Remote Operator Training and Certification Framework

Competency Tables – Operational Level of responsibility

Remote Operator (O)				
Function: Contribute to the safe operation of the vessel				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Competence	**ID Number**	**KUP**	**Methods for Demonstrating Competence**	**Criteria for Demonstrating Competence**
1.00 Monitor the safety of remote operations	1.01	Define key terminology used in MASS, including remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Terminology is correctly applied throughout operations
	1.02	Identify and describe the different types of MASS in use, including vessel capable of remote operation	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The capabilities of different MASS in service are correctly identified
	1.03	Explain different modes of operation and control used in MASS operations, including remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The mode of operation is correctly identified
	1.04	Define a ROC and explain its function(s)	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme	Functions of a ROC are correctly identified

			.2 approved simulator training .3 approved practical training .4 examination	The Remote operator correctly identifies between various setups of ROCs in operation
	1.05	Identify and explain the roles and responsibilities of personnel engaged in remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Communications across departments are consistently clear and successful Remote Operator functions are carried out at their appropriate level of responsibility
	1.06	Identify the systems and infrastructure that enables the teleoperation and monitoring of a vessel and its functions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The remote operations network, systems and equipment is correctly identified and mapped
	1.07	Identify and explain the application of international and national regulations to the ROC and vessel	. Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Operations remain compliant with regulatory requirements The Remote Operator can identify the regulatory jurisdiction for the ROC and vessel
	1.08	Explain the Remote Operator's responsibility to intervene in automated and autonomous system functions	. Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly explains the capabilities and limitations of an automated or autonomous system The Remote Operator correctly recognises when intervention in automated or autonomous systems is required

	1.09	Explain the principles of redundancy and identify the application of redundant systems in remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies and explains the function of ROC, network and vessel redundant systems
	1.10	Explain the principles of robustness and identify the application of robust systems in remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies and explains the function of ROC, network and vessel robust systems
	1.11	Identify and explain the function and arrangements of back-up systems, including: .1 ROC .2 data communications system .3 vessel control systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies and explains the function of back-up systems The Remote Operator correctly recognised situations when changeover to back-up systems is required
	1.12	Explain the considerations to take when assessing the accuracy and reliability of information received in the ROC	. Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Information is critically assessed, prior to taking action The Remote Operator recognises when information received in the ROC is not actionable
	1.13	Explain limitations to building and maintaining situational awareness in a ROC	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training	The Remote Operator identifies and understands how their situational awareness may be impaired

			.3 approved practical training .4 examination	
	1.14	Identify and explain the causes of fatigue, pertinent to a Remote Operator	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator can identify factors impacting concentration, alertness and fatigue in a ROC
	1.15	Explain the application of regulations to a Remote Operator, working at ROC located onshore	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The scope of occupational health and safety regulations is correctly identifying The Remote Operator explains the actions to take, should they or other Remote Operators be unfit to undertake watchkeeping duties
Function: Monitor connectivity and control between the ROC and vessel				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Competence	**ID Number**	**KUP**	**Methods for Demonstrating Competence**	**Criteria for evaluating competence**
2.00 Establish and monitor connectivity between the ROC and vessel	2.01	Identify and explain the key components of a communications network and control system required to enable remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The key elements and functions of the vessel's network, teleoperation and monitoring system are correctly identified
	2.02	Identify the different types of data communication systems that enable connectivity between a ROC and vessel	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Remote Operator correctly identifies the network that enables connectivity between ROC and vessel

	2.03	Explain the operating principles, capabilities and limitations of the different types of data communication systems enabling connectivity between a ROC and vessel	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator accounts for the capabilities and limitations of each type of data communication system throughout watchkeeping and vessel operations
	2.04	Identify and explain factors impacting data communication systems and the status of connectivity	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Factors impacting connectivity between ROC and vessel are correctly identified and accounted for throughout the voyage and during vessel operations
	2.05	Identify and explain how forecasts may be incorporated into the risk assessing of connectivity and data communication system usage, including: i) Meteorological conditions ii) Environmental conditions iii) Security hazards iv) Coverage v) Geopolitical and commercial hazards vi) Permit and licencing framework	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator completes risk assessments identifying the hazards and mitigating measures Forecasts are updated and incorporated into navigational watches and vessel operations Hazards regarding connectivity between ROC and vessel are accurately identified and addressed.
	2.06	Explain the principles of a robust data communications system	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies the back-up data communication systems The Remote Operator correctly identifies when a change-over to a backup data communication system is required

