

**2019 MATE ROV COMPETITION TECHNICAL DOCUMENTATION SCORE SHEET - RANGER AND EXPLORER**

JUDGE NAME:

COMPETITION CLASS:

TEAM #:

COMPANY/SCHOOL NAME: N/A

Category	Criteria	Scoring Requirements	Enter your scores here	Raw Score	Points Possible	Raw %	Weight	Category Score	Comments
				by category					
<b>Overall Presentation</b>				0	60	0%	20%	0.00	
	<b>Document specifications</b>								
	All 4 requirements met = 4 points 3 requirements met = 3 points 2 requirements met = 2 points 1 requirement met = 1 point	Document meets the following requirements: length no more than 25 pages, font size of at least 12 points, table of contents included, all measurements are in SI units (except things traditionally specified in other units, e.g. PVC diameter)	<input type="text"/>	0					
	Use same scale as above	Title page meets the following content requirements: company name, organization/school name and location (city, state), team members and their roles, and mentor name(s)	<input type="text"/>	0					
		Abstract provides clear, concise summary of work in 250 words or less	<input type="text"/>	0					
	<b>Use of images and data</b>								
		Photo of complete vehicle is included	<input type="text"/>	0					
		Effective use of images, diagrams, and data to communicate the design and thought process	<input type="text"/>	0					
		Photos accompanied by appropriate captions	<input type="text"/>	0					
		Includes at least one effective mechanical drawing or sketch	<input type="text"/>	0					
		Diagrams and drawings use sensible labeling of signals, dimensions and components	<input type="text"/>	0					
	<b>Understanding</b>								
		Demonstrates clear understanding of the technical and scientific concepts and their relationship to vehicle design and implementation	<input type="text"/>	0					
		Document clearly describes the vehicle design and building process	<input type="text"/>	0					
	<b>Document Design</b>								
		Thorough attention to grammar and spelling	<input type="text"/>	0					
		Document is thoughtfully prepared, with thorough attention paid to messaging strategy and aesthetic presentation	<input type="text"/>	0					
		Document presents a professional view of the company	<input type="text"/>	0					
	<b>Acknowledgements and References</b>								
		Document provides 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	<input type="text"/>	0					
		Document provides adequate acknowledgement of contributions of companies and individuals that contributed funds, equipment, and/or other support to the team	<input type="text"/>	0					

Category	Criteria	Scoring Requirements	Enter your scores here	Raw Score	Points Possible	Raw %	Weight	Category Score	Comments
<b>Teamwork</b>									
	<b>Company Effort</b>			0	20	0%	10%	0.00	
		Document clearly demonstrates that the vehicle and report were team efforts, not done by mentors or working professionals		0					
	<b>Project Management</b>								
		Team developed and maintained a schedule to aid in building the vehicle		0					
		Describes the organizational and planning processes and activities used		0					
		Describes how resources, procedures, and protocols were managed to meet mission objectives and solve day to day operational problems		0					
		Describes how specific team roles were assigned to design/build the vehicle		0					
<b>Design Rationale</b>									
	<b>Content</b>			0	44	0%	30%	0.00	
		Describes a logical, step-by-step planning and design process		0					
		Describes how design ideas were originated, evaluated, and selected		0					
		Data was used to compare and select from among alternative designs		0					
		The science or techniques behind the tasks is discussed		0					
		Provides clear description and sensible rationale for design choices related to cost, size, and weight		0					
	<b>Understanding</b>								
		Demonstrates a detailed understanding of the science/industry mission		0					
		Provides clear description and sensible rationale relating designs choices and specifications to meet mission task requirements		0					
	<b>Build vs. buy, new vs. used: Justification</b>								
		Provided justifications for build vs. buy decisions		0					
		Provided justifications for new vs. re-used decisions		0					
	<b>Understanding</b>								
		Demonstrated comprehension of engineering principles of both their built and bought components		0					
		Demonstrated comprehension of engineering principles of both their new and re-used components		0					
<b>SID</b>									
	<b>System Integration Diagrams</b>			0	12	0%	5%	0.00	
	All 4 requirements met = 4 points 3 requirements met = 3 points 2 requirements met = 2 points 1 requirement met = 1 point	SID meets requirements: made using CAD, distinguishes between surface controls and the ROV, includes fuse/circuit breaker and shows its location, and uses ANSI, NEMA or IEC recognized electrical, hydraulic, and/or pneumatic symbols		0					
		SID has appropriate level of detail: is a system level/connection diagram (not a board or component-level schematic)		0					
		An appropriate block diagram of system controls is provided: i.e. a software block diagram/flow chart, or other SID detailing fluid power or mechanical controls. If mechanical controls are used, a sound rationale is provided.		0					

