

2015 MATE ROV Competition Technical Report Rubric

Judge: _____

Class (circle one): RANGER EXPLORER Team#: _____ School Name and #: _____

| Technical Report Summary | | | | | |
|--------------------------|--|--|---|--|--------|
| Category | Scoring Criteria | | | | Points |
| Overall Presentation | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| Basic requirements | Report is 25 pages or less; includes a table of contents; all measurements are in SI units (exceptions include ½ PVC, etc.); excellent attention to grammar; title page includes all elements as specified in the guidelines: Company name, school, club or organization name, city and state, members and roles, name of mentor | Report is 25 pages or less; includes a table of contents; most measurements are in SI units (exceptions include ½ PVC, etc.); very good attention to grammar; title page includes most elements as specified in the guidelines: Company name, school, club or organization name, city and state, members and roles, name of mentor | Report is over or less than 25 pages; includes an inaccurate table of contents; some measurements are in SI units; good attention to grammar, some issues; title page includes some elements as specified in the guidelines: Company name, school, club or organization name, city and state, members and roles, name of mentor | Report is over or significantly under 25 pages; table of contents missing or inaccurate; measurements not SI units; poor attention to grammar, many typos, etc.; many specified elements of the title page missing | |
| Abstract | 250 words or less and provides an excellent, clear and concise summary of work | 250 words or less and provides a concise summary of work | 250 words or less and provides an adequate summary of work | 250 words or less but is not clear nor concise | |
| Understanding of ROV | Clearly describes how the vehicle was designed, clear understanding of the technical and scientific concepts behind designing and building the vehicle | Describes how the vehicle was designed, demonstrates an understanding of the technical and scientific concepts behind designing and building the vehicle | Issues with the description of how the vehicle was designed, demonstrates some understanding of the technical and scientific concepts behind designing and building the vehicle | Poorly written, information missing, does not demonstrate or capture in any way an understanding of the technical and scientific concepts behind the vehicle | |
| Photos of ROV | Photo of complete vehicle included, includes additional photos which fully | Photo of complete vehicle included, includes additional photos which | Photo of complete vehicle included, no additional photos or additional photos which | Photos missing or not of high quality, captions missing and mechanical drawing or sketch missing | |

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| | capture vehicle design, excellent captions accompany photos, also includes an excellent mechanical drawing or sketch | somewhat capture vehicle design, captions accompany photos, also includes a mechanical drawing or sketch | do not capture vehicle design, captions accompany photos, also includes an adequate mechanical drawing or sketch | or of very poor quality | |
| Report design, professionalism and attention to detail | Report is extremely well thought through, logically organized and concise; demonstrates an excellent professional view of the company, team clearly spent a great deal of time working through details | Report is well thought through, logically organized and concise; demonstrates a good professional view of the company, some details missing or pieces which could have used more attention | Report is acceptable, issues with flow, logic, and/or concision; demonstrates an adequate professional view of the company, many pieces require more attention to detail | Report is not well written, many issues, not logical, not enough information; completely unprofessional, clearly very little time spent preparing the report | |
| Budget | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| Accounting of funds | Thorough description of budget planning and following, math is accurate, travel estimates to competition seem very reasonable | Description of budget planning and faltering, math is accurate, travel estimates to competition are reasonable | Loose description of budget planning and faltering, math has some inaccuracies, travel estimates have issues | Poor description, poor use of funds, many math errors, travel unreasonable | |
| Project Costing | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| Parts, materials, time and services | A clear distinction is made between items purchased, re-used and donated, time and services either paid or donated | A good distinction is made between items purchased, re-used and donated, time and services either paid or donated | Questions remain between items purchased, re-used and donated, time and services either paid or donated | Muddled or no distinction between items purchased, re-used and donated, time and services either paid or donated | |
| Income, donations and use of funds | Acknowledgement of all income sources, donations, includes fair market value of donations (if applicable), overall excellent use of funds | Acknowledgement of all income sources, donations, includes fair market value of donations (if applicable), good use of funds | Acknowledgement of donations, does not include fair market value of donations (if applicable), mediocre use of funds and/ or not all income sources documented clearly | No acknowledgement of donations, poor accounting of all income sources, poor use of funds, several overall issues with budget | |

| System Integration Diagram (5 points max) | | | | |
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| SID Checklist: Created using CAD; Makes a clear distinction between surface controls and the ROV; Discloses presence of fuse/circuit breaker; System level/connection diagram (nota board or component-level schematic; Uses ANSI, NEMA or IEC recognized electrical, hydraulic, and/or pneumatic symbols; Software block diagram or flow chart; If fluid power is used, includes a fluid power SID | | | | |
| | 5 points | 3 points | 1 points | 0 points |
| | All components on checklist satisfied with excellent level of care | All components on checklist satisfied | Most components on checklist included | Some components address with several critical issues |

