Maritime & Coastguard Agency

Remote Operator Training Descriptor

Remote Operator- Operational Level

Remote Operator- Management Level

June 2025

Contents

PART 1 – Remote Operator Training Scheme Structure

1.0 Introduction

1.1 This scheme sets out a training pathway a candidate can progress through to achieve a Certificate of Proficiency (CoP) as a Remote Operator.

1.2 This document sets out the minimum requirements for Remote Operator training courses and in-service experience.

1.3 This training descriptor may be used by Training Providers seeking to undertake the MCA short course approval for generic Remote Operator training courses.

1.4 The successful completion of a training course set out in this document qualifies the candidate to be issued with the appropriate Remote Operator CoP, as set out in the document “RO_CERTIFICATION_FRAMEWORK”.

1.5 MIN 643 (M) and MSN 1865, as amended, must be consulted for information concerning the MCA short course approval processes.

1.6 The following documents should be read in conjunction with this training descriptor:

i) “RO_GLOSSARY”

ii) “RO_ROLE_DESCRIPTOR”

iii) “RO_CERTIFICATION_FRAMEWORK”

iv) “RO_COMPETENCY_TABLES_(O)”

v) “RO_COMPETENCY_TABLES_(M)”

vi) “RO_TRB_TABLES_PHASE_II”

1.7 This training descriptor shall be reviewed by the MCA as required so that standards are current and applicable to regulations, developing technology and vessel operations.

2.0 General

2.1 This training scheme sets out a phased and progressive framework, including MCA approved training courses and in-service experience requirements.

2.2 The combination of classroom, practical, simulator and in-service experience allows for prospective Remote Operators to apply skills and knowledge gained in training to real-world situations.

2.3 This training scheme requires participation from the following stakeholders:

i) Prospective Remote Operators.

ii) Prospective and approved Training Providers.

iii) Remote Operation Centres and qualified Remote Operators.

iv) The ROC and vessel's operator.

v) The Maritime and Coastguard Agency UK (MCA).

2.4 Within this scheme, the role of the MCA is to provide and undertake a short course approval process for Remote Operator training courses under a common generic framework.

2.5 The MCA provide this service in wider maritime education with the objective to promote safe standards and practice in industry and academia.

3.0 Training Scheme Purpose

3.1 Organisations conducting maritime remote operations employ personnel to undertake watchkeeping duties in a ROC.

3.2 Information concerning training in remote operations is currently set out in MGN 703.

3.3 MGN 703 specifies that Remote Operators must complete training in remote operations, prior to undertaking watchkeeping duties.

3.4 The provisions set out in the "RO_CERTIFICATION_FRAMEWORK", establish the certification requirements for a Remote Operator that may be developed in future,

subject to this framework's successful implementation. This may include a Remote Operator CoP.

3.5 This training framework is provided in order to establish a streamlined and effective mechanism by which Remote Operators can be trained to a recognised standard and be issued with an MCA-recognised CoP.

3.6 Adopting a generic training framework shall ensure that a consistent approach is adopted by industry, academia and the MCA.

3.7 This training descriptor sets out the requirements for a Training Provider to deliver training in remote operations and issue a generic Remote Operator CoP.

3.8 This training descriptor sets out the requirements for a candidate to progress through a formal training programme and gain MCA-approved certification as a Remote Operator.

4.0 Objectives of the Remote Operator Training Framework

4.1 To set out the minimum requirements for Training Providers delivering MCA-approved Remote Operator training.

4.2 To set out the minimum requirements for candidates seeking to complete an MCA-approved Remote Operator training course.

5.0 Specific training and familiarisation

5.1 Nothing within this scheme relieves a Remote Operator, nor the vessel's owner or operator, of the requirement to complete company, ROC and vessel-specific training and familiarisation, prior to undertaking duties.

5.2 Specific training and familiarisation as noted in 5.1 must be provided for Remote Operators gaining in-service experience and completing a Training Record Book (TRB) during Phase II.

5.3 The provisions outlined in 5.1 and 5.2 must be implemented by the vessel's owner or operator.

6.0 Aims of Remote Operator Training Courses

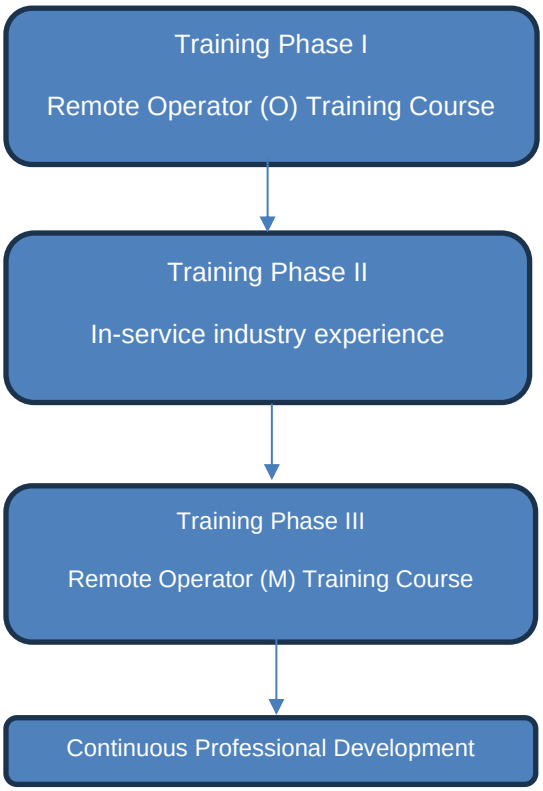
6.1 To equip the candidate with a level knowledge and skills needed to safely navigate and operate vessels by means of teleoperation.

6.2 To use procedures, facilities and equipment that are realistic and applicable to current remote operations.

6.3 To conduct assessment(s) of the candidate and for them to be issued with a Remote Operator CoP, if successful.

7.0 Training Phase Breakdown

7.1 The training pathway set out below aligns with the certification pathway set out in document “RO_CERTIFICATION_FRAMEWORK”.



7.2 Training Phase I

i) The candidate successfully enrols on a Remote Operator (O) training course.

ii) The candidate successfully completes the course objectives.

iii) The candidate is issued with a course completion certificate and a Remote Operator (O) CoP.

iv) The candidate is issued with a TRB and Remote Operator logbook.