	2.07	Identify and explain how a degraded state of connectivity, impacts a Remote Operator's ability to control and monitor vessel functions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies the impact that a degraded state of connectivity has on vessel functions The Remote Operator correctly identifies the appropriate action to take upon detecting degraded connectivity
	2.08	Explain the licencing and permit framework of data communication networks, including how this impacts remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies the impact of the data communication network licencing and permit framework The Remote Operator ensures that the operation remains within the limits of the permit and licencing framework
	2.09	Identify and explain the contingencies in place to mitigate the loss or degradation of connectivity	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly initiates procedures designed for the degradation or loss of connectivity between ROC and vessel
	2.10	Establish connectivity between the ROC and vessel	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The procedure designed to connect the ROC to the vessel is followed The data communications link between the ROC and vessel is verified
	2.11	Confirm that there is sufficient bandwidth for the vessel's planned navigation and operation	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training	The Remote Operator stops the job when vessel required bandwidth exceeds safe and available limits

			.3 approved practical training .4 examination	
	2.12	Changeover between data communication systems and verify connectivity	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for changing over between data communication systems are followed The status of connectivity is correctly confirmed
	2.13	Changeover between data communication channels and verify connectivity	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for changing over between data communication channels are followed The status of connectivity is correctly confirmed
	2.14	Explain the principle of data prioritisation, including how it impacts vessel functions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies scenarios when data prioritisation is initiated The Remote Operator monitors systems that are prioritised during conditions of degraded connectivity
	2.15	Monitor any degradation of connectivity and assess the impact on vessel functions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly recognises and monitors degraded connectivity The procedure designed for responding to degraded connectivity is followed
	2.16	Explain the contingencies in place following a sustained loss of connectivity, including actions to re-establish connectivity between ROC and vessel	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme	The Remote Operator correctly identifies a loss of connectivity

			.2 approved simulator training .3 approved practical training .4 examination	The Remote Operator explains the actions to take in the event of a loss of connectivity
3.00 Verify and monitor control between ROC and vessel	3.01	Verify remote control and monitoring functions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Control and monitoring systems are tested, prior to departure, arrival and vessel operations
	3.02	Explain the contingencies in place following a loss of control systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies the loss of a vessel control system(s) The Remote Operator correctly identifies a total loss of vessel control systems The Remote Operator explains the actions to take when a loss of control system is detected
	3.03	Give and take control of the vessel between control positions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The procedures designed for the transfer of control between control positions are followed The transfer of control does not result in a loss of control of vessel systems
	3.04	Give and take control between ROCs, including the back-up ROC	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training	Procedures designed for the transfer of control between ROCs are followed The transfer of control does not result in a loss of control of vessel systems

			.3 approved practical training .4 examination	
Function: Conduct and monitor vessel operations at the operational level				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Competence	**ID Number**	**KUP**	**Methods for Demonstrating Competence**	**Criteria for evaluating competence**
4.00 Operate and monitor sensory systems and equipment	4.01	Identify the sensory systems and interfaces used to build situational awareness	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Remote Operator correctly identifies sensory system(s) and corresponding interface(s) The Remote Operator maintains situational awareness throughout navigation and operations
	4.02	Explain the operating principles, capabilities and limitations of different types of camera systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Camera systems are operated and monitored, appropriate to their capabilities, limitations and their application to navigation and vessel operations
	4.03	Set up, monitor and adjust camera systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Camera systems are operated and monitored in accordance with their technical specifications
	4.04	Explain the capabilities and limitations of sound reception systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training	Sound reception systems are operated and monitored, appropriate to their capabilities, limitations and their application to navigation and vessel operations

			.4 examination	
	4.05	Set up, monitor and adjust sound reception systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Sound reception systems are operated and monitored in accordance with their technical specifications
	4.06	Explain the function of different types of inertial sensors and apply information obtained from these sensors	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The vessel's motion is correctly derived and applied from inertial sensory systems Inertial sensory systems are operated and monitored in accordance with their technical specifications
	4.07	Monitor meteorological and environmental sensory systems and apply information obtained from the	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Environmental and meteorological sensors are operated and monitored in accordance with technical specifications Information obtained from meteorological and environmental sensory systems is correctly interpreted, applied and recorded
	4.08	Monitor and adjust sensory systems interfaces, appropriate to the prevailing circumstances, conditions and vessel operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Sensory systems interfaces are set up, monitored and adjusted to maximise situational awareness
	4.09	Monitor the degradation of sensory systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme	Remote Operator correctly identifies when sensory systems and associated interfaces are in a state of degradation