Category	Criteria	Scoring Requirements	Enter your scores here	Raw Score	Points Possible	Raw %	Weight	Category Score	Comments
<b>Safety</b>				0	16	0%	10%	0.00	
	<b>Content</b>								
		Document highlights safety features and philosophy		0					
		Document describes how the vehicle is designed and built to meet safety requirements		0					
	<b>Safety procedures</b>								
		Document describes substantive operational safety protocols		0					
		Document describes checklists for construction and operation		0					
<b>Critical Analysis</b>				0	32	0%	10%	0.00	
	<b>Testing and Troubleshooting</b>								
		Describes how (complete) vehicle was tested		0					
		Describes troubleshooting strategies and techniques used		0					
		Describes use of prototyping and testing to evaluate design options		0					
	<b>Challenges</b>								
		Describes at least one significant technical challenge encountered, and the process used to resolve it		0					
		Describes at least one significant interpersonal or organizational challenge encountered, and the process used to resolve it		0					
	<b>Lessons Learned</b>								
		Describes technical lessons learned		0					
		Describes interpersonal or management lessons learned		0					
		Describes development of skills		0					
<b>Future Improvements</b>				0	4	0%	5%	0.00	
	<b>Reflection</b>								
		Provides a thoughtful and logical discussion of at least one potential improvement to design, design process, or project management		0					
<b>Accounting*</b>				0	24	0%	10%	0.00	
	<i>*See supplemental info tab for more information</i>								
	<b>Budget</b>								
		Thorough and accurate description of budget planning and following		0					
		Reasonable travel expense estimates are provided		0					
	<b>Cost accounting</b>								
		Overall accounting is thorough and accurate		0					
		A clear distinction is made between items purchased, re-used, and donated		0					
		All income sources are acknowledged and estimates of the fair market value of donations (items, services, and time) are reasonable		0					
		Accounting reflects effective use of funds		0					
				0	212	100%		0.00	<b>Base Score</b>
				<b>Raw Score</b>	<b>Max Points (cat)</b>	<b>Total % (check:100)</b>			

Category	Criteria	Scoring Requirements	Enter your scores here	Raw Score	Points Possible	Raw %	Weight	Category Score	Comments
<b>Discretionary Points</b>			<b>0-4 pts each</b>	0	12		1	0	<b>Discretionary points</b>
		Document describes exceptional design of vehicle, sensors, instruments, software, tools or other features		0					
		Team developed exceptional original software or made exceptional adaptation of software to create a unique solution		0					
		Documents describes remarkable effort to design and manufacture every component of the vehicle		0					
<b>Deductions</b>			<b>0-4 pts each</b>	0	12		1	0	<b>Deduction points</b>
		Components designed/implemented by a commercial company without adequate justification		0					
		Evidence that the work was performed by coaches, mentors, parents, or other non-team members		0					
		Significant overuse of commercial or reused components without adequate justification		0					
								0	<b>Final Score</b>
<b>Other Comments</b>									

Scoring Rubric (applies to all score items)	Outcome	Criteria	Score
	<b>Missing</b>	Not included, can't evaluate	<b>0</b>
	<b>Needs work</b>	Effort made, meets some key requirements. Understanding or treatment of key requirements needs more depth	<b>1</b>
	<b>Partially meets requirement</b>	Response demonstrates understanding and addresses most key requirements	<b>2</b>
	<b>Meets requirement</b>	Response demonstrates thorough understanding and addresses all key requirements	<b>3</b>
	<b>Exceeds requirement</b>	Response extends beyond key requirements, demonstrating exceptional depth and breadth of understanding	<b>4</b>

Discretionary Points Rubric	Degree	Points
<b>Criteria:</b> - Novelty - Depth of Understanding - Depth of Analysis - Effectiveness (functions as intended) - Quality of Implementation	<b>None</b>	<b>0</b>
	<b>Minor</b>	<b>1</b>
	<b>Fair</b>	<b>2</b>
	<b>Good</b>	<b>3</b>
	<b>Extraordinary</b>	<b>4</b>

Deductions Rubric	Degree	Deduction
<b>Criteria:</b> - Extent to which team relied on outside help, existing work and/or purchased components and services	<b>None</b>	<b>0</b>
	<b>Minor</b>	<b>1</b>
	<b>Fair</b>	<b>2</b>
	<b>Medium</b>	<b>3</b>
	<b>Extreme</b>	<b>4</b>



# Technical Report Rubric Supplemental Ir

---

## **PHOTOGRAPH OF YOUR COMPLETED ROV**

In your technical documentation you must include at least one photo(s) of your completed, assembled vehicle, in addition to any photos of individual components. You are permitted to make modifications that may change the look of your vehicle between the time you submit your report and the competition.