7.3 Training Phase II

i) The candidate receives Company, ROC and vessel-specific training and familiarisation, prior to undertaking watchkeeping duties.

ii) The candidate gains in-service experience in a ROC undertaking watchkeeping duties.

iii) The candidate completes the tasks set out in TRB.

iv) The candidate is issued with a Company and Master testimonials.

7.4 Training Phase III

i) The candidate successfully enrols on a Remote Operator (M) training course.

ii) The candidate successfully completes the course objectives and assessments.

iii) The candidate is issued with a course completion certificate and Remote Operator (M) CoP.

iv) The candidate is able to undertake a role at management level.

v) The candidate undertakes updated training (5-year intervals).

8.0 In-service experience

8.1 Phase II sets out the provision for experience to be gained in industry, where a minimum period of in-service time must be completed, before proceeding to Phase III.

8.2 A Remote Operator must gain in-service experience:

i) At a ROC where the Remote Operator is able to undertake a navigational watch by teleoperation.

ii) At a ROC where the Remote Operator is capable of assuming a structured watchkeeping schedule.

iii) For an unmanned vessel, capable of teleoperation.

8.3 Remote Operators completing Phase II must receive Company, ROC and vessel-specific training and familiarisation, prior to undertaking watchkeeping duties.

8.4 The Remote Operator must meet the minimum in-service requirements and complete the tasks in the TRB during Phase II, before progressing to Phase III.

8.5 An individual conducting the in-service training and assessment for a Remote Operator progressing though the scheme would be expected to:

i) Follow the provisions set out in the TRB.

ii) Hold a valid Remote Operator CoP (M) and an applicable, valid maritime CoC.

iii) Have completed Company, ROC and vessel-specific training and familiarisation.

iv) Have a full understanding of the Remote Operator training scheme.

v) Be qualified to undertake any task to be assessed and able to determine the candidate's ability to successfully complete tasks.

vi) Have accrued a minimum of 400 hours of total in-service experience as a Remote Operator, prior to assessing a candidate and confirming the completion of tasks.

8.6 Candidates must complete a minimum of 120 hours over a minimum of 15 days of in-service experience during Training Phase II.

8.7 A single day of in-service experience must:

i) Consist of a minimum period of 4 hours, during any 24-hour period.

ii) Consist of the Remote Operator undertaking watchkeeping duties.

8.8 During Phase II Remote Operators must participate in all operations, drills and maintenance duties, pertinent to their role.

8.9 The Company and Master must issue an endorsement(s) upon:

i) The Remote Operator's successful completion of TRB tasks.

ii) The Remote Operator's successful completion of the required in-service experience.

iii) The Remote Operator's in-service conduct to have been deemed as satisfactory by the Master of the vessel(s).

8.10 Upon successful completion of Phase II, the candidate can apply to enrol in a Remote Operator (M) training course (Phase III).

9.0 Time to complete the training scheme

9.1 From the date a candidate successfully enrols in Phase I of the training scheme, they have a maximum period of 5 years to complete all elements of the training scheme.

9.2 This maximum period is set out to provide flexibility to progressing Remote Operators whilst ensuring that individuals retain the skills and experience developed in the scheme.

9.3 Should a candidate undertake a refresher training course and achieve a Certificate in Updated Proficiency, the period for all elements of the training scheme to be completed, shall be extended to 5 years from the date of successfully completing the refresher training.

PART 2 – Candidate Requirements

1.0 General

1.1 The following commercial certification can be accepted by Training Providers for candidates seeking to undertake the appropriate Remote Operator training course:

i) Certification as set out in the “RO_ CERTIFICATION_FRAMEWORK_”.

ii) MCA accepted Certificates of Equivalent Competency (CEC) or Flag State Endorsement (FSE).

iii) An MCA accepted CEC/FSE for a non-UK STCW compliant CoC issued by a country whose seafarer training is recognised by the UK. See MSN 1867(M), as amended.

2.0 Associated certification

2.1 The vessel’s owner/operator is responsible for ensuring that a Remote Operator’s certificates are valid prior to undertaking watchkeeping duties.

2.2 The vessel’s owner/operator must ensure that a Remote Operator’s certification is valid, prior to undertaking duties as a Remote Operator during Phase II.

3.0 Candidate enrolment

3.1 Prior to enrolling on a course, Training Providers must check the following documents are valid:

i) A candidate’s official ID.

ii) A copy of the candidate’s valid CoC.

iii) Remote Operator CoP(O) (for Phase III).

iv) Copy of the Company and Master’s Testimonial confirming the candidate’s suitability (for Phase III).

4.0 Observer enrolment

4.1 A TP may provide the facility for an observer to participate in the course, for the purpose of gaining an understanding of remote operations.

4.2 An observer is not required to hold or provide the valid certification set out in section 1.0 or 3.0 of this part.

4.3 Prior to enrolling on a course, a Training Provider must check the observer's official ID.

4.4 An observer must provide a letter from their employer to a Training Provider stating the observer's:

i) Current role and responsibilities.

ii) Purpose for attending the course.

4.5 A Training Provider TP must verify that the observer has a legitimate interest in sitting a training course, as set out in the company letter.

4.6 A TP must ensure that an observer does not interfere with the training and assessment of prospective Remote Operators.

4.7 An observer must not undertake an examination or assessment during the training course.

4.8 A TP must ensure that an observer is not issued with a course completion certificate, any certificate of attendance or a Remote Operator CoP.

4.9 An observer must not be issued with any document which sets out that they have completed an MCA-approved training course.