| Design Rationale | 3 - Excellent | 2 - Very Good | 1 - Good | 0 - Poor or missing |
|---|--|--|--|---|
| Presented in clear and logical manner | Excellent description in a clear, logical manner of how vehicle was built to perform specific tasks, decisions on shape and materials used | Good description in a logical manner of how vehicle was built to perform specific tasks, decisions on shape and materials used | Description of how vehicle was built to perform specific tasks, decisions on materials used | Poor description or understanding of vehicle design |
| Demonstrates step-by-step planning and design process | Described exactly, step-by-step the planning and design process, why design decisions were made, which materials were used and why (plastic vs. metal, machining, 3D printing) | Described some design decisions and the planning process and which materials were used and why (plastic vs. metal, machining, 3D printing) | Unable to thoroughly describe design and planning process and materials decisions | Lack of any thorough explanation of the planning and design process |
| Describes problem solving | Thoroughly describes how the company brainstormed ideas to solve the mission tasks and evaluated those ideas against competing alternatives | Describes how the company brainstormed ideas to solve the mission tasks and evaluated those ideas against competing alternatives | Somewhat describes how the company brainstormed ideas to solve the mission tasks and evaluated those ideas against competing alternatives, information missing | Lacking description of any problem solving initiatives |
| Effective use of imagery | Extremely effective use of imagery, schematics, and data to communicate the design evolution | Effective use of imagery, schematics, and data to communicate the design evolution | Somewhat effective use of imagery, schematics, and data to communicate the design evolution | Ineffective use or non-use of imagery, schematics, and data to communicate the design evolution |
| Acquisition and application of | Effectively describes | Describes acquisition and | Lacking or ineffective | No description of |

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| technical skills | acquisition and application of technical skills | application of technical skills | description of acquisition and application of technical skills | acquisition and application of technical skills | |
| Flowchart | Effectively descriptive flowchart of the software flow or rationale describing why hardware only approach | Descriptive flowchart of the software flow or rationale describing why hardware only approach | Lacking or ineffective flowchart of the software flow or rationale describing why hardware only approach | No flowchart or rationale provided | |
| System Design | | | | | |
| Category | Scoring Criteria | | | | Points |
| Vehicle Systems | 3 - Excellent | 2 - Very Good | 1 - Good | 0 - Poor or missing | |
| Original vs. commercial components | The majority of the components were designed and built by the team | Many of the components were designed and built by the team | A few of the components were designed and built by the team | None of the components were designed by the team | |
| New vs. re-used | Majority of components are new this year | Some components are new this year | A few components are new this year | Same vehicle as last year | |
| Decisions for use of components | Described exactly the decision making process to re-use any components | Described decisions, not completely clearly, to re-use any components | Unable to thoroughly describe decisions to re-use any components | It was clear that the team or only one team member understood any decisions | |
| Corporate team memory | Described how the team and vehicle evolution and year's mission contributed to the design decisions or if new team, excellent description of research conducted to begin decision process | Described influences from past team members or vehicle design or if new team, good description of research conducted to begin decision process | Little corporate team memory demonstrated or if new team, little description of research conducted to begin decision process, basically just got lucky | It was clear that the team did not understand the decision process or only one team member understood the vehicle | |
| Troubleshooting Techniques | 3 - Excellent | 2 - Very Good | 1 - Good | 0 - Poor or missing | |
| | Explains troubleshooting techniques employed, describes how whole vehicle was tested | Explains troubleshooting techniques employed, describes how components of vehicle were tested | Somewhat explains troubleshooting techniques employed, inadequately describes how whole vehicle or components of vehicle were tested | Does not explain troubleshooting techniques employed and/or how whole vehicle or components of vehicle were tested | |
| Safety | 3 - Excellent | 2 - Very Good | 1 - Good | 0 - Poor or missing | |
| Safety features and philosophy | Thoroughly describes | Describes safety | Describes safety features | Does not describe | |

