squelch</li> </ul>			
13.5	<ul style="list-style-type: none"> <li>Dual watch.</li> </ul>			
13.6	<ul style="list-style-type: none"> <li>Pressel switch when speaking</li> </ul>			
13.7	<ul style="list-style-type: none"> <li>Simplex communication system.</li> </ul>			
Evidence / note				
14. Intercom / Telephone		<b>EVALUATION</b>		
		<b>C</b>	<b>N.C.</b>	<b>N.A</b>
14.1	The simulator shall include a communications system that will allow for internal ship communications to be conducted.			
Evidence / note				
15. General Emergency Alarm		<b>EVALUATION</b>		
		<b>C</b>	<b>N.C.</b>	<b>N.A</b>
15.1	There shall be a facility provided for activating the General Emergency Alarm from the wheelhouse.			
Evidence / note				

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16. Indicators		EVALUATION		
		C	N.C.	N.A
	Each own ship station shall have at least the following indicators:			
16.1	• Wind direction and speed indicator			
16.2	• Rudder Angle Indicator			
16.3	• Rate of Turn Indicator			
16.4	• RPM /Pitch Indicator			
16.5	• Clock (Exercise time indicator)			
16.6	• Depth indicator			
16.7	• Doppler Speed Log			
16.8	It should be capable of indicating fore / aft and athwart ship speed. Depending upon the depth, speed shall be indicated on ground or water track.			
Evidence / note				
17. Instruments and controls		EVALUATION		
		C	N.C.	N.A
17.1	Instrument for indication of navigational lights.			
17.2	Controls of propulsion plant for mooring operations. By any method, it shall be possible to observe the ship's side and the dock during operation of such controls.			
17.3	Steering compass and bearing compass (or repeater) with an accuracy of at least 1 degree.			
17.4	AIS (automatic identification system).			
Evidence / note				
18. Electronic Navigation Aids		EVALUATION		
		C	N.C.	N.A
18.1	Global Position System (GPS) - Simulation of all facilities of a standard GPS receiver shall be available. This should include display of latitude, longitude, course and speed over ground by the own ship, UTC, normal navigational calculation functions such as Great Circle, Rhumb line sailing, 100 way points, Alarms for X-track error, anchor drag, approaching way point, etc.			
Evidence / note				
19. Echo Sounder		EVALUATION		
		C	N.C.	N.A
19.1	Simulation of complete echo sounder shall be provided. Facility to change gain adjustment, change over from DBS to DBK and vice versa etc, shall be provided. Alarm for shallow water depth should be provided.			

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Evidence / note			
20. Anchor Control		<b>EVALUATION</b>	
		<b>C</b>	<b>N.C.</b>
	Anchor Control capable of simulating anchoring with 2 anchors (port and starboard - Bower anchors) and:		
20.1	<ul style="list-style-type: none"> <li>Means to let go and heave up own ship's anchor</li> </ul>		
20.2	<ul style="list-style-type: none"> <li>Indicators for amount of cable paid out, direction of cable and strain on cable.</li> </ul>		
Evidence / note			
21. Sound Signal Generator		<b>EVALUATION</b>	
		<b>C</b>	<b>N.C.</b>
21.1	Ship horn to be provided on the wheelhouse console as a pushbutton.		
	Facilities shall be available to generate fog signals manually or automatically operated by own ship(s) independently, as well as for each target separately by the Instructor console. The fog signals should be interactive and the intensity and direction at own ship stations shall correspond to relative range and position of the station generating the sound signal. The fog signal generator shall be capable of generating the sound signals for the following:		
21.2	<ul style="list-style-type: none"> <li>Vessel making way through water.</li> </ul>		
21.3	<ul style="list-style-type: none"> <li>Vessel making no way through water.</li> </ul>		
21.4	<ul style="list-style-type: none"> <li>Vessel restricted in her ability to manoeuvre</li> </ul>		
21.5	<ul style="list-style-type: none"> <li>Vessel at anchor</li> </ul>		
21.6	<ul style="list-style-type: none"> <li>Vessel aground</li> </ul>		
21.7	<ul style="list-style-type: none"> <li>Vessel not under command.</li> </ul>		
Evidence / note			
22. Navigation Lights and Shapes Display		<b>EVALUATION</b>	
		<b>C</b>	<b>N.C.</b>
22.1	Full set of Navigation, Christmas tree lights and shapes shall be available, which the own ship can select for display depending upon the prevailing circumstances.		
Evidence / note			