

## NASA HUMAN EXPLORATION ROVER COMPETITION

## **Background Presentation**

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NASA Human Exploration Rover Challenge revolves around NASA's plans to explore planets, moons, and asteroids across the solar system [1].

Our task is to:

- Design
- Construct
- Test

A human-powered rover capable of traversing various, demanding environments.

Project sponsored by: SAE, NASA



## Benchmarking

### •Background: No pre-existing NAU designs or builds





Design 1: Quadrature Cycle

Design 2: NAU HPV





#### Design 3: Recumbent Cycle

#### Design 2: Tandem Cycle

NASA HER - 09/29/2014 - 4

**Greg Dowske** 

## Design Requirements

### •Sponsor: NASA Human Exploration Rover Challenge

### Competition Requirements

- Human Propelled (50)
- Needs to be designed and built by the NAU team (40)
- Collapsible (30)
- Seat two drivers (30)
- No air inflated wheels (30)
- Carried by two individuals (20)
- Wheels must have debris mitigation devices (10)

- Wheels of adequate diameter to traverse obstacles and crevasses (10)
- Must be able to climb inclines (10)
- Maintain traction throughout various surfaces(10)
- A narrow design (10)



## Customer Requirements

# Customer: Dr. John TesterRequirements

- Safety seat restraints (30)
- Small turning radius (25)
- High volumetric storage (15)
- No sharp protrusions (10)

- Rover painted in school colors (10)
- Built with campus equipment and resources (10)



## Schedule

	0	Task Mode ▼	Task Name 👻	- Duration -	- Start -	Finish 🗸	Predecessors	•14 ▼ 8 15	Jul '14 22 29 6	Aug '14   3   10   17   2	Sep '14 24   31   7		Oct '14 28 5 12		Nov'14 2 9 16	Dec '		Jan '15 28   4   1	Feb '15 1 8	/lar '15 1   8   15	pr 15 5 12
	_	*	Team Chater	7 days	Fri 9/5/14	Mon 9/15/14															
		*?																			
		*?	Report																		
		*	Report: Background	13 days	Mon 9/15/14	Wed 10/1/14							<b></b>								
		*	Report: Preliminary	30 days	Thu 10/2/14	Wed 11/12/14	4								<b></b>						
		*	Report: Final	22 days	Thu 11/13/14	Fri 12/12/14	5								· · · · ·						
Ð	;	*?	▲ Staff Meetings																		
		*	Staff Meetings 1	1 day	Mon 9/22/14	Mon 9/22/14						-									
		*	Staff Meetings 2	1 day	Thu 10/9/14	Thu 10/9/14	8						····•								
)		*	Staff Meetings 3	1 day		Mon 11/17/14									1						
1 0	;	*?	Presentations																		
2		*	Presentations 1: Background & Designs	1 day	Mon 9/29/14	Mon 9/29/14															
3		*	Presentations 2: Something Cool	1 day	Mon 10/27/14	Mon 10/27/14	12							· · · •			······				
4		*		1 day	Mon 12/15/14	Mon 12/15/14	13										1				
5		*?	Engineering																		
5 📖			Research	30 days	Mon 9/8/14	Fri 10/17/14															
7		*	Bike Research Purchases	55 days	Mon 9/29/14	Fri 12/12/14															
3 📖			Design	55 days	Mon 9/29/14	Fri 12/12/14															
9		*	Purchase Materials	37 days	Sat 11/15/14	Sun 1/4/15															
)		*	Establish and Pay for Transportation	5 days	Mon 1/12/15	Fri 1/16/15															
1 📖			Build	45 days	Mon 1/5/15	Fri 3/6/15	18												 	 <b>.</b>	
2			Test	14 days	Mon 3/9/15	Thu 3/26/15	21														
3 🔳			Maintanence	12 days?	Fri 3/27/15	Mon 4/13/15	22														
4																					
5		*	Competition	3 days	Thu 4/16/15	Mon 4/20/15	23														

### •Schedule: On Track



### **Available Funding:**

- <u>SAE:</u> Possibly \$2000 Expected \$1500
- <u>NASA:</u> No Funding
- <u>ASNAU:</u> Possible Travel Expenses

### **Anticipated Expense:**

- Competition Lodging = \$500
- Travel & Shipping = \$6,000
- Fabrication =  $0 \Leftrightarrow 500$
- Parts & Prototyping = \$1,200
- Total Anticipated Expense =  $$7,700 \Leftrightarrow $8,200$

### **Expense to Date:**

• SAE Membership - 7 members x \$25 = \$175