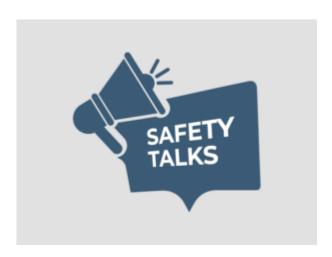
# Autonomous and Remotely-Operated Ship Safety Meeting Kit



# WHAT'S AT STAKE

Autonomous and remotely-operated ship safety refers to the measures and considerations taken to ensure the safe operation of ships that are controlled and operated remotely by human operators located onshore or in a control center. Unlike fully autonomous ships, which operate without direct human intervention, remotely-operated ships rely on human operators to control and monitor their operations from a remote location.

# WHAT'S THE DANGER

#### DANGERS AND RISKS WITH AUTONOMOUS AND REMOTELY-OPERATED SHIPS

- There is always a risk of system failures or malfunctions, which can lead to accidents or loss of control. Technical glitches, software bugs, or hardware failures could compromise the ship's safety and navigation.
- Autonomous and remotely-operated ships are connected to networks and rely on software and communication systems and are vulnerable to cybersecurity threats. Hackers could potentially gain unauthorized access, manipulate systems, or disrupt communication.
- Removing human operators from ships means relying solely on pre-programmed algorithms and artificial intelligence for decision-making. These systems are advanced and may not always account for all possible scenarios or have the same level of judgment and adaptability as human operators.
- Autonomous and remotely-operated ships operate in unpredictable and dynamic marine environments face challenges such as adverse weather conditions, rough seas, and navigational hazards.
- While autonomous systems are designed to detect and avoid collisions, there is always a possibility of errors in sensor data interpretation or unexpected vessel behavior, which could result in accidents.
- The regulatory and legal framework governing autonomous and remotelyoperated ships is evolving. There may be gaps or inconsistencies in existing regulations that need to be addressed.

## **HOW TO PROTECT YOURSELF**

KEY TOOLS AND TECHNOLOGIES UTILIZED IN AUTONOMOUS AND REMOTELY-OPERATED SHIP SAFETY

**Sensors:** Autonomous and remotely-operated ships are equipped with various sensors to collect data about the vessel, its surroundings, and environmental conditions.

**Collision Avoidance Systems:** Collision avoidance systems employ advanced algorithms to identify potential collision risks and provide warnings or take automated actions to avoid accidents.

**Communication Systems:** Autonomous and remotely-operated ships require robust communication systems. These systems ensure constant communication for monitoring, control, and situational awareness.

**Navigation Systems:** Precise and reliable navigation systems integrate data from sensors, GPS, and other sources to determine the ship's position, heading, speed, and course.

**Remote Monitoring and Control Systems:** Remote monitoring and control systems enable operators onshore to remotely monitor and control autonomous or remotely-operated ships.

**Cybersecurity Solutions:** As autonomous and remotely-operated ships rely on software, communication networks, and data exchange, cybersecurity solutions are critical to protect against cyber threats.

**Simulation and Testing Tools:** Simulation and testing tools create virtual environments to simulate various scenarios and test the ship's response to different conditions.

Data Analytics and Artificial Intelligence: Data analytics and artificial intelligence (AI) technologies are used to process and analyze the vast amount of data collected by autonomous and remotely-operated ships.

#### INDIVIDUAL PROTECTION IN THE OPERATION OF AUTONOMOUS AND REMOTELY-OPERATED SHIPS

**Stay Informed:** Stay updated on the latest developments, regulations, and safety measures related to autonomous and remotely-operated ships.

**Choose Reputable Operators:** If you plan to travel on an autonomous or remotely-operated ship, research and choose reputable ship operators with a strong track record of safety and compliance.

**Understand Emergency Procedures:** Familiarize yourself with the emergency procedures specific to the autonomous or remotely-operated ship you are traveling on.

**Evaluate Cybersecurity Measures:** When selecting a ship operator, ensure they have robust systems in place include encryption, authentication mechanisms, regular updates and patches.

Verify Redundancy Systems: Inquire about the redundancy systems in place on

autonomous and remotely-operated ships. Ask how critical components such as navigation, propulsion, and communication are backed up to mitigate the risk of failures.

Follow Safety Guidelines: Follow all safety guidelines and instructions including wearing appropriate safety gear, adhering to safety barriers, and obeying safety protocols during embarkation, disembarkation, and onboard activities.

**Maintain Awareness:** While onboard an autonomous or remotely-operated ship, maintain situational awareness of your surroundings. Be observant of any unusual activities or malfunctions and report them to the ship's crew or operators.

**Provide Feedback:** If you encounter any safety concerns or observe potential hazards during your journey on an autonomous or remotely-operated ship, provide feedback to the ship operator or relevant authorities.

## FINAL WORD

Remotely-operated ship safety involves robust communication, monitoring, control systems, cybersecurity, emergency response plans, operator training, and compliance with applicable regulations.