

# From the Gulf of Mexico to Jupiter's Moon Europa

## RANGER CLASS SCORE SHEET

Company Name

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:
- All power cords, power bars, pressurized cylinders, etc. are secured.
  - No hazardous materials are leaking onto the pool deck.
  - 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). ☐

### Organizational and Operational Effectiveness (up to 10 points total)

- Up to 2 points – Organization
  - Chain of command evident 1 \_\_\_\_\_
  - Roles clear and executed well 1 \_\_\_\_\_
- Up to 2 points – Task Plan
  - Task plan is well thought out to maximize score 1 \_\_\_\_\_
  - Alternate plans available 1 \_\_\_\_\_
  - All team members are aware of the plan 1 \_\_\_\_\_
- Up to 2 points – Time Management
  - Awareness of time 1 \_\_\_\_\_
  - Adjusting timeline to adapt to situations 1 \_\_\_\_\_
- Up to 2 points – Team Cooperation
  - Composure under pressure 1 \_\_\_\_\_
  - Supportive of each other 1 \_\_\_\_\_
  - Team communicates well with each other 1 \_\_\_\_\_
- Up to 2 points – ROV Deployment and Control
  - ROV deployed 1 \_\_\_\_\_
  - ROV deployed and under control to perform tasks 1 \_\_\_\_\_

**Total points (out of 10)** \_\_\_\_\_

### 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:** Diver assistance may or may not be available during regional product demonstration time. Any diver assistance will result in a 5 point penalty. At the international competition diver assistance will be available only after the product demonstration time is complete, and will result in a 5 point penalty.

**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.

**Bonus points for size and weight****Size bonus, up to 20 points – \_\_\_\_\_**

- ROV is less than 48 cm – 20 bonus points
- ROV is within 48.1 cm and 54 cm – 10 bonus points
- ROV is within 54.1 cm and 60 cm – 5 bonus points
- ROV is within 60.1 cm and 75 cm – 0 bonus points

Judge initials: \_\_\_\_\_

CEO initials: \_\_\_\_\_

**Weight bonus, up to 20 points – \_\_\_\_\_**

- ROV is less than 11 kg – 20 bonus points
- ROV is between 11.01 kg and 12 kg – 10 bonus points
- ROV is between 12.01 kg and 14 kg – 5 bonus points
- ROV is greater than 14 kg – 0 bonus points

Judge initials: \_\_\_\_\_

CEO initials: \_\_\_\_\_

**RANGER Product Demonstration Task Scoring Breakdown:****Task #1: Mission to Europa****Scoring – up to 100 points**

**Judges' Notes:** Companies may complete the steps of Task #1 in any order except for the following: The four steps of connecting the ESP to the power and communications hub (**1.5**, **1.6**, **1.7** and **1.8**). These steps **MUST** be completed in order. Companies may alternate between this and the other tasks (2 – 5). Companies that cannot complete one of the steps **1.5** through **1.8** cannot continue with the remaining steps of Task #1.

**1.1 10 points** – inserting the temperature sensor into the venting fluid \_\_\_\_\_**1.2 up to 20 points** – measuring the temperature of the venting fluid \_\_\_\_\_

- **20 points** – within 3°C of benchmark
- **10 points** – within 4°C of benchmark
- **5 points** – within 5°C of benchmark
- **0 points** – not within 5°C of benchmark

**1.3 up to 10 points** – determining the thickness of the ice crust \_\_\_\_\_

- **10 points** - ≤ 10 cm from true depth
- **0 points** - > 10 cm from true depth

**1.4 up to 10 points** – determining the depth of the ocean underneath the ice \_\_\_\_\_

- **10 points** - ≤ 10 cm from true depth
- **0 points** - > 10 cm off from true depth

**1.5 5 points** – retrieving the ESP's cable connector from the elevator \_\_\_\_\_**1.6 up to 20 points (10 points each)** – laying the cable through two waypoints \_\_\_\_\_**1.7 5 points** – opening the door on the power and communication hub \_\_\_\_\_**1.8 20 points** – inserting the cable connector into the port on the hub \_\_\_\_\_**TOTAL POINTS FOR TASK #1** \_\_\_\_\_

**Task #2: Mission-Critical Equipment Recovery****Scoring – up to 40 points**

**Judges' Notes:** Companies may alternate between this and the other tasks. The proper serial numbers must be identified before the CubeSat can be placed in the collection basket.