			.2 approved simulator training .3 approved practical training .4 examination	
	4.10	Explain the impacts that degraded connectivity has on the Remote Operator's ability to operate and monitor sensory systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies the impact of degraded connectivity on sensory systems The Remote Operator correctly identifies when connectivity is impacting sensory systems and their situational awareness
	4.11	Explain how information obtained from sensors impacts human perception and situational awareness	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator recognises when information obtained from sensory information is not reliable or accurate The Remote Operator does not take action based on scanty information
5.00 Monitor IT, OT and implement cyber security policies	5.01	Identify and explain the function of key elements of the ROC and vessel IT and OT infrastructure	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly maps key ROC and vessel IT and OT systems
	5.02	Explain key IT and OT terminology, pertinent to remote operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly uses IT and OT terminology, pertinent to remote operations The Remote Operator correctly uses terminology from DfT Cyber Security Code of Practice for Ships

	5.03	Digitally lock/unlock workstations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for locking/unlocking workstations are followed
	5.04	Identify and explain how network segmentation impacts ROC and vessel systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly maps segmentation across the ROC and vessel systems and networks The Remote Operator correctly identifies vessel functions impacted by network segmentation
	5.05	Identify and explain precautions to be taken during periods of IT/OT maintenance	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Hazards are correctly identified and mitigated
	5.06	Explain ROC and vessel software updating and rollback procedures	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator follows procedures designed for ROC and vessel software updates and rollbacks
	5.07	Explain the function of software version control	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training	The Remote Operator correctly identifies and records software version Records of software version are maintained

			.3 approved practical training .4 examination	
	5.08	Identify relevant IT, OT and cyber security regulations and guidance, applicable to MASS, including vessels capable of remote operation	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Operations are carried out in accordance with applicable regulations and guidance
	5.09	Identify and explain ROC, network and vessel cyber security vulnerabilities, threats and mitigating measures	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Cyber security threats and vulnerabilities are identified and mitigated The Remote Operator is able to correctly identify when a cyber security incident may have occurred
	5.10	Identify how cyber security incidents can impact vessel control and monitoring functions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The remote operator correctly identifies ROC, network and network functions that can be impacted by cyber security incidents
	5.11	Explain the capabilities of ROC and vessel cyber security system(s)	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies ROC, network and vessel systems protected by cyber security systems, including any automated functions The Remote Operator correctly identifies back-up systems that may be used in the event of a cyber security incident
	5.12	Explain the control of physical access to ROC IT and OT infrastructure	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme	The Remote Operator correctly applies access control policies to the ROC

			.2 approved simulator training .3 approved practical training .4 examination	
	5.13	Explain how cyber security incidents may be detected in a ROC	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Indications of cyber security incidents are correctly identified
	5.14	Identify and explain contingencies in place for cyber security incidents	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator identifies actions to take upon detecting a cyber security incident The Remote Operator identifies stakeholder required to respond to a cyber security incident
Function: Conduct navigation at the operational level				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Competence	**ID Number**	**KUP**	**Methods for Demonstrating Competence**	**Criteria for evaluating competence**
6.00 Appraise, plan, execute and monitor a voyage	6.01	Demonstrate the voyage planning and verification process	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The voyage plan is verified by distributed teams working from different control positions and ROCs
	6.02	Identify and explain additional considerations to be accounted for in the voyage planning process, including: .1 the anticipated availability, reliability and degradation of data communication systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme	Voyage planning procedures are correctly followed

