### Document Specifications

Document met requirements: length no more than 10 pages, inclusive of SID, safety checklist, and all appendices. Font size of at least 12 points, used Times New Roman, Arial, or Calibri font, all measurements were in SI units (except things traditionally specified in other units, e.g. PVC diameter)

**Note:** Linked or attached documents will not be judged as part of the technical report score.

Title page met the following content requirements: (1) company name, (2) organization/school name and location (city, state, country), (3) team members and their roles, (4) and mentor name(s)

Abstract provided clear, concise summary of work in 150 words or less

Use of Images and Data

- Effective use of photos and sketches to capture the vehicle's design features
- Sketches used sensible labeling of symbols, dimensions, and components

Document Design

- Document presented a professional view of the company
- Photo of complete vehicle was included
- Thorough attention to grammar and spelling
- Photos accompanied by appropriate captions
- Sketches used sensible labeling of symbols, dimensions, and components

Acknowledgements and References

- Document provided a properly documented list of references - books, journals, web sites, etc. used as sources; documented contributions of companies, individuals who contributed funds, equipment, and/or technical/moral support
- Document provided adequate acknowledgement of contributions of companies and individuals that contributed funds, equipment, and/or other support to the team

### Overall Report

<table>
<thead>
<tr>
<th>Max Points</th>
<th>Weight</th>
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<tbody>
<tr>
<td>44</td>
<td>15%</td>
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This scale applies only to first two questions. See Rubric for the remainder of the questions.

All 4 requirements met = 4 points
3 requirements met = 3 points
2 requirements met = 2 points
1 requirement met = 1 point

### Engineering Design Rationale

<table>
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<tr>
<th>Max Points</th>
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<tbody>
<tr>
<td>52</td>
<td>40%</td>
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This section should include a detailed description of the vehicle, tools, and other subsystems

### Design Rationale

- Described a logical, step-by-step planning and design process
- Described how design ideas were originated, evaluated, and selected
- The science or techniques behind the tasks is discussed
- Provided clear description and sensible rationale for design choices related to cost and size

### Innovation

Innovation demonstrated in vehicle design, tools, or other features

### Problem Solving

- Described how the company brainstormed ideas and used information and data to evaluate them

### Vehicle Systems

- Described how components and materials were selected
- Described how the design evolved to meet the mission specifications
- Explained the number and placement of thrusters
- Description of buoyancy that demonstrates application of buoyancy principles

### Payload and Tools

- Payload tools were designed to meet mission requirements
- Explained build (in-house) vs. buy (outsource) decisions and how they related to mission requirements
- Explained new vs. reused/inherited decisions and how reused components meet this year’s requirements

Teamwork

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<tr>
<th>Max Points</th>
<th>Weight</th>
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<tbody>
<tr>
<td>12</td>
<td>10%</td>
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Included a description of the company (overview or company profile) and personnel (individual members and their roles and responsibilities)

Described how resources, procedures, and protocols were managed to meet mission objectives and solve day-to-day operational problems

**Note:** This section should include a detailed description of the vehicle, tools, and other subsystems
### System Integration Diagram (SID)

**Max Points:** 1  **Weight:** 5%

**Note:** Pre-competition safety inspectors will review and score in greater detail

### Safety

**Max Points:** 12  **Weight:** 10%

**Content**
- Described the safety rationale, including how it covers personnel, equipment, and operational safety
- Highlighted safety features and other vehicle-specific safety precautions related to tasks

**Safety Procedures**
- Document included a checklist for construction and operation

### Critical Analysis

**Max Points:** 8  **Weight:** 10%

**Testing and Troubleshooting**
- Described troubleshooting strategies and techniques used

### Accounting

**Max Points:** 12  **Weight:** 10%

**Budget**
- Thorough and accurate description of budget planning and following
- A clear distinction was made between items purchased, re-used, and donated
- All donations (items, services, and time) were acknowledged

### Discretionary Points

**Max Points:** 8  **Weight:** 100%

Document described exceptional design of vehicle, sensors, instruments, software, tools or other features

Other (explanation/example is required in comments)

### Deductions

**Min Points:** -8  **Weight:** 100%

Evidence that the work was performed by coaches, mentors, parents, or other non-team members

Significant overuse of commercial or reused components without adequate justification

### Final Score

**Max Points:** 50 + Discretionary & Deductions

**SCORING RUBRIC - ALL QUESTIONS (Except Discretionary & Deductions)**

- **Missing:** Not included, can't evaluate 0
- **Needs Work:** Effort made, meets some key requirements. Understanding or treatment of key requirements needs more depth. Judges had to question deeply to find answers. 1
- **Partially Meets Requirement:** Response demonstrates understanding and addresses most key requirements. Simple prodding from judges encouraged team to answer. 2
- **Meets Requirement:** Response demonstrates thorough understanding and addresses all key requirements. Team addressed topic without prompting. 3
- **Exceeds Requirement:** Response extends beyond key requirements, demonstrating exceptional depth and breadth of understanding 4

**SCORING RUBRIC - DISCRETIONARY POINTS**

- **Novelty, Depth of Understanding, Depth of Analysis, Effectiveness (functions as intended), Quality of Implementation**
  - None 0
  - Minor 1
  - Fair 2
  - Good 3
  - Extraordinary 4

**SCORING RUBRIC - DEDUCTIONS**

- **Extent to which team relied on outside help, existing work and/or purchased components and services**
  - None 0
  - Minor 1
  - Fair 2
  - Medium 3
  - Extreme 4

*Last Modified: 3/31/2023*