

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

Company Name

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

**Company is approved for image recognition**  
**Company is approved for autonomous operations**

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

<b>Safety Check and Set-Up (up to 10 points)</b>	Points	
Company presents safety card or signed safety inspection sheet.	0	5
Vehicle and control system present no safety hazards.	0	5
Examples: <ul style="list-style-type: none"> <li>o All power cords, power bars, pressurized cylinders, etc. are secured.</li> <li>o No hazardous materials are leaking onto the pool deck.</li> <li>o Vehicle is hand-launched by team members in a safe manner.</li> </ul>		
Company is cleared for demonstration: _____ (official's initials)		
<b>Total Safety Check and Set-Up (out of 10)</b>		
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.		

**Total**

<b>Organizational and Operational Effectiveness (up to 10 points)</b>	Points	
<b>Up to 2 points – Organization</b>		
Chain of command evident	0	1
Roles clear and executed well	0	1
<b>Up to 2 points – Task Plan</b>		
Task plan is well thought out to maximize score	0	1
Alternate plans available and all team members are aware of the plan	0	1
<b>Up to 2 points – Time Management</b>		
Awareness of time	0	1
Adjusting timeline to adapt to situations	0	1
<b>Up to 2 points – Team Cooperation</b>		
Composure under pressure	0	1
Supportive of each other and communicate well with each other	0	1
<b>Up to 2 points – ROV Deployment and Control</b>		
ROV deployed by the end of the 5-minute set-up period	0	1
ROV is under control of pilot and prepared to perform tasks	0	1
<b>Total Organizational and Operational Effectiveness (out of 10)</b>		

**Total**

<b>Bonus points for size and weight</b>	Points	
<b>Size bonus (up to 10 points)</b>		
ROV is less than 64 cm – 10 bonus points	0	5 10
ROV is within 64.1 cm and 75 cm – 5 bonus points		
ROV is within 75.1 cm and 92 cm – 0 bonus points		
Vehicles larger than 92 cm may not compete		
		Judge initials: _____
		CEO initials: _____
<b>Total</b>		
<b>Weight bonus (up to 10 points)</b>		
ROV is less than 20 kg – 10 bonus points	0	5 10
ROV is between 20.01 kg and 28 kg – 5 bonus points		
ROV is between 28.01 kg and 35 kg – 0 bonus points		
Vehicles heavier than 35 kg may not compete		
		Judge initials: _____
		CEO initials: _____
<b>Total</b>		

**Total**

**Total**

Task # 1: Ensuring Public Safety - Dam Inspection and Repair (up to 120 points)	Points				
<b>Judges' Notes:</b> Companies may complete the steps of this task in any order.					
<b>1.1 up to 60 points</b> – inspecting the foundation of the dam					
<ul style="list-style-type: none"> <li>o following a transect line to inspect the foundation                             <ul style="list-style-type: none"> <li><b>25 points</b> – autonomous inspection</li> <li><b>5 points</b> – manual inspection</li> </ul> </li> </ul>	0	5	25		
<ul style="list-style-type: none"> <li>o locating and gathering information about the length of the crack                             <ul style="list-style-type: none"> <li>o locating and autonomous determination of the length of crack concurrent with autonomous line following                                     <ul style="list-style-type: none"> <li><b>25 points</b> – length within 1 cm of true length</li> <li><b>10 points</b> – length between 1.1 and 2 cm of true length</li> <li><b>0 points</b> – Length not within 2.1 cm of true length</li> </ul> </li> <li>o locating and autonomous determination of the length of crack concurrent with manual control                                     <ul style="list-style-type: none"> <li><b>15 points</b> – length within 1 cm of true length</li> <li><b>5 points</b> – length between 1.1 and 2 cm of true length</li> <li><b>0 points</b> – Length not within 2.1 cm of true length</li> </ul> </li> <li>o manual locating and determination of crack length                                     <ul style="list-style-type: none"> <li><b>5 points</b> – length within 1 cm of true length</li> <li><b>0 points</b> – Length not within 1.1 cm of true length</li> </ul> </li> </ul> </li> </ul>	0	5	10	15	25
<ul style="list-style-type: none"> <li>o locating and gathering information about the length of the crack                             <ul style="list-style-type: none"> <li><b>10 points</b> – autonomous mapping on video display</li> <li><b>5 points</b> – Mapping crack on paper grid</li> </ul> </li> </ul>	0	5	10		
<b>1.2 10 points</b> – inserting grout into voids underneath the dam	0	10			
<b>1.3 up to 15 points</b> – inspecting and repairing a trash rack					
<ul style="list-style-type: none"> <li><b>5 points</b> – removing the damaged screen of the trash rack</li> <li><b>10 points</b> – installing a new screen</li> </ul>	0	5			
<ul style="list-style-type: none"> <li><b>10 points</b> – installing a new screen</li> </ul>	0	10			
<b>1.4 up to 35 points</b> – deploying a secondary, micro-ROV from the primary ROV to inspect the inside of the drain pipe for indicators of a possible dam failure					
<ul style="list-style-type: none"> <li>o identifying areas of muddy water flow inside the pipe using:                             <ul style="list-style-type: none"> <li><b>30 points</b> – Micro-ROV only connected to primary ROV by fiber optic cabling</li> <li><b>20 points</b> – Micro-ROV connected to primary ROV by copper wiring</li> </ul> </li> </ul>	0	20	30		
<ul style="list-style-type: none"> <li><b>5 points</b> – docking the micro-ROV to the primary ROV</li> </ul>	0	5			
<b>Total Task # 1 (out of 120)</b>					