		.2 control system settings and parameters .3 contingencies and abort points .4 safe states .5 compliance with flag, coastal and port state requirements .6 the forecasting and application of environmental, meteorological, security and geopolitical forecasts .7 port and local requirements for unmanned ships .8 sensory system settings and parameters .9 ROC systems and equipment, settings and parameters .10 navigational watch handovers .11 transfer of control .12 methods and frequency of primary and secondary position fixing .13 the data communication system permits and licencing framework .14 changeover of data communication systems and channels .14 the status of the back-up ROC	.2 approved simulator training .3 approved practical training .4 examination	Voyage plans incorporate additional information pertinent to remote operations
	6.03	Operate and adjust control system settings and parameters as required by the voyage plan	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Control system settings and parameters are set up and adjusted as required by the voyage plan and SMS

	6.04	Explain the impact of varying conditions of connectivity on control systems whilst maintaining navigational watchkeeping duties	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator promptly recognises when connectivity impacts a navigational watch
	6.05	Monitor the vessel's position and proximity to traffic and navigational hazards upon entering a safe state	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The vessel's position keeping and fixing is monitored when the vessel enters a safe state
	6.06	Explain how the vessel's position is fixed, accounting for delays in the transfer of data	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator is able to demonstrate a primary and secondary methods of position fixing when operating beyond visual line of sight Latency and any delay(s) in the vessel's real-time position fixing is determined and corrected
	6.07	Handover and relieve the navigational watch	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The procedure designed for the handover of the navigational watch at the same control position is followed The procedure designed for the handover of the navigational watch at a different control position is followed
7.00 Maintain situational awareness during a	7.01	Explain how maintaining a lookout by use of remote sensory systems impact a Remote Operator during a navigational watch	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training	The Remote Operator accounts for the limitations of digital interfaces whilst maintaining a safe navigational watch

navigational watchkeeping			.3 approved practical training .4 examination	
	7.02	Set up, monitor and adjust camera systems and correctly identify vessels ad navigational hazards	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Camera systems are appropriately set up, monitored and adjusted to ensure that a proper lookout is maintained throughout a navigational watch Targets are detected at an adequate range and correctly identified
	7.03	Assess and apply information obtained from surface and sub surface detection and ranging equipment	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Information obtained from detection and ranging equipment is correctly applied to verify positions and maintain situational awareness
	7.04	Set up, monitor and adjust sound reception systems, appropriate to the prevailing circumstances and conditions	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Sound reception systems are appropriately set up, monitored and adjusted to ensure that a proper lookout is maintained throughout a navigational watch Sound signals are correctly detected and identified
	7.05	Identify and explain how environmental and meteorological factors impact maintaining a safe navigational watch from a ROC	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly recognises and records changes to environmental and meteorological conditions The Remote Operator correctly assess the impacts that prevailing conditions may have on vessel functions Environmental and meteorological conditions that may result in remote operations being unsafe are identified and action is taken to mitigate the effects

	7.06	Set up, monitor and adjust sensory system interfaces to build and maintain operational situational awareness	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator adjusts all sensory systems and interfaces to maintain overall situational awareness during navigational watchkeeping
Operate vessel steering and propulsion systems	8.01	Explain how digital interfaces and display units in a ROC impact the Remote Operator's judgement of vessel motions during manoeuvres	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator accounts for limitations of digital interfaces when assessing the vessel's motion and depth perception
	8.02	Explain and assess the impact that degraded connectivity has on steering and propulsion systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator promptly recognises and accounts for the impacts of degraded connectivity when manoeuvring the vessel
	8.03	Explain the capabilities and limitations of different steering modes used in remote operations and demonstrate an ability to change between steering modes	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The steering mode appropriate to the prevailing circumstances and conditions is selected The procedure designed for change over between steering control modes is followed
	8.04	Identify and explain precautions to be taken when remotely manoeuvring within proximity to other vessels, navigational hazards, offshore structures and in port	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training	The risks associated with remotely manoeuvring in close proximity to vessels, navigational hazards, offshore structures and in port are identified and mitigated

			.3 approved practical training .4 examination	Manoeuvres result in the vessel passing obstacles at a safe distance
	8.05	Operate remote control steering and systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for manoeuvres are followed Steering and propulsions systems are operated in accordance with technical specifications
	8.06	Manoeuvre the vessel within and beyond visual line of sight, including: .1 maintaining heading control at slow speed .2 maintaining heading control by use of relative bearings and terrestrial reference points .3 taking action to avoid collision .4 in narrow channels or fairway .5 upon encountering restricted visibility .6 berthing operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Manoeuvres result in the vessel passing other vessels, navigational hazards and objects at a safe distance The Remote Operator recognises when the vessel is operating within and beyond visual line of sight
Function: Respond to system failures, emergencies and security incidents				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Competence	**ID Number**	**KUP**	**Methods for Demonstrating Competence**	**Criteria for evaluating competence**
9.00 Respond to failures of ROC or vessel systems	9.01	Explain the functions of Failure Mode Effect Analysis (FMEA) and apply FMEA in response to failures of ROC, network and vessel systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly applies FMEA during failures in systems and equipment