**NOTE:** Reports will not be re-evaluated and rescored for any changes to your vehicle from the time that you submit your documentation and the competition.

## **SID**

See the Design and Building Specifications section of the competition manual for guidance on creating your system interconnection diagram (SID).

## **ACCOUNTING**

### **Budget**

At the beginning of the project, companies should establish a budget.

A budget is different than a project costing sheet (see the next bullet) in that it is a projection of the cost of the project.

Companies should create categories and realistically estimate what they think that they will spend in each.

If well-thought out, the project costing will align with the budget (i.e., the amount budgeted for a certain category will be the actual amount spent).

The budget can be included as an appendix.

Budgets typically don't provide estimates for every part, either just the overall categories or the categories and larger purchases.

How the budget is split up will be different for each company, though it is suggested that the company goes further than just a budget of parts and travel (for example, break it up into the overall components, chassis, electrical, travel, etc.)

Including items being re-used in the budget can be helpful to figure out how much the team estimates it will need to raise funds for.

Example Budget:

Budget				Reporting period	
<b>School Name:</b>		Zande High School		From: 12/1/2014	
<b>Instructor/Sponsor:</b>		Jill Zande		To: 5/28/2014	
<b>Income</b> <i>Income at start of project (if any)</i>					
<b>Source</b>				<b>Amount</b>	
Zande High School Grant				\$	1,000.00
<b>Expenses</b>					
<b>Category</b>	<b>Type*</b>	<b>Description/Examples</b>	<b>Projected Cost</b>	<b>Budgeted Value</b>	
Hardware	Purchased	PVC pipe, tees	\$ 2,000.00	\$ 2,000.00	
Electronics	Purchased	Control boards, wire	\$ 500.00	\$ 500.00	
	Re-used	Logitech Extreme 3D Pro	\$ 35.00	\$ -	
	Donation	2 SeaBotix Thrusters	\$ 2,600.00	\$ -	
Sensors	Purchased	Lights Camera Action SS-AquaCam	\$ 1,000.00	\$ 1,000.00	
Travel	Purchased	1 round-trip airfare to St. John's	\$ 1,500.00	\$ 1,500.00	
General	Purchased	Marketing material, transportation packaging	\$ 150.00	\$ 150.00	
				\$ -	
				\$ -	
				\$ -	
				\$ -	
				\$ -	
				\$ -	
				\$ -	
<b>*Items must fall into one of the following:</b>					
Purchase - defined as items that will be purchased new or services paid for.				Total Income: \$ 1,000.00	
Re-use - defined as items that were purchased in previous years. Amount MUST be listed as the current market value.				Total Expenses: \$ 7,785.00	
Donation - defined as equipment, materials, and time that were contributed to your company.				Total Expenses-Re-use/Donations: \$ 5,150.00	
				Total Fundraising Needed: \$ (4,150.00)	

**Project costing**

Project costing is an accounting of your income, donations, and expenditures.

Items must be listed as one of the following: purchased, re-used, parts donated, or cash donated.

For re-used or donated items, report the item's current market value and note the source or organization that made the donation.

Example Project Costing:

PROJECT COSTING							Reporting period	
<b>School Name:</b>				Zande High School			From: 12/1/2014	
<b>Instructor/Sponsor:</b>				Jill Zande			To: 5/28/2014	
Funds								
Date	Type*	Category	Expense	Description	Sources/Notes	Amount	Running Balance	
12/1/2014	Purchased	Hardware	PVC	PVC pipe, tees	Used for vehicle frame	\$ (200.00)	\$ (200.00)	
12/5/2014	Re-used	Electronics	Joystick	Logitech Extreme 3D Pro	Used for control system	\$ (35.00)	\$ (235.00)	
1/10/2015	Parts donated	Sensors	Camera	Lights Camera Action SS-AquaCam	Won at a previous competition	\$ (600.00)	\$ (835.00)	
1/31/2015	Purchased	Travel	Airfare	1 round-trip airfare to St. John's	Chaperone's ticket	\$ (900.00)	\$ (1,735.00)	
2/2/2015	Cash donated	General		Funds donated by local Rotary Club	Used for general vehicle construction	\$ 500.00	\$ (1,235.00)	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
							\$ -	
<b>*Items must fall into one of the following:</b>								
Purchased - defined as items that are purchased new or services paid for.						Total Raised	\$ 500.00	
Re-used - defined as items that were purchased in previous years. Amount MUST be listed as the current market value.						Total Spent	\$ (1,735.00)	
Parts donated - defined as equipment, materials, and time that were contributed to your company. Do NOT include items given to your school for general use.						Final Balance	\$ (1,235.00)	
Cash donated - defined as funds contributed to your company. Do NOT include funds given to your school for general use.								