### Document Specifications

Document met the following requirements: (1) length no more than 25 pages, inclusive of SID, safety checklist, and all appendices, (2) font size of at least 12 points, (3) table of contents included, and (4) all measurements are 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 250 words or less

### Use of Images and Data

Photo(s) of vehicle was included

Photos accompanied by appropriate captions

Diagrams and drawings used sensible labeling of signals, dimensions and components

### Document Design

Thorough attention to grammar and spelling

Document was well organized, with thorough attention paid to messaging strategy and aesthetic presentation

### 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 who contributed funds, equipment, and/or other support to the team

### Project Management

Included a description of the company (overview or company profile) and personnel (individual members and their roles and responsibilities)

Developed a schedule to aid in building the vehicle

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

### Vehicle Structure

This section should include a detailed description of the vehicle, tools, and other subsystems

### Design Rationale

**Engineering Design Rationale**

Overall vehicle design presented in clear and logical manner

Demonstrated step-by-step planning and design process

Design decisions discussed and demonstrated thoughtful and balanced trade-offs

### Innovation

Company made innovations or modifications resulting in higher functionality at reduced costs

Innovation demonstrated in vehicle design, tools, or other features

### Problem Solving

Described how the company brainstormed ideas

Used rational process (data, trade study) to evaluate alternatives

### Systems Approach

Company demonstrated a balanced systems approach to the design (e.g., good integration between vehicle and sensors, holistic approach to vehicle systems, etc.)

### Vehicle Systems

Described trade-offs and rationale for vehicle cost, size, and weight

### Teamwork

Max Points: 12  Weight: 10%

**Overall Report**

Max Points: 44  Weight: 15%

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

### Overall Report

Max Points: 92  Weight: 40%

Last Modified: 3/12/2024
Propulsion
Explained rationale for number, type, and placement of thrusters
Described trade-offs to balance power consumption, cost, performance and mission requirements

Buoyancy and Ballast
Description of buoyancy system that demonstrated application of buoyancy principles

Payload and Tools
Explained rationale for number, type, and placement of cameras
Payload tools were designed to meet mission requirements
Sensors were designed or selected to meet mission requirements

Build vs. Buy, New vs. Used
Explained new vs. reused/inherited decisions and how reused components meet this year’s requirements

System Integration Diagrams
SID was included with the report

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: 12     Weight: 10%

Testing and Troubleshooting
Described vehicle testing methodology
Described troubleshooting strategies and techniques used
Described use of prototyping and testing to evaluate design options

Accounting
Max Points: 24     Weight: 10%

Budget
Thorough and accurate description of budget planning and following
Reasonable travel expense estimates were provided [Cost provided in USD]

Cost Accounting
Overall accounting was thorough and accurate
A clear distinction was made between items purchased, reused, and donated
All income sources were acknowledged and estimates of the fair market value of donations (items, services, and time) were reasonable [Cost provided in USD]
Accounting reflected effective use of funds

Max Points: 1     Weight: 5%
## Discretionary Points

| Document described exceptional design of vehicle, sensors, instruments, software, tools or other features | Max Points: 16 | Weight: 100% |
| Company developed exceptional original software or made exceptional adaptation of software to create a unique solution | |
| Document described remarkable effort to design and manufacture every component of the vehicle | |
| Other (explanation/example is required in comments) | |

## Deductions

| Components designed/implemented by a commercial company without adequate justification | Min Points: -12 | 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

| Novelty, Depth of Understanding, Depth of Analysis, Effectiveness (functions as intended), Quality of Implementation | |

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

- **Missing:** Not included, can't evaluate  
  0 points

- **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 point

- **Partially Meets Requirement:** Response demonstrates understanding and addresses most key requirements.  
  2 points

- **Meets Requirement:** Response demonstrates thorough understanding and addresses all key requirements.  
  3 points

- **Exceeds Requirement:** Response extends beyond key requirements, demonstrating exceptional depth and breadth of understanding.  
  4 points

## SCORING RUBRIC - DISCRETIONARY POINTS

- **None**  
  0 points

- **Minor**  
  1 point

- **Good**  
  2 points

- **Extraordinary**  
  3 points

## SCORING RUBRIC - DEDUCTIONS

- **None**  
  0 points

- **Minor**  
  1 point

- **Fair**  
  2 points

- **Medium**  
  3 points

- **Extreme**  
  4 points