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| highlighted | safety philosophy and specific safety features of vehicle | philosophy and safety features of vehicle | of vehicle | safety features | |
| Safety checklist | Developed and provided a copy of a very detailed checklist and protocol, vehicle built in accordance with safety specifications | Provided a copy of checklist and protocol, vehicle built in accordance with safety specifications, some detail missing, possibly adapted from another source | A checklist provided, but missing detail, unsure if vehicle built safely without inspection | No safety information provided | |
| Challenges | 5 - Excellent | 3 - Very Good | 1 - Good | 0 – Poor or missing | |
| Describes at least one challenge faced by team; Describes method(s) used to overcome the challenge(s) | Excellent descriptions of at least one technical and one non-technical challenge and method provided | Good descriptions of at least one technical and one non-technical challenge and method provided | Adequate descriptions of technical or non-technical challenges or method provided | Poor pr missing descriptions | |
| Lessons Learned | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| Technical | Excellent description of technical lesson(s) learned or skills gained | Good description of technical lesson(s) learned or skills gained | Adequate descriptions of technical lesson(s) learned or skills gained | Poor pr missing descriptions | |
| Interpersonal | Excellent description of interpersonal lesson(s) learned or skills gained | Good description of interpersonal lesson(s) learned or skills gained | Adequate descriptions of interpersonal lesson(s) learned or skills gained | Poor pr missing descriptions | |
| Future Improvements | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| | Extremely thoughtful and logical discussion of at least one improvement | Thoughtful and logical discussion of at least one improvement | Vague discussion of at least one improvement | Poor or missing discussion of at least one improvement | |
| Reflections | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| | Thoughtful personal or professional accomplishments from competition participation presented as a team or as individual team members | Personal/professional accomplishments provided from competition presented as a team or as individual team members | A personal or professional accomplishments provided from competition presented as a team or as individual team members | Poor or missing reflections | |
| Teamwork | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| Company effort | Company clearly demonstrated the vehicle (design and | Company demonstrated the vehicle and report were | Somewhat described company effort, not mentor or working | Poor or lacking description or clear input from mentor or | |

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| | component build) and report were company efforts, not mentor or working professionals | company efforts, not mentor or working professionals | professionals | working professionals | |
| Team assignments | Company provides an excellent description of the specific team assignments to design/build the vehicle | Company provides a good description of the specific team assignments to design/build the vehicle | Vague description of the specific team assignments to design/build the vehicle | Poor or lacking description of the specific team assignments to design/build the vehicle | |
| Project Management | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| Schedule | Company developed and maintained a schedule to aid in building the vehicle | Company developed and somewhat maintained a schedule to aid in building the vehicle | Company was not able to follow their schedule do to various issues | Poor or lacking schedule, or major slips due to lack of problem solving | |
| Description of project management | Company provided an excellent description of the process and activity of planning, organizing, motivating, and controlling resources, procedures, and protocols to achieve specific goals in scientific or daily problems | Company provided a good description of the process and activity of planning, organizing, motivating, and controlling resources, procedures, and protocols to achieve specific goals in scientific or daily problems | Company provided a vague description of the organization process, controlling resources, procedures, and protocols to achieve specific goals in scientific or daily problems | Company provided a little to no description of the organization process, and/or clearly demonstrates a lack of team effort or overall project management | |
| References and Acknowledgments | 3 - Excellent | 2 - Very Good | 1 - Good | 0 – Poor or missing | |
| | Provided a properly documented list of books, journals, web sites, etc used as sources; documented contributions of companies, individuals who contributed funds, equipment, and/or technical/moral support | Provided a list of all books, journals, web sites, etc used as sources; documented contributions of companies, individuals who contributed funds, equipment, and/or technical/moral support | Provided a few books, journals, web sites, etc used as sources, not properly documented; poorly documented contributions of companies, individuals who contributed funds, equipment, and/or technical/moral support | No references provided; missing documentation of contributions | |
| Score Sub-Total (100 points max) | | | | | |

| Discretionary Points (6 points max) | | | | |
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| Originality | 3 - Excellent | 2 - Very Good | 1 - Good | Points |
| Vehicle and/or systems exhibit unique concepts or innovations | Exceptional innovation described in vehicle design, tools or other feature | Very clever innovation in vehicle design, tools or other feature | Interesting innovation in vehicle design, tools or other feature | |
| Clever materials solutions, original safety features | Exceptionally clever materials solutions or safety features, etc | Very clever materials solutions or safety features, etc | Interesting materials solutions or safety features, etc | |
| Deductions (-9 points max) | | | | |
| Deductions | - 3 Extreme | - 2 Moderate | - 1 Minor | |
| Commercial assistance | Vehicle was designed/created by a commercial company and lack of any justification | Some assistance was provided by a commercial company and some justification | Minor assistance was provided by a commercial company and with justification | |
| Interference | Significant contribution by coaches, mentors, or parents | Some contribution by coaches, mentors, or parents | Minor contribution from coaches, mentors, or parents | |
| Overuse of components | Significant overuse of commercial components without adequate justification and/or overuse of re-used components without adequate justification | Overuse of commercial components without adequate justification and/or overuse of re-used components without adequate justification | Some use of commercial components without adequate justification and/or overuse of re-used components without adequate justification | |
| TOTAL TECHNICAL REPORT SCORE | | | | |