PART 3 – Remote Operator Training Course Requirements

1.0 General

1.1 A TP must deliver a comprehensive and structured course that reflects the requirements set out in this scheme.

1.2 A TP must:

i) Deliver all elements of an MCA-approved Remote Operator training courses as set out in the conditions of approval, agreed to by the MCA and the TP.

ii) Ensure that they comply with the requirements set out in MSN 1865 (M) and MIN 643 (M), as amended.

iii) Ensure that candidates have met the minimum level of competence required for each level of responsibility, to qualify for course completion. This includes the candidate's successful completion of all assessments.

iv) Ensure that a candidate has successfully completed all elements of a training course, prior to issuing a CoP.

v) Review and amend their training courses where appropriate and as required by MCA, to ensure that current regulations, operating procedures and recognised standards are incorporated into their courses.

vi) Forward amendments to training courses to the MCA for due consideration and record keeping, in alignment with the provisions set out in MSN 1865 (M) and MIN 643 (M), as amended.

vii) Ensure that each course consists of modules that have clear objectives that are measurable and subject to assessment.

viii) Ensure that sufficient resources are provided to MCA-approved instructors, assessors and candidates.

ix) Ensure that the methodology of the course delivery is appropriate and realistic to the competency being assessed. To achieve this, TPs must

assess the appropriateness of optimal educational methodologies to specific competencies.

x) Ensure that simulation and/or practical exercises are incorporated into the training course where appropriate.

xi) Ensure that best practices are incorporated into any simulated and/or practical exercises.

xii) Ensure that candidates are provided with sufficient theoretical knowledge and understanding of remote operations and the MASS industry. This should enable them to assess information and recognise appropriate actions to take.

xiii) Ensure that the human element, including the human-machine interface is considered in the development of training equipment, course delivery and simulation and/or practical exercises.

xiv) Ensure that any candidate that has been determined to be insufficiently prepared, competent or experienced to undertake a training course is not enrolled onto a training course.

xv) Ensure that any candidate that has not successfully completed all elements of a training course, including assessments is not issued with a CoP.

1.3 A TP must not issue a candidate with any form of certification that:

i) Has been found to have cheated during an assessment.

ii) Has provided invalid or fraudulent service time, certification or identification.

iii) Has not met the minimum requirements of the training course.

iv) Conducted themselves in an unsafe manner.

1.4 In the event that a TP does not issue a certificate to a candidate, the TP should provide the candidate a clear explanation of the rationale, including the next steps a candidate may follow.

2.0 Language

2.1 Training Providers looking to provide MCA-approved courses must deliver all aspects of the course in English.

3.0 Training day

3.1 A training day is defined as one which has no more than 8 hours of total contact time.

3.2 A training day cannot be more than 10 hours in total duration.

4.0 Minimum hours of course delivery

4.1 The Remote Operator (O) training course shall consist of no less than 40 hours of contact time.

4.2 The Remote Operator (M) training course shall consist of no less than 40 hours of contact time.

4.3 The TP must clearly assign a number of contact hours to each module so that realistic timescales for course delivery and assessment are identified.

4.4 The TP must clearly identify the percentage of simulated and/or practical exercises and taught theory.

4.5 Nothing restricts the TP in exceeding 40 hours of total contact time during each training course to ensure a comprehensive delivery of the training course.

4.6 Where TPs wish to deliver courses with low numbers of candidates, they may propose alternative arrangements for contact time during their desk-top assessment.

5.0 Training Phase Competence Requirements

5.1 Training Phase I requires the following to be completed:

i) Completion of the Operational Level competencies set out in the document "RO_COMPETENCY TABLES_(O)".

5.2 Training Phase II requires the following to be completed:

i) Completion of the tasks set out in the document "RO_TRB_P2".

ii) Completion of the Annexes set out in "RO_TRB_P2".

5.3 Training Phase III requires the following to be completed:

i) Completion of the Management Level competencies set out in the document "RO_COMPETENCY TABLES_(M)".

6.0 Training Plans

6.1 Prospective TPs should present their training plans to the MCA in alignment with the Short Course Approval process set out in MIN 643 (M) and MSN 1865(M), as amended.

6.2 TPs should engage candidates in training courses by use of interactive teaching methodologies, supported by appropriate course content, facilities and equipment.

6.3 TPs may employ appropriate methods of course delivery and assessment, including but not limited to:

i) Simulation exercises, demonstrations and assessment
ii) Practical exercises, demonstrations and assessment
iii) Team exercises
iv) Classroom teaching, including presentations and discussions
v) Theoretical assessment
vi) Oral assessment
vii) Group based learning activities
viii) Case studies
ix) Continuous assessment
x) Summative assessment
xi) Any alternative appropriate methodology approved by MCA

6.4 TPs may issue candidates with course material to supplement their learning, outside the allotted contact hours.

6.5 The TP should ensure that courses adopt methodology, systems and equipment that reflect current remote operations.

6.6 When developing and delivering training courses, TPs must comply with all applicable requirements, including but not limited to:

i) UK Regulations applicable to the operation of a Maritime Autonomous Surface Ships (MASS).
ii) UK Regulations, applicable to the operation of a Remotely Operated Unmanned Vessel (ROUV).
iii) Applicable International Maritime Organization (IMO) Conventions and Codes.

6.7 When developing and delivering Remote Operator training courses, TPs must ensure that the following are taken into consideration:

i) STCW 1978, as amended.
ii) IMO performance standards for simulators.

6.8 Where simulator training is used, compliance with applicable regulations must be incorporated into training exercises.

7.0 Learning Objectives

7.1 Learning Objectives must be:

i) Clearly identified to candidates.

ii) Structured to ensure the effective delivery of competencies.

iii) Assigned to modules that are appropriate to the Training Phase (i.e. Phase I and III).

iv) Realistic, so that they may achieved within a training course.

v) Measurable, so that may be reliable and accurately assessed.

8.0 Training Provider Course Delivery and Assessment Requirements

8.1 Approved TPs must comply with the requirements set out in MSN 1865 (M), Annex F and MIN 643 (M), as applicable.

8.2 Prospective TPS should familiarise themselves with the requirements of the MCA short course approval process, including but not limited to the Quality Management System (QMS) requirements.

8.3 Assessments should be organised so that candidates can evidence through demonstration and examination, that they meet the minimum requirements of each Training Phase.

8.4 The TP must identify the most appropriate methodology for delivery and assessment of specific competence.

8.5 “RO_COMPETENCY TABLES” sets out the competence requirements and potential methodologies for specific areas of Remote Operator training.

8.6 The provisions set out in section 6.0 of this Part should also be considered when determining appropriate methodology for delivery and assessment.