- 2.1 up to 20 points (5 points each)** – finding and identifying the serial numbers of the four mission-critical CubeSats \_\_\_\_\_
- 2.2 up to 20 points (5 points each)** – recovering the CubeSats and placing them in the collection basket \_\_\_\_\_

**TOTAL POINTS FOR TASK #2** \_\_\_\_\_**Task #3: Forensic Fingerprinting****Scoring – up to 40 points**

**Judges' Notes:** Companies may complete the steps of Task #3 in any order and may alternate between this and the other tasks.

- 3.1 up to 10 points (5 points each)** – collecting one sample from two oil mats \_\_\_\_\_
- 3.2 up to 10 points (5 points each)** – returning the samples to the surface \_\_\_\_\_
- 3.3 up to 20 points (10 points each)** – analyzing gas chromatographs to determine the samples' origin \_\_\_\_\_

**TOTAL POINTS FOR TASK #3** \_\_\_\_\_**Task #4: Deepwater Coral Study****Scoring – up to 30 points**

**Judges' Notes:** Companies may complete the steps of Task #4 in any order and may alternate between this and the other tasks.

- 4.1 up to 10 points (5 points each)** – photographing the two coral colonies \_\_\_\_\_
- 4.2 up to 10 points (5 points each)** – comparing the photos to previous years to assess the condition of each colony \_\_\_\_\_
- 4.3 up to 10 points (5 points each)** – returning two coral samples to the surface \_\_\_\_\_

**TOTAL POINTS FOR TASK #4** \_\_\_\_\_**Task #5: Rigs to Reefs****Scoring – up to 50 points**

**Judges' Notes:** Companies MUST complete the steps of Task #5 in order. Companies may alternate between this and the other tasks. Companies that cannot complete one of the steps cannot continue with the remaining steps of Task #5.

- 5.1 10 points** – installing a flange on the top of the wellhead \_\_\_\_\_
- 5.2 10 points** – securing the flange with a bolt \_\_\_\_\_
- 5.3 10 points** – installing a wellhead cap over the flange \_\_\_\_\_
- 5.4 20 points (10 points each)** – securing the cap with two bolts \_\_\_\_\_

**TOTAL POINTS FOR TASK #5** \_\_\_\_\_

**Please use the scoring summary worksheet below to verify and tally scores.**

**SCORING SUMMARY WORKSHEET**

<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>	0	1 2 3 4 5
Company is effectively organized to undertake the product demonstration	6	7 8 9 10
<b>Safety check, set-up, and organization point total:</b>		
<b>SIZE and WEIGHT Bonus</b>		
Size bonus	0	5 10 20
Weight bonus	0	5 10 20
<b>Task #1: Mission to Europa (up to 100 points)</b>		
Inserting the temperature sensor into the venting fluid	0	10
Measuring the temperature of the venting fluid	0	5 10 20
Determining the thickness of the ice crust	0	10
Determining the depth of the ocean under the ice	0	10
Retrieving the ESP's cable connector from the elevator	0	5
Laying the cable through two waypoints	0	10 20
Opening the door of the power and communications hub	0	5
Inserting the cable connector into the port	0	20
<b>Task #1 point total:</b>		
<b>Task #2: Mission Critical Equipment Recovery (up to 40 points)</b>		
Finding and identifying the serial numbers of the four critical CubeSats	0	5 10 15 20
Recovering the CubeSats and placing them in the collection basket	0	5 10 15 20
<b>Task #2 point total:</b>		
<b>Task #3: Forensic Fingerprinting (up to 40 points)</b>		
Collecting one sample of two oil mats on the seafloor	0	5 10
Returning the samples to the surface	0	5 10
Analyzing gas chromatographs to determine the samples' origin	0	10 20
<b>Task #3 point total:</b>		
<b>Task #4: Deepwater Coral Study (up to 30 points)</b>		
Photographing two coral colonies	0	5 10
Comparing the photos to previous photos to assess their condition	0	5 10
Returning two coral samples to the surface	0	5 10
<b>Task #4 point total:</b>		
<b>Task #5: Rigs to Reefs (up to 50 points)</b>		
Installing a flange on top of the wellhead	0	10
Securing the flange with a bolt	0	10
Installing a wellhead cap on top of the flange	0	10
Securing the cap to the flange with 2 bolts	0	10 20
<b>Task #5 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		
Diver assistance _____ - 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: \_\_\_\_\_