2019 National Engineering Design Challenge Judges Training: Poster & Symposium

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## Thank You!

Thank you for volunteering to score posters!

We created this slide deck to provide some information about scoring. Thanks for taking the time to review it!



## Agenda

- What is MESA?
- Things to keep in mind
- About the competition
- Rubric scale
- Rubric parts
- Logistics of scoring

Pro Tip: Have a copy of the rubric in front of you while we go over it

Poster Rubric Poster Overview Entire Competition Rules

## What is MESA USA?

- Mathematics Engineering
  Science Achievement
- Classroom and After
  School programs
- Human Centered Design & STEM

- 10 States
- Underrepresented in STEM
- Over 49,000 K-12 and college students are served annually

## Why Training?

- 1. Inter-rater reliability
  - The degree of agreement among raters.
  - Common understanding of expectation for each part of rubric
- 2. Consistency among states
- 3. Context of the Pitch within the scope of the entire National Competition
- 4. Familiarity with specifications and the rubric
- 5. Provide information about MESA students. Set expectations

## About the Competition

- Teams of 3-4 students
- Must be designed around the needs of a client.
- An Arduino microcontroller must be part of the solution

- Students will
  - Write a Product Report
  - Give a Product Pitch
  - Give a Technical
    - Presentation and have an Interview
  - Create a Poster

## **Competition Components**

- Technical Presentation & Interview-100 points
- Poster & Symposium 50 points
  - Project Report 100 points
  - Prototype Pitch 100 points
- Total: 350 points

## The Poster

#### **Objective**

Provide an overview of the project, highlighting key points of the design process including relevant data, presenting the resulting prototype, and share conclusions and recommendations for further development.

## **Contents: Poster**

- a. Problem Statement
- b. Objective
- c. Prototype
- d. Code/PsuedoCode
- e. Trade Table
- f. Data
- g. Results/Conclusions

- h. Readability
- i. Title/Tagline

## Scale for all items



(5)-Exceptional: Exceeds all aspects of the standard when possible.

(4)-Excellent: Meets all aspects of the standard very effectively.

(3)-Good: Meets all aspects of the standard effectively but no more;

(2)-Fair: Almost meets the standard. May be inaccurate or unclear.

(1)-Poor: Attempts to meet the standard but provides information which is irrelevant or unnecessary.

(0)-Not present: No attempt appears to have been made to meet this standard.

Pro Tip: Judges may not award half points. Whole points only!

### Poster

			LEVEI	OF MASTERY			
Poster Rubric	Exceptional	Excellent	Met Criteria	Fair	Poor	Not Present	Notes
	(5 points):	(4 points)	(3 points)	(2 points)	(1 point)	(0 points)	
<b>Problem Statement:</b> The team adequately defines the problem being addressed by							
the team in 50 or fewer words							
<b>Objective:</b> An adequate describes how their project address the problem and may							
include information about the variables addressed, desired attributes, and/or design							
choices made in 50 words or less							
<b>Prototype:</b> A visual graphic of the prototype is present and highlights innovations				15	ed		
and/or important components of the design							
Code/PsuedoCode: Includes an adequate description or example of the processes		· · · · · ·					
that run the Arduino and the prototype that can be understood by most observers.							
Trade Table: Provides an adequate comparison between the prototype and current							
products on the market. Includes at least two points of comparison							
Data: Provides a graph or table that presents relevant information from the results of		8		14	22		
testing to increase the observers understanding of the project.							
Results/Conclusions: Includes an adequate summary of design process including							
final results and discussion about the next steps of the project to improve design or							
bring it to market							
Engineering Design Process: A graphic adequately illustrates the iterative process							
the team went through to accomplish their objective.	7	s					
<b>Readability:</b> The poster is easy to read and has a balanced amount of graphics vs.			Graphics:	Graphics: Some	Graphics: A few	-	
text			Text: Concise	Text: About hair	half.	Mostly text	
Title/Tagline: Includes a title and takeaway line for the poster.	19 		Creative &	Sufficiently	Simple		
	*		Memorable	Explanatory	Summarization	None	
Size: No more than 36" x 48" and no less 24" x 36"	-				Yes	No	
School Name included	2				Yes	No	
Team Member's Names included					Yes	No	
Official MESA logo included					Yes	No	
Column Totals:					1d		

## **Problem Statement**

The team defines the problem that they are trying to solve with their device.