8.7 Notwithstanding the provisions set out in section 6.0 of this Part, the methodology that a TP may use to deliver competence may include, but is not limited to:

i) Classroom teaching

ii) Practical demonstration

iii) Simulated demonstration

8.8 Notwithstanding the provisions set out in section 6.0 of this Part, the methodology that a TP may use to assess competence may include, but is not limited to:

i) Theoretical assessment

ii) Oral questioning

iii) Practical exercises and assessment

iv) Simulated exercises and assessment

8.9 The methods of delivery and assessment should be appropriate to the competence being assessed.

8.10 The methods of delivery and assessment should provide a reliable mechanism to determine a candidate's competence in a specific area.

8.11 TPs are encouraged to use a variety of methodologies to deliver training in remote operations.

8.12 TPs must retain evidence of a candidate's ability to meet the minimum required competencies, to be assessed in audits.

8.13 Candidates should receive a training and assessment plan, prior to attending the course.

8.14 The TP must establish an appeals process for candidates that challenge assessment decisions.

8.15 TPs seeking re-approval of their short course must retain evidence of assessment materials. This must be formally documented and made available for audits.

8.16 For any theoretical assessments:

i) The TP must provide a question bank.

ii) A question bank must be made available for review during course approval and audits.

iii) A question bank must include a minimum number of questions, sufficient to provide four different exams.

iv) A question bank must be reviewed and amended annually.

8.17 Where assessment of competency is to be determined by simulated and/or practical demonstration:

i) The TP must maintain and review a task assessment bank.

ii) Instructors must be provided with the criterion that would be used to verify a candidate's performance in each simulated and/or practical assessment.

iii) A pass or fail criterion for simulated and/or practical assessments must be provided to instructors.

iv) An instructor must be trained in the established pass or fail criterion.

v) A maximum time for simulated and/or practical assessments must be clearly identified.

9.0 Instructors

9.1 Sufficient instructors should be provided so that the minimum ratio of instructor-to candidates-is maintained.

9.2 The minimum ratio of instructors to candidates is 1:8, respectively.

9.3 Should the course include the provision of observers, the minimum ratio of instructors to candidates is 1:10, should there be two persons classed as observers.

9.4 Should the course include the provision of observers, the maximum ratio of observers to candidates is 2:8, respectively.

9.5 Should there be more than 8 candidates sitting a course, a second instructor is required to participate as an instructor and assist in simulated and/or practical exercises.

9.6 Should a second instructor be required, they must be included in the attendance records and identified as an additional instructor.

9.7 To qualify as an instructor or assessor, the individual must meet the following criteria:

i) Hold valid commercial certification, including:

   a) Management or operational CoC, as set out in STCW 1978, as amended, and as applicable to the training course's level of responsibility.

   b) Certification set out in Table A5.1 Appendix 5 of The Workboat Edition 3, as amended, holding a minimum of a management level certificate that allows the holder to work commercially as a Master in Area Category of Operation 1 or a recognised equivalent as may be accepted by the MCA.

   c) Certification that sets out completion of MCA-approved training in NAEST(O), NAEST(M), SSNR or NARAS.

ii) Hold associated certification that validates their maritime CoC.

iii) Hold a Remote Operator CoP, appropriate to the course's level of responsibility (i.e. O/M).

iv) Hold an IMO Train the Trainer certificate or a recognised teaching qualification, as set out in MIN 643 (M).

v) Have accrued a minimum of 400 hours of in-service experience as a Remote Operator undertaking watchkeeping duties in a ROC.

vi) Have completed type-specific training and familiarisation on the systems, equipment and procedures used during a training course.

vii) Be fully familiar with any simulator equipment and characteristics of digital training models in use, including the appropriate application of simulators in training exercises.

viii) Have a working knowledge and experience of current industry equipment and remote operation best practice.

ix) Be undertaking a continuous professional development programme so they can maintain a skillset and knowledge that is current.

9.8 Elements of training may be delivered by appropriately experienced or qualified personnel or technical specialists. This may be beneficial for when depth of knowledge or alternative qualifications are appropriate for the subject matter. Individuals that are required to deliver this subject matter must be supervised by a qualified instructor. This may include:

i) Cyber security

ii) Data communication systems

iii) Autonomous system/s

9.9 Any specialist proposed for elements of training set out in 9.8 is not to be considered as a qualified instructor within this scheme.

9.10 Notwithstanding the provisions set out in section 9.8 or 9.9 of this part, any specialists that are proposed to deliver training, shall be considered during the desk-top assessment of any training course.

10.0 Remote Operator Training Facilities and Equipment

10.1 TPs must adhere to the requirements set out in MIN 643 and MSN 1865 (M) Annex F, as amended.

10.2 TPs must be appropriately equipped with teaching and learning aids that are designed to enable each learner to fully engage in the learning process.

10.3 TPs must use equipment and facilities that are appropriate for the identified delivery and assessment methodology.

10.4 TPs must ensure that operating procedures are issued to candidates undertaking simulated and/or practical training and assessment. Generic checklists are provided in Annex B for reference and development.

10.5 Training equipment used in a course must meet any established performance standards (i.e. ECDIS/RADAR/ARPA).

10.6 TPs undertaking MCA-approval must demonstrate that they are able to provide sufficient equipment and facilities to ensure simulated and/or practical and theoretical instruction.

10.7 A candidate must be provided with the opportunity to access a training workstation on a 1:1 basis, so that they are able to demonstrate individual competence in all areas where assessment by simulated and/or practical demonstration is the specified methodology.

10.8 The instructor/assessor must be physically located at the Training Centre for the duration of the training course and at the control position during any practical training exercises.

10.9 Any candidate workstations must:

i) Use screens of no less than 19” screens.

ii) Incorporate compatible operating systems and graphics cards that are sufficient to run realistic training exercises.

iii) Incorporate control systems appropriate to the planned exercises.

iv) Be capable of being monitored by instructors and assessors.

10.10 Any instructor workstation shall:

i) Include an interface sufficient to encompass all aspects of any simulated or practical exercises.

ii) Enable control of any simulated or practical exercises.

iii) Enable the design, execution or playback of any simulated exercises.

10.11 Where belly packs/ alternative control systems are used in a training course to deliver a competence, this shall be assessed during the desk-top assessment.

10.12 Annex A sets out guidance on the functions and systems that can be incorporated into a remote operations simulator. This information may also be used for the purpose of practical training platforms.

