

# SCIENCE UNDER THE ICE

## RANGER CLASS SCORE SHEET

ROVs in Extreme Environments: Science and Industry in the Arctic



Company CEO: \_\_\_\_\_

Product demonstration station officials: \_\_\_\_\_

**Safety Check and Set-Up (up to 10 points total)**

- 5 points – Company presents signed safety inspection sheet.
- 5 points – Vehicle and control system present no safety hazards.

Examples:

- o All power cords, power bars, pressurized cylinders, etc. are secured.
- o No hazardous materials are leaking onto the pool deck.
- o Vehicle is hand-launched by team members in a safe manner.

Company is cleared for demonstration: \_\_\_\_\_ (official’s initials) \_\_\_\_\_ total points (out of 10)

*Note: An official’s decision to disqualify a company due to safety concerns is final. If there is a safety concern, please contact the lead safety inspector or competition coordinator.*

Check here if the company presented you with a JSA (Job Safety Analysis).

<b>Organizational and Operational Effectiveness (up to 10 points total)</b>		✓
• Up to 2 points – Organization		
o Chain of command evident	1	_____
o Roles clear and executed well	1	_____
• Up to 3 points – Task Plan		
o Task plan is well thought out to maximize score	1	_____
o Alternate plans available	1	_____
o All team members are aware of the plan	1	_____
• Up to 2 points –Time Management		
o Awareness of time	1	_____
o Adjusting timeline to adapt to situations	1	_____
• Up to 3 points – Team Cooperation		
o Composure under pressure	1	_____
o Supportive of each other	1	_____
o Team communicates well with each other	1	_____
<b>Total points (out of 10)</b>		_____

**Penalty Points**

**Tether pulling:** Issue a warning for the first infraction. Begin deducting points AFTER the first infraction.

**Illegal communication:** Company members at the side of the pool may not communicate visual evidence of the ROV status (location, need to turn, etc.).

**Debris:** Companies that leave debris (e.g. parts of their ROV, including weights and flotation) in the pool such that a diver must retrieve the debris will also receive penalty points. Product demonstration props are NOT considered debris. A company constructed collection basket is considered debris.

**Diver Assistance:** None is being provided for this mission.

**Fuses**

If a vehicle blows the MATE power supply in-line fuse, the company is allowed one spare. If the vehicle blows the second MATE fuse, the product demonstration performance period is over. The company will receive points for the product demonstration tasks that they have completed up to that point but will not receive a time bonus score.

**RANGER Product Demonstration Task Scoring Breakdown:****Task #1: Science under the ice (up to 100 points)**

<b>Task #1: Science under the ice</b>	<b>Scoring – up to 100 points</b>
<b>Judges' Notes:</b> Companies may complete the steps of Task #1 in any order.	
<b>1.1 5 points</b> – removing a sample of algae from the underside of the ice	_____
<b>1.2 5 points</b> – returning a sample of algae to the surface	_____
<b>1.3 5 points</b> – removing a sea urchin from the seafloor	_____
<b>1.4 5 points</b> – returning a sea urchin to the surface	_____
<b>1.5 up to 10 points</b> – using a handbook to identify and count species of sea stars	_____
<ul style="list-style-type: none"> <li>○ <b>10 points</b> – all sea star species properly identified and counted</li> <li>○ <b>5 points</b> – at least four sea star species properly identified and counted</li> <li>○ <b>0 points</b> – less than four sea star species properly identified and counted</li> </ul>	
<b>1.6 10 points</b> – deploying a passive acoustic sensor in a designated area	_____
<b>1.7 5 points</b> – surveying the iceberg at four points around its perimeter	_____
<b>1.8 up to 10 points</b> – measuring the <b>keel depth</b> of the iceberg	_____
<ul style="list-style-type: none"> <li>○ <b>10 points</b> - <math>\leq</math> 10 cm off true depth</li> <li>○ <b>0 points</b> - <math>&gt;</math> 10 cm off true depth</li> </ul>	
<b>1.9 up to 10 points</b> – measuring the <b>diameter</b> of the iceberg	_____
<ul style="list-style-type: none"> <li>○ <b>10 points</b> - <math>\leq</math> 10 cm off true length</li> <li>○ <b>0 points</b> - <math>&gt;</math> 10 cm off true length</li> </ul>	
<b>1.10 5 points</b> – using the dimensions to calculate its volume within 10%	_____
<b>1.11 10 points</b> – using the coordinates to map the location of the iceberg	_____
<b>1.12 up to 10 points</b> – using the location, heading and keel depth to determine the threat level to the four oil platform surface platforms	_____
<ul style="list-style-type: none"> <li>○ <b>10 points</b> – all four assessments are correct</li> <li>○ <b>5 points</b> – one assessment is incorrect by only one threat level</li> <li>○ <b>0 points</b> – more than one assessment is incorrect or one assessment is off by more than one threat level</li> </ul>	
<b>1.13 up to 10 points</b> – using the location, heading and keel depth to determine the threat level to the four oil platform subsea assets	_____
<ul style="list-style-type: none"> <li>○ <b>10 points</b> – all four assessments are correct</li> <li>○ <b>5 points</b> – one assessment is incorrect by only one threat level</li> <li>○ <b>0 points</b> – more than one assessment is incorrect or one assessment is off by more than one threat level</li> </ul>	
<b>TOTAL POINTS FOR TASK #1</b> _____	

**SCORING SUMMARY WORKSHEET**

The purpose of this sheet is to allow you to verify and tally scores from the previous pages.

<b>SAFETY CHECK &amp; SET-UP</b>			
Signed safety inspection sheet	0	5	
Vehicle and control system present no hazards	0	5	
<b>ORGANIZATION</b>			
Company is effectively organized to undertake the product demonstration	0	1	2 3 4 5
	6	7	8 9 10
<b>Safety check, set-up, and organization point total:</b>			
<b>Task #1: Science under the ice (up to 100 points)</b>			
Removing a sample of algae from the underside of the ice sheet	0	5	
Returning a sample of algae to the surface	0	5	
Removing a sea urchin from the sea floor	0	5	
Returning the sea urchin to the surface	0	5	
Using a species identification handbook to identify and count sea stars	0	5	10
Deploying a passive acoustic sensor in a designated area	0	10	
Surveying the iceberg at four points around its perimeter	0	5	
Measuring the keel depth of the iceberg	0	10	
Measuring the diameter of the iceberg	0	10	
Calculating the volume of the iceberg within 10% of its true volume	0	5	
Using the coordinates to map the location of the iceberg	0	10	
Determining the threat level to the four surface platforms	0	5	10
Determining the threat level to the four subsea assets	0	5	10
<b>Task #1 point total:</b>			

<b>PENALTY POINT DEDUCTIONS</b>	
*Illegally pulling tether _____ infractions X - 5	
*Illegal communication _____ infractions X - 5	
*** Leaving debris in the pool _____ infractions X - 5	
Exceeded 5-minute demobilization period _____ minutes X - 1 =	

<b>TIME BONUS</b>	
1 point for every minute and 0.01 point for every second under 15 minutes	
Duration of Product Demonstration: _____	
Minutes under 15 remaining: _____ X 1 point = _____	
Seconds remaining: _____ X 0.01 point = _____	
<b>Time bonus</b>	
<b>TOTAL PRODUCT DEMONSTRATION SCORE</b>	

**Official's initials:** \_\_\_\_\_ **Company CEO's initials:** \_\_\_\_\_