	9.02	Recognise and respond to alarms and alerts	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Alarms are correctly identified, and immediate action is taken to mitigate hazardous situations The Remote Operator informs the relevant engineers and technicians upon detecting failures in systems and equipment Communication with engineers and technicians is consistently clear and successful during failures of ROC, network and vessel systems
	9.03	Operate emergency stops	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for operating emergency stops are followed
	9.04	Take initial action in response to a failure in ROC systems and equipment, including: .1 IT/OT systems .2 power supply and ancillary systems .3 data communications systems .4 digital displays or interfaces .5 control and monitoring systems	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for the failure of ROC systems and equipment are followed
	9.05	Take initial action in response to failure of vessel systems, including: .1 data communications systems .2 sensory systems .3 steering and propulsion systems .4 navigational equipment	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for the failure of vessel systems and equipment are followed

		.5 IT/OT systems .6 power plant and auxiliary systems		
	9.06	Explain the function of a safe state	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Situations where the vessel must enter a safe state are correctly identified
	9.07	Identify when the vessel has entered a safe state	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The vessel's entry into a safe state is correctly identified and recorded
	9.08	Enter the vessel into a safe state	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for the vessel's entry into a safe state are followed
	9.09	Explain actions to take once the vessel has entered a safe state	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies actions that should be taken following the vessel's entry into a safe state
	9.10	Recover the vessel from a safe state	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme	Procedures designed to recover the vessel from a safe state are followed

			.2 approved simulator training .3 approved practical training .4 examination	
	9.11	Explain the function of a manual override	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies situations where the operation of a manual override is required
10.00 Respond to security incidents	10.01	Identify and explain the different considerations to be taken during ROC and vessel security incidents	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator promptly identifies security vulnerabilities and threats to the ROC and vessel The Remote Operator initiates the appropriate response upon detecting a security incident The Remote Operator correctly identifies the security arrangements and procedures implemented at the ROC
	10.02	Take action in response to a ROC security incident, including: .1 physical attack on the ROC, ancillary equipment or associated facilities .2 bomb threat .3 cyber security incident .4 physical trespass .5 civil unrest .6 any other incident requiring evacuation from the control position or ROC	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for ROC security incident(s) are followed
	10.03	Take action in response to a vessel security incident, including:	Examination and assessment of evidence obtained from one or more of the following:	Procedures designed for vessel security incident(s) are followed

		.1 piracy .2 cyber security incidents .3 bomb threat .4 stowaways .5 spoofing and jamming of vessel systems	.1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	
11.00 Respond to emergencies	11.01	Take action in response to an emergency located at the ROC, including: .1 Loss of control .2 Fire .3 Medical emergency .4 Any other event that requires the evacuation from the workstation or ROC	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for a ROC emergency are followed
	11.02	Take action in response to an emergency located at the vessel, including .1 Loss of control .2 Fire .3 Flooding .4 Collision/allision .5 Grounding .6 MOB/ Person detected in the water	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	Procedures designed for a vessel emergency are followed
	11.03	Identify and explain the contingencies in place to recover an unmanned vessel	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training	Remote Operator correctly recognises when the recovery of the vessel is required Risk assessments, toolbox talks and permits are carried out for vessel recovery operations

			.3 approved practical training .4 examination	Remote Operator identifies the appropriate method to regain control of the vessel The procedure(s) designed for the recovery of the vessel are followed
	11.04	Identify and explain how an unmanned vessel can render assistance to persons in distress at sea	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator correctly identifies how to assist persons in distress from unmanned ships
	11.05	Explain how unmanned vessels can participate in Search and Rescue operations	Examination and assessment of evidence obtained from one or more of the following: .1 approved training programme .2 approved simulator training .3 approved practical training .4 examination	The Remote Operator understands their obligations to participate in SAR operations The Remote Operator identifies systems that they can operate to provide assistance to persons in distress