10.13 TPs must ensure that the required QMS covers all aspects of any simulated, practical and theoretical exercises. More information on QMS requirements is set out in MIN 643 (M) and MSN 1865 (M), as amended.

11.0 Practical Delivery and Assessment of Competence

11.1 Where competence is to be proposed via a means other than digital simulation, such as practical demonstration, this should be included in the initial proposal for desk-top assessment.

11.2 A TP must clarify any equipment that is planned to be used as a practical training platform during their desk top submission.

12.0 Server/network

12.1 Any simulated or practical systems in use should include a server system and/or network that is sufficiently capable to store and run the required software and data for planned exercises.

13.0 Issue of Certification

13.1 TPs may issue a CoP to candidates that have met the minimum requirements of each Training Phase.

13.2 Specific CoP requirements are set out in the "RO_CERTIFICATION_FRAMEWORK".

13.3 The TP must set out a policy and provide a mechanism to address lost, stolen or fraudulent certificates.

13.4 The TP must provide MCA with all records of issued certification upon the closure of the TP or the termination of an MCA-approved training course.

14.0 Health and Safety

14.1 TPs must comply with all applicable regulations set out by the Health and Safety Executive and ensure that procedures comply with applicable regulations.

14.2 TPs must make arrangements to respond to any emergency, incident or accident that may occur during the course delivery. In the UK, these requirements are stipulated in the Management of Health and Safety at Work Regulations 1999, as amended.

14.3 TPs must complete risk assessments that identify and minimise potential risks to the health and safety of candidates and staff.

14.4 Effective measures that minimise and control risks should be implemented, monitored and reviewed.

14.5 During a training course, TPs must ensure the safety of candidates and staff at all times.

14.6 TPs must ensure that applicable safeguarding regulations are complied with.

15.0 GDPR

15.1 TPs must comply with the UK General Data Protection Act 2018.

15.2 TPs must provide candidates with information including:

i) The purpose for processing personal data.

ii) Any retention of records for that personal data.

iii) Who the data will be shared with.

15.3 TPs must issue the information set out in section 15.2 of this Part in a privacy information notice to a candidate. This must be issued to a candidate prior to, or at the time of data collection.

15.4 The TP must ensure that a candidate's personal details, other than those stipulated on the certificate template are not included in any documentation or publications.

Annex A – Guidance on the Use of Simulators during Remote Operator Training

1.0 The practical demonstration and operation of the vessel may involve the use of simulators that ensure a realistic level of simulation. The simulation should be such, that the candidate is exposed to systems, equipment and interfaces that are realistic and used in industry.

1.1 The function of the information set out in this Annex is to provide information on elements that may be included within a simulator. This information is set out for the purpose of enabling a candidate to demonstrate a competence. Depending on the competence to be assessed, elements of the information provided within section 10.0 may be necessary for the completion of a learning outcome or competence.

1.2 Notwithstanding the minimum criteria set out within this training and certification framework, TPs may seek to include novel technologies into their training programme. This may be assessed during a desk-top assessment.

2.0 The use of IMO STCW Code Part A Regulation I/12, as amended may be used as guidance for recommended standards governing the use of simulator equipment.

3.0 The use of simulators must be appropriate for the training or assessment of the candidate. All exercises should be undertaken in real time, to ensure that the candidate gains a realistic appreciation of remote operations.

4.0 Simulation training plans should consist of several simulated exercises, that follow a clear structure and progress into more advanced tasks, appropriate to the candidate's level of responsibility.

5.0 Sufficient time for candidates to become fully familiarised with training equipment should be allocated.

6.0 The length of each exercise should vary in accordance with the objective and complexity of each exercise.

7.0 Any simulator used in the delivery of Remote Operator training must:

i) Be capable of providing a realistic ROC set-up.

ii) Be capable of providing a digital environment that is realistic to the physical environment.

iii) Be capable of providing a controlled operating environment that can impact the teleoperation and monitoring of the vessel and the physical environment.

iv) Be suitable for selected training objectives and exercises.

v) Provide an interactive interface.

vi) Monitor and record exercises.

vii) Provide RADAR simulation.

viii) Provide ARPA or accepted alternative simulation.

ix) Provide ECDIS/Electronic Chart Plotting Systems simulation.

x) Be capable of simulating an unmanned vessel, capable of teleoperation and monitoring of vessel functions.

xi) Be capable of simulating voyage planning, execution and monitoring.

xii) Be capable of simulating the state and degradation of connectivity between the ROC and vessel, including the resulting impact on ROC and vessel systems

xiii) Be capable of simulating the monitoring and control of vessel sensory systems.

xiv) Be capable of simulating the monitoring of the mode and status of connectivity between ROC and vessel.

xv) Be capable of simulating the failures of ROC systems.

xvi) Be capable of simulating the failures of vessel systems.

xvii) Be capable of simulating emergency situations and security incidents.

xviii) Be capable of simulating steering and propulsion controls systems.

xix) Be capable of simulating emergency stop control systems.

8.0 TPs must ensure that during simulated training exercises:

i) Comprehensive briefs are conducted that include clear objectives.

ii) Candidates are adequately familiarised with the simulator, prior to commencement.

iii) Exercises are appropriate for the Remote Operator's level of responsibility and suitable to the training objective.

iv) The exercise is monitored and recorded.

v) The exercise is peer reviewed.

vi) A comprehensive debrief is completed.

9.0 TPs must ensure that during simulated assessments:

i) Comprehensive briefs are conducted that include clear objectives.

ii) Candidates are provided with a clear assessment method and criteria for the successful completion of objectives.

iii) The conditions under which a candidate is to be assessed are clearly set out.

iv) Assessments are monitored and recorded.