Task # 2: Maintaining Healthy Waterways (up to 90 points)	Points				
<b>Judges' Notes:</b> Companies may complete the steps of this task in any order.					
<b>2.1 up to 25 points</b> – monitoring water quality					
<ul style="list-style-type: none"> <li>o measuring the water temperature                             <ul style="list-style-type: none"> <li><b>10 points</b> – temperature measurement within 2 C of benchmark</li> <li><b>5 points</b> – temperature measurement between 2 and 4 C of benchmark</li> <li><b>0 points</b> – temperature measurement is not within 4 C of benchmark</li> </ul> </li> </ul>	0	5	10		
<ul style="list-style-type: none"> <li>o measuring the pH of an in situ water sample                             <ul style="list-style-type: none"> <li><b>15 points</b> – pH is within 0.5 PH of benchmark</li> <li><b>5 points</b> – pH is between 0.51 and 1.0 of benchmark</li> <li><b>0 points</b> – pH is not within 1.0 of benchmark</li> </ul> </li> </ul>	0	5	15		

<b>2.2 up to 25 points</b> – determining habitat diversity				
<b>5 points</b> – lifting a rock from the bottom	0	5		
o examining the benthic species underneath the rock	0	5	25	
<b>5 points</b> – using a handbook to determine the number and type of benthic species				
<b>25 points</b> – using image recognition to determine the number and type of benthic species				
<b>5 points</b> – recording the date, time, temperature, pH and species diversity on a data sheet	0	5		
<b>2.3 5 points each, 10 points total</b> – transporting and releasing trout fry	0	5	10	
<b>2.4 up to 20 points</b> - restoring fish habitat				
<b>10 points</b> – removing a degraded rubber tire	0	10		
<b>10 points</b> – installing a new fish/reef ball	0	10		
				<b>Total</b>
<b>Total Task # 2 (out of 90)</b>				

<b>Task # 3: Preserving History (up to 90 points)</b>	Points				
<b>Judges' Notes:</b> Companies may choose to recover the cannon or mark the location of the cannon shells first. Once companies begin lift operations on the cannon, they cannot receive further points for any calculations					
<b>3.1 up to 70 points</b> – recovering the Civil War era cannon					
<b>5 points</b> – prior to the competition, determining the lift capability of your ROV	0	5			
o Calculating the amount of force needed to lift the cannon					
o <b>up to 30 points</b> - calculating the volume of the cannon					
o Length measurement	0	5			
<b>5 points</b> – within 1 cm of true length					
<b>0 points</b> – not within 1 cm of true length					
o Radius 1 measurement	0	5			
<b>5 points</b> – within 0.5 cm of true length					
<b>0 points</b> – not within 0.5 cm of true length					
o Radius 2 measurement	0	5			
<b>5 points</b> – within 0.5 cm of true length					
<b>0 points</b> – not within 0.5 cm of true length					
o Radius 3 measurement	0	5			
<b>5 points</b> – within 0.5 cm of true length					
<b>0 points</b> – not within 0.5 cm of true length					
<b>10 points</b> - Volume calculation within 10 cm <sup>3</sup> of actual	0	10			
<b>5 points</b> - using the cannon's casting mark to identify the build location and build date and consulting a handbook to determine the composition	0	5			
<b>5 points</b> - Calculating the weight of the cannon in water	0	5			
<b>5 points</b> - Determining if the ROV has enough thrust to lift the cannon	0	5			
<b>20 points</b> - returning the cannon to the surface side of the pool	0	20			
<b>3.2 5 points each, 20 points total</b> – identifying and marking the location of metal cannon shells / non-metal debris	0	5	10	15	20
					<b>Total</b>
<b>Total Task # 3 (out of 90)</b>					

**Fuses:** ROV systems are allowed one replacement fuse during the product demonstration. In the event that the ROV system blows the second fuse during the demonstration, time will stop, the demonstration run will be over, and no additional points will be earned. Companies should have adequate replacement fuses on hand, MATE will not provide replacements.

Penalty Points (deduct 5 points for each infraction)	No. of Infractions		
<b>Tether Pulling:</b> Company members cannot pull on the tether to assist in moving or turning the vehicle. Judges should issue a warning for the first infraction and begin deducting points AFTER the first infraction.	a		
<b>Illegal communication:</b> Company members at the side of the pool may not communicate visual evidence of the ROV status such as location of vehicle, need to turn, that the vehicle is stuck, etc.	b		
<b>Debris:</b> Companies that leave debris (e.g. parts of their ROV, including weights and flotation) in the pool at the end of the product demonstration time, or leave debris that a diver must retrieve will receive penalty points. Product demonstration props are NOT considered debris. A company constructed collection basket is considered debris if it is still in the water when product demonstration time ends.	c		
<b>Diver Assistance:</b> Any diver assistance (if available) must be requested by the company and will result in a 5 point penalty. The clock does not stop during diver assistance.	d		
<b>Total Penalty Points</b>	(total a + b + c + d) X 5 =	<b>Total</b>	

TIME BONUS (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</b>	

<b>TOTAL PRODUCT DEMONSTRATION SCORE</b>	<b>Grand Total</b>
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