This would earn a 5. It is concise, easy to read, and lets the audience know what the poster is about quickly.

### The Mission

Natural disaster victims are stranded and are in need of humanitarian aid

Unmanned UAVs are needed to stream photos of buildings in order to facilitate a safe rescue operation

# Objective

The team provides a succinct overview of their prototype and its capabilities. The information provided allows the reader to understand the purpose of the prototype, who it was designed for, and what is it designed to do.

Objective: Design fire fighting water tank for the S-70C FireHawk
 Able to quickly and efficiently deliver water to fires
 Have a simple and reliable door opening system
 Have specific drop patterns that is able to be controlled by pilot
 Increase direct flow of water when dropped

This decribes the variables addressed, design choices, and desired attributes. It is 44 words in length. This would earn a 5.

## Prototype

This is where a picture/technical drawing of the prototype would occur. It would highlight any innovative components and/or important design choices.

This is a good picture of the prototype. No design features or components are highlighted and no important design choices are highlighted. This would earn a 2.



## Code/PsuedoCode

The team will provide a copy of their Arduino code

or PsuedoCode for the Arduino.

This provides a good overview of the code for the Arduino. It shows the flow of the code with clear designations for the loops. This would earn a 5.



## Trade Table

The team had provided a comparison between their device and similar devices currently on the market.

Our Device	Device A	Device B
\$30	\$45	\$40
3.2 lb	5.5 lb	4.9 lb
9 V	4 AA	6 AAA

The team has provided a table. There are no labels, names of other devices, or context. This would receive a 2.

### Data

This section is where students will present their data from tests with analysis.

The figures on the right are data and code from a prosthetic arm challenge. The data shows the results from one of the challenges and the code used in their arm. This would score a 3. To score a 5, the team would need more testing data as This chart is for Trial 2 but does not show Trial 1.

DATA Trial 2					
1	.755	Tier 2	10		
2	.8s	Tier 1	5		
3	.55	Tier 1	5		
4	.465	Tier 1	5		
5	.55	Out of Bounds	0		
Total points:25					

## Results/Conclusions

This section is where students will present their results and conclusions on their project.

This summarizes the testing of the device and the results of their project. It does not talk about next steps and what the team will do to improve it or bring it to market. This would Score a 2.

#### Conclusion

System User Interface serves as a proof of concept design that can be customized to fit the needs of other mission types

- The UAVs served as a testbed for the software rather than an industry quality platform
- Our system has met all Critical Performance Requirements proposed by our Sponsors

## **Engineering Design Process**

In this section, teams are to describe the process they went

through and provide a visual example of it.

This is a visual example of the Engineering Design Process. It does not describe what the team did, it is generic. This would score a 1.



## Readability

We want the posters to be easily read. Here is where that is taken into account.

- **3** The poster is about half graphics and all text is concise. No paragraphs
- **2** The poster is about half text that has a paragraph with some graphics
- **1** The poster is more than half text.
- 0 The poster is mostly text

# Title/Tagline

The team should have a title for their project and a tagline at the bottom to help readers remember their product.

- **3** The title and tagline are creative and easy to remember
- **2** The title and tagline sufficiently explain the project
- **1** The title and tagline are summaries of project
- 0 No title and tagline

### Size

- The poster is between 24" by 36" and 36" by 48"
- At MESA Nationals, all posters must be printed. No trifold are allows

- 1 Yes, it is between these sizes
- 0 No, it is not between these sizes

## School Name, Team Members, Logo

The posters need to have the school name, names of all the team members, and the official MESA Logo. Each one is required and worth one point.

- 1 Yes, it is included
- 0 No, it is not included

## Questions?

If you have any questions while scoring, please look back at these slides or reach out to your point of contact.

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Thank you for serving as a judge for the National Engineering Design Competition. We will see you at MESA Day!

## Thank you!