10.0 The following should be incorporated into a remote operations simulator:

10.1 Navigation systems:

i) GNSS receiver

ii) AIS transponder/receiver

iii) Speed and distance log

iv) Heading indicator

v) RADAR

vi) ARPA, including track extraction.

vii) ECDIS/ Electronic Chart Plotting Systems

viii) Echo Sounder

ix) Search light/signalling lamp

x) Date and time

xi) Data logger

xii) Navigational lights

xiii) Control systems, including control of operational parameters

10.2 Steering and propulsion systems:

i) Steering control system and indicator

ii) Steering mode selector and indicator

iii) RPM / pitch / speed control system and indicator

iv) Rate of turn indicator

v) Power Management System

vi) Emergency Stops

vii) Propulsion clutch control and indicator

viii) Auxiliary/ emergency power generation control

ix) Secondary/ back-up steering system control

10.3 Sensory systems and equipment

i) Sound reception system (SRS), including directional (SRS)

ii) Cameras, including

a. Forward fixed

b. Pan/tilt/zoom

c. Optical mode control

d. Thermal/ IR/Wide angle

e. Camera-compass bearing overlay

iii) Anemometer

iv) Temperature/humidity sensors

v) Vibration sensors

vi) Motion sensors

vii) Fire detection system

viii) Bilge level sensor

ix) Salinity sensor

x) Fuel level sensor

xi) Propulsion and steering sensors/repeaters

10.4 Vessel Operations Systems and Equipment

i) Anchoring and mooring control and monitoring system

ii) Stability monitoring and control system

iii) Watertight arrangement control system

iv) Bilge pump control system

v) Firefighting system

vi) Override for manned operations.

vii) Ventilation control system

viii) Life Saving Appliances (LSA) control system

ix) Towing arrangements and any associated control system

x) Payload control system

xi) Cyber Security System

10.5 Internal and external communications

i) On-board speaker system

ii) Alarm system

iii) Radiocommunications equipment

10.6 ROC-Vessel Connectivity

i) Indicator of mode of connectivity between ROC and vessel

ii) Indicator of status of connectivity between ROC and vessel

iii) In-built data communications link manager

iv) Graphical User Interface (GUI)

v) Cyber security system

10.7 ROC

i) Display monitors

ii) The control position

iii) Fire Systems

iv) Security measures, including cyber security

v) Recording systems

vi) IT/OT segmentation

vii) Power supply, including auxiliaries

viii) Back-up ROC

ix) Vessel’s plans/drawings/manuals

x) Alarms and alerts

Annex B – Generic Emergency Checklists

1.0 The checklists set out in this annex are provided as guidance to a Training Provider for the generic actions that a Remote Operator may take in the event of an emergency or security incident.

2.0 The checklists below are aligned to the sections on emergency response and security set out in the “RO_COMPETENCY TABLES”.

3.0 These checklists are not exhaustive and must not be used for ROC/vessel specific checklists for commercial operations. ROC/vessel-specific checklists may be developed, appropriate to training exercises and objectives.

4.0 A TP must ensure that any developed checklists that are provided to candidates reflect procedures used in industry and are specific to the systems and equipment used during training courses.

5.0 The Checklists set out in this Annex consider the following scenarios:

i) Emergencies occurring at a ROC, located onshore.

ii) Emergencies occurring on an unmanned ship operating beyond or within visual line of sight.

1.0 Emergencies occurring at a ROC

TABLE 1.01	
Emergency: Fire (located in the ROC)	
Actions to take	**Notes**
Initial Actions	
Sound alarm in ROC	
Inform Master	
Confirm location and initial assessment of fire	
Initiate firefighting procedures	
Inform ROC management, engineering and technical departments	
Back-up ROC to standby	
Consider stopping vessel/ entering into safe state	
Assess traffic/navigational hazards in the area	
Inform any local/support teams and place on standby	
Secondary actions	
Confirm whether evacuation from ROC is required	
Conduct an initial assessment of ROC systems and equipment, including the remote control of vessel functions	
Conduct an initial assessment of ROC power supplies and auxiliary systems	
Confirm the status of data communication systems	
Fire extinguished	
Conduct initial damage assessment of ROC	
Confirm the remote control of vessel functions	
Conduct risk assessment as to whether safe to continue operations and navigation	
Consider vessel recovery/transfer to back up ROC	
Fire not extinguished, ROC to be evacuated	
Manoeuvre vessel so as to not cause collision/allision/become a navigational hazard	
Broadcast GMDSS as appropriate	

Vessel to enter safe state/ [fallback state]	
Initiate transfer of control to back-up ROC	
Initiate vessel recovery procedures as is required	

TABLE 1.02	
Emergency: Cyber Security Incident	
Actions to take	**Notes**
Sound alarm	
Inform Master, engineers, technicians, ROC management	
Confirm status of [automated] OT cyber security response	
Isolate systems as required to restrict extent of breach	
Inform ROC management, engineering, technical support and any on-board crew	
Initiate cyber security counter measures	
Assess traffic/navigational hazards in the area	
Verify vessel's response to remote control	
Consider stopping vessel/entering safe state	
Inform local/support teams	
Back up ROC to standby	
Confirm status of data communications systems	
Confirm status of cyber security across [departments/teams/crews]	
Consider switching to alternative data communications link	
Assess whether it is safe to transfer control to back-up ROC or vessel	
Inform local authorities as applicable	
Plot vessel's last known position, course and speed	
Verify the function of navigational equipment on board the vessel	
Confirm the function of the vessel's machinery and propulsion	
Consider vessel recovery	
Consider activation of manual override	

Establish communications with ROC (/Back-up ROC) in control of vessel and conduct handover	

TABLE 1.03	
Emergency: Medical emergency at the control position	
Actions to take	**Notes**
Initial Actions	
Raise alarm	
Inform Master	
Confirm location and initial assessment of casualty	
Initiate medical first aid procedures	
Call emergency services	
Inform ROC management	
Re-assess and address minimum levels of safe manning	
Assess traffic and navigational hazards	
Vessel manning levels insufficient to continue safe operations	
Vessel to enter safe state/ fallback state	
Establish communications with (back-up) ROC in control of vessel and conduct handover	
Initiate transfer of control to back-up ROC	
Consider vessel recovery procedures	

TABLE 1.04	
Emergency: Security incident	
Actions to take	**Notes**
Initial Actions	
Raise alarm	
Inform Master	
Conduct an initial assessment of security breach	
Call emergency services	
Inform ROC management	
Assess traffic/navigational hazards in the area	
Initiate ROC security procedures	
Establish communications with back-up ROC and conduct handover	
Consider transfer of control to back-up ROC	
Security Incident unresolved	
Transfer vessel to back-up ROC (if in distinct location)	
Broadcast appropriate GMDSS	
Consider stopping vessel/ entering into safe state	
Consider evacuation from ROC	
Consider initiating vessel recovery procedures	

1.05	
Emergency: Loss of control systems	
Actions to take	**Notes**
Initial actions	
Inform Master	
Inform engineers and ROC management	
Assess the impact on vessel functions	
Confirm the status of data communications systems	
Confirm the status of sensory systems and equipment	
Switch to back-up systems	
Consider stopping vessel operations	
Consider vessel to enter a safe state	
Raise alarm	
Sound/display appropriate signals	
Broadcast appropriate GMDSS	
Confirm surrounding traffic and navigational hazards	
Inform the relevant coastal authorities	
Inform VTS and port authorities	
Confirm the status of ROC and vessel's cyber security systems	
Plot vessel's last known position, course and speed and commence monitoring	
Confirm the status of the vessel's machinery and propulsion	
Initiate vessel recovery procedures	

2.0 MASS- Remote Operation- Unmanned Vessel operating beyond Visual Line of Sight

Emergencies occurring on board the vessel

TABLE 2.01	
Emergency: Fire	
Actions to take	**Notes**
Sound alarm	
Inform Master	
Inform engineering and technical departments	
Confirm location and initial assessment of fire	
Verify the vessel's response to remote control	
Confirm the status of data communication systems	
Confirm the function of the vessel's machinery and propulsion	
Inform Coastguard	
Broadcast appropriate GMDSS	
Check the status of automated fire extinguishing systems	
Operate remote fire extinguishing systems	
Close fire dampening systems	
Operate emergency stops	
Make isolations as required to reduce spread of fire/damage to vessel	
Operate sensory systems to monitor vessel spaces	
Maintain situational awareness of traffic and navigational hazards	
Vessel to enter safe state	
Initiate support vessel firefighting measures	
Coordinate firefighting with vessels on scene	
Manoeuvre vessel to minimise the spread of fire	
Manoeuvre vessel to minimise damage to another vessels/the environment	
Conduct initial damage assessment	
Initiate vessel recovery procedures	
Coordinate response with support vessel	
TABLE 2.02	

Emergency: Flooding	
Actions to take	**Notes**
Sound alarm	
Inform Master	
Inform engineering and technical departments	
Confirm location and initial assessment of flooding	
Verify the vessel's response to remote control	
Confirm the status of data communication systems	
Confirm the function of the vessel's machinery and propulsion	
Inform Coastguard	
Check status of bilge pumps	
Check the status of automated watertight arrangements	
Close remote watertight arrangements	
Manoeuvre vessel to minimise impact of flooding	
Conduct initial damage assessment	
Assess the rate of flooding	
Vessel to enter safe state	
Coordinate response with vessels on scene	
Manoeuvre vessel to minimise flooding	
Manoeuvre vessel to minimise damage to other vessels and the environment	
Coordinate support vessel manoeuvres to minimise impact of flooding	
Operate emergency stops	
Make isolations as required	
Operate sensory systems to monitor vessel spaces	
Maintain situational awareness of traffic and navigational hazards	
Monitor operation of bilge systems	
Support vessel to standby on scene/ coordinate recovery	
Broadcast appropriate GMDSS	
Coordinate response with vessels on scene	
Initiate vessel recovery procedures	

TABLE 2.03	
Emergency: Grounding	
Actions to take	**Notes**
Prior to grounding	
Sound alarm	
Inform Master	
Inform engineering and technical departments	
Deploy anchors	
Plot position / check sounding	
Manoeuvre vessel to minimise the impacts of grounding	
Close remote watertight arrangements	
Assess support vessel's position and depth of available water	
Assess whether support vessel can provide assistance	
Following grounding	
Display/sound signals	
Verify the vessel's response to remote control	
Confirm the status of data communication systems	
Confirm the function of the vessel's machinery and propulsion	
Inform Coastguard	
Broadcast appropriate GMDSS	
Confirm the status of fire alarm panel	
Confirm the status of bilge alarm	
Confirm the status of automated watertight arrangements	
Conduct initial damage assessment [tank soundings /vessel spaces]	
Check the status of automated watertight arrangements	
Operate sensory systems to monitor vessel spaces	
Maintain situational awareness of traffic and navigational hazards	
Monitor sensors for indications of MARPOL incident	
Operate emergency stops	
Make isolations as required	
Coordinate the response with vessels on scene	
Confirm tide and tidal range	

Confirm vessel stability	
Initiate procedures to re-float vessel	
Initiate vessel recovery procedures/ tow	
Consider support vessel to assist in towing operation	

TABLE 2.04	
Emergency: Collision/allision	
Actions to take	**Notes**
Pre-collision/allision	
Sound signalling/ light signalling apparatus	
Sound alarm	
Emergency stop procedures/ manoeuvre vessel to minimise impact	
Call Master	
Inform engineers, technician and support teams	
Check the status of automated watertight arrangements	
Check position of support vessel	
Post-collision/allision	
Inform CG	
Broadcast appropriate GMDSS	
Verify the vessel's response to remote control	
Confirm the status of data communications systems	
Confirm the function of the vessel's machinery and propulsion	
Conduct initial damage control assessment	
Sounding of tanks/ bilge alarm panel	
Confirm status of fire alarm panel	
Monitor sensors for indications of MARPOL incident	
Establish communications with the other vessel(s)	
Manoeuvre vessel to minimise further damage to the other vessel/ the environment	
Request support vessel for support/ standby	
Operate sensory systems to monitor vessel spaces	
Maintain situational awareness of traffic and navigational hazards	

Monitor sensors for indications of MARPOL incident	
Prepare to render assistance to other vessels	
Coordinate response with local/support vessel	
Initiate vessel recovery procedures	

TABLE 2.05	
Emergency: Cyber security incident	
Actions to take	**Notes**
Sound alarm	
Emergency stop procedures/ manoeuvre vessel to minimise impact	
Call Master	
Inform engineers, technician and support teams	
Stop operations/take all way off/heave to	
Sound/display appropriate signals	
Broadcast appropriate GMDSS	
Inform CG	
Transfer control to back-up ROC	
Switch to alternative data communications link	
Activate override	
Plot vessel's last known position, course and speed	
Verify the function of navigational equipment on board the vessel	
Confirm the function of the vessel's machinery and propulsion	
Verify the vessel's response to remote control	
Confirm the status of data communications systems	
Isolate systems as required	
Operate sensory systems to monitor vessel spaces	
Maintain situational awareness of traffic and navigational hazards	
Manoeuvre vessel away from navigational hazards	
Vessel to enter safe state	

Coordinate response with support vessel	
Conduct an initial assessment of cyber incident	
Confirm the status of the vessel’s machinery and propulsion	
Coordinate response with local/support vessel	
Initiate vessel recovery procedures	

2.06	
Emergency: Loss of control	
Actions to take	**Notes**
Total loss of control	
Identify and assess the loss of control of vessel functions	
Switch to back-up systems	
Stop operations/take all way off/hold position	
Vessel to enter safe state	
Sound alarm	
Sound/display appropriate signals	
Call Master	
Broadcast appropriate GMDSS	
Inform Engineers, local onshore teams, support vessels	
Sound/display appropriate signals	
Confirm the status of data communications systems	
Operate sensory systems to monitor vessel spaces	
Maintain situational awareness of traffic and navigational hazards	
Inform Coast Guard	
Confirm the status of ROC and vessel's cyber security systems	
Determine whether cyber-attack has occurred	
Plot vessel's last known position, course and speed	
Confirm the status of the vessel's remaining running hours, machinery and propulsion	
Confirm whether vessel is holding position/drifting/In a safe state	
Initiate remote vessel recovery procedures	
Coordinate response with local/support vessel	
Manoeuvre vessel away from navigational hazards	
Initiate vessel recovery procedures	

TABLE 2.07	
Emergency: Piracy incident	
Actions to take	**Notes**
Call Master	
Sound alarm	
Commence sound signalling	
Initiate counter piracy measures	
Inform support vessel	
Inform engineers and technicians	
Inform Coastguard	
Broadcast appropriate GMDSS	
Consider notifying other water users in proximity of pirate attack	
Consider openings in vessel's structure	
Plot vessel's last known position, course and speed	
Verify the vessel's response to remote control	
Confirm the status of data communications systems	
Confirm the position and intercept of security threat/ pirate vessel	
Manoeuvre to safe haven/safe water/ port/support vessel	
Confirm whether vessel recovery is safe/conduct RA	
Following boarding	
Isolate/ shutdown vessel systems and equipment	
Initiate audio warnings to boarding party	
Consider holding position/dead ship	
Confirm location of unauthorised third parties	
Monitor and record on-board activities and location of unauthorised third parties	
Verify the vessel's response to remote control	
Coordinate response with support vessel	
Coordinate response with CG and Maritime Authorities	

TABLE 2.08	
Emergency: Person detected in the water	
Actions to take	
Plot position of person in the water	
Commence initial manoeuvres	
Deploy LSA and (any) recovery systems	
Deploy smoke float(s)	
Maintain a visual contact with person in the water	
Inform Master	
Inform support vessel	
Sound alarm in ROC	
Inform Coastguard	
Broadcast appropriate GMDSS	
Broadcast appropriate AIS transmission	
Sound appropriate signals	
Monitor latency and connectivity	
Manoeuvre vessel to not endanger casualty during a loss of connectivity / control	
Inform engineers, local onshore teams, support vessels	
Inform water users near person in water	
Initiate appropriate response and recovery procedures	
Operate vessel speaker system to communicate with person in water	
Coordinate response with local/support vessel/ local authorities	

TABLE 2.09	
Emergency: Pollution incident (Note: liquid pollution from vessels)	
Actions to take	**Notes**
Stop vessel operations (where safe to do so)	
Manoeuvre vessel to contain or reduce the [impact] of the spill	
Sound alarm in the ROC	
Inform Master	
Broadcast an appropriate GMDSS	
Inform Engineers, local onshore teams, support vessels	
Check activation of bilge alarm	
Check status of bilge pumps	
Take actions to prevent further release	
Assess the type and source of spill	
Assess the movement of the spill	
Coordinate response with support vessel	
Assess the risk of ignition or fire related to the spill [Fire extinguishing/suppression systems on standby]	
Assess risk to any person in proximity of spill	
Inform local authorities, port authorities as applicable	
Initiate pollution response procedures	
Conduct an assessment on the vessel's stability	
Initiate transfer of liquids into tanks as applicable	
If spill contained on vessel, commence clean up procedures	
Initiate vessel recovery procedures	

Annex C – Visual Line of Sight Operations

1.0 An operation that is conducted within visual line of sight, means being able to control the navigation and operation of the vessel, within a suitable distance of the Remote Operator, such that the Remote Operator can:

.1 maintain continuously visual contact with the vessel

.2 maintain control of the vessel's course, heading and speed

.3 maintain situational awareness

.4 determine the orientation and motion of the vessel

.5 determine the orientation and motion of other vessels

.6 execute and monitor the passage plan

.7 avoid collision or allision with other vessels, obstacles in the water, or navigational hazards

.8 apply the COLREGS

.9 control vessel systems and equipment

.10 determine when the vessel is no longer operating within the definition of VLOS or determine when the conditions of VLOS have become unsafe

2.0 A suitable distance of a VLOS operation may depend on, but is not limited to:

.1 the eyesight of the Remote Operator

.2 the height of eye of the Remote Operator

.3 the visual conspicuity of the vessel

.4 lighting on board the vessel

.5 the prevailing meteorological and environmental conditions

.6 the location, density and direction of traffic

.7 obstacles that may obscure the vessel from the Remote Operator

.8 whether the operation is during the hours of daylight or darkness [night]]

.9 the location of the control station, in relation to the vessel

.10 back scatter and light emitted from own vessel's light

.11 the type, capabilities and limitations of the data communication systems in use

.12 the size of the vessel

.13 the limits of vessel operations so that it remains within VLOS

3.0 The determination of the vessel’s aspect may be aided by navigational lights. However, the use of telemetry as the sole method to indicate the vessel’s orientation is not accepted as being sufficient to define an operation as being within VLOS.

4.0 In instances where the vessel is within visual sight, but the Remote Operator is unable to remain within the conditions set out in the VLOS definition, consideration should be taken for which means of control and monitoring is safe and effective.

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