

Project Management Assignment

Reflection

Successes - The following list is filled with a few items that the team members believe we did well in the previous semester.

- Worked well with communication between members even with the limited number of members
- Managed to always complete tasks given within a timely manner and kept on schedule for the most part
- Any time there was a difference of opinion in the group it was worked out professionally and all members were heard out
- Team was able to work together through the difficult parts of the project and help each other fill out the team roles if anyone was struggling

Improvements - This list details where the team could improve during this semester and throughout the end of this project.

- Team could work on learning to work ahead in the project so not everything is left up to the deadline
- Need to work on communicating with one another when new ideas are had for the project
- If there is a miscommunication it needs to be resolved quickly
- Now that everyone understands their roles and responsibilities it should be easier for everyone to work into their roles better

Action Items -

- Team will work together on time management and hold each other accountable in order to make sure that the design project goes smoothly and we succeed
- Team will share all ideas that they have for the design project in one of the many group chats that we have in order to ensure that everyone is heard and everyone is caught up with ideas for design
- Team will work together to make sure that everything is explained as clearly as possible and all of the team members are on the same page before we finalize anything in our design
- Each team member will work on making sure that their role within the group is being fulfilled

and that the other members have to do as little slack pick up as possible

Remaining Design Efforts -

- Team needs to work on finalizing the list of parts to be purchased with professor
- Need to redesign the nozzle to be 3D printed in a modular fashion in order to cut costs and allow team to print the nozzle in the makerlab
- Need to begin ordering parts for design

Gantt Chart

In order to stay up to date with the new semester, our team has created an updated Gantt chart as shown below in Figure 1. This Gantt chart will guide our team on breaking down major deliverables into more manageable tasks that will enable us to finish upcoming deliverables in a timely manner.

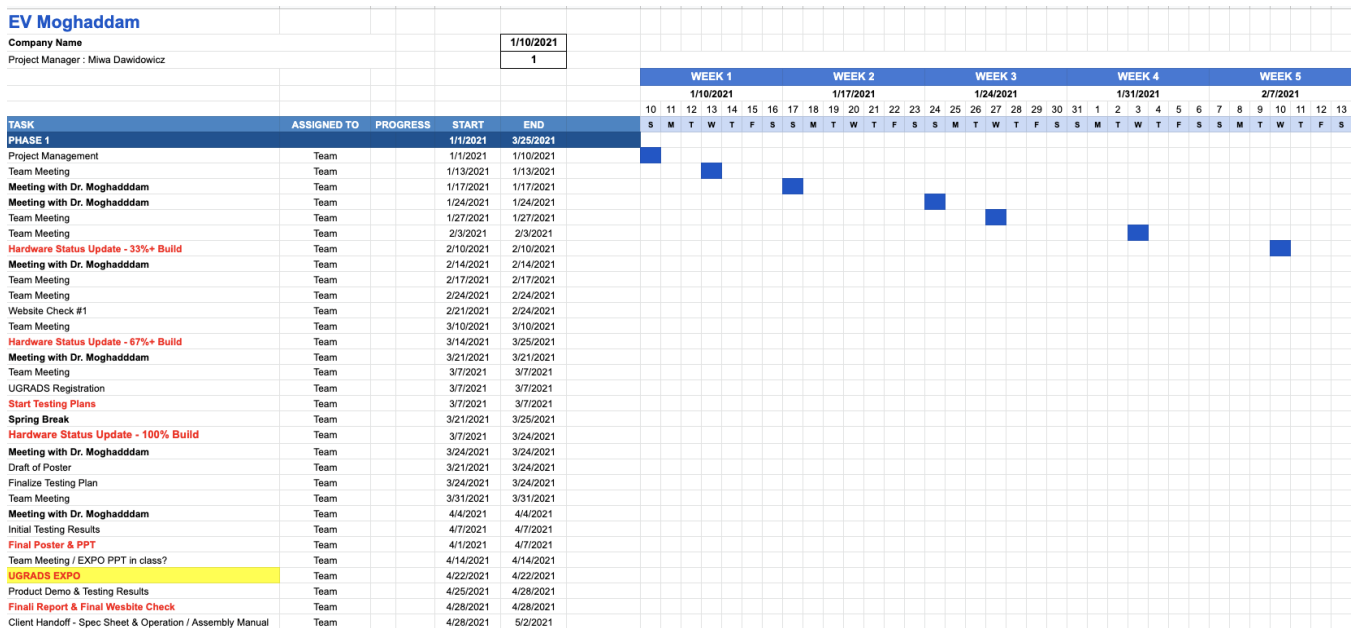


Figure 1: Spring 2022 Gantt Chart

Major milestones that will need to be completed prior to first Hardware Status Update:

- Meeting with Dr. Moghaddam to discuss components purchased and the finalized first draft of



the schematic.

- Meeting up with the team to get started on the hardware build. Plan to reach 33+% of the build done prior to deliverable due date.
- Finalizing schematic on how to wire up each component.
- Meeting with Dr. Moghaddam to discuss components purchased need to be purchased and ask how the client would like the components mounted onto the vehicle.
- Meeting up with the team to discuss what will be purchased and initializing a schematic on how to wire up each component.
- Creating a bill of materials in order to find out what will need to be purchased.

Purchasing Plan

The updated Bill of Materials (BOM) shows what parts need to be made or bought. There are 12 parts that the team has agreed upon, but as the semester progresses more parts may need to be purchased. As of right now, the team is currently working on purchasing and designing their parts. The team will need to meet with Dr. Moghaddam to overlook the BOM and verify if all parts are correct for our design.

Bill of Materials (Purchased Items)

EV Moghaddam												
Part #	Part Name	Qty	Description	Functions	Make/Buy	Raw Materials Needed	Dimensions	Primary Vendor	Manufacturer/Location	Estimated Time of Arrival	Link to Cost estimate	Cost
1	Thermoelectric Generator	1	10PCS TEC1-12706, 12V, 5.8A	Converts temperature difference to electricity	Buy	Part will be ordered	40mm x 40mm x 3.8mm	Amazon	GeeBat	4 days to ship from Amazon	https://www.amazon.com/GeeBat-TEC1-12706-Thermoelectric-HeatSink-Cooling/dp/B011T8SAZG	\$29.00
2	Monocrystalline Solar Film	2	Flexible Solar Panel, 100W, 12V	Converts solar energy to electricity	Buy	Part will be ordered	42.3in x 20.4in x 0.1in	Amazon	TP-Solar	6 days to ship from Amazon	Amazon.com : Toppolar Flexible Solar Panel 100W 24V/12V Monocrystalline Bendable - 100 Watt 12Volt Semi-Flexible Mono Solar Panels Charger Off-Grid for RV Boat Cabin Van Car Uneven Surfaces : Patio, Lawn & Garden	\$140.00
3	DC Generator	2	Magnetic DC Motor, 12V/24V, 2-3.7A	Converts Kinetic energy into electricity	Buy	Part will be ordered	51mm x 70mm, shaft diameter 8mm	Amazon	WMYCONGCONG	6 days to ship from Amazon	https://www.amazon.com/Flexible-Monocrystalline-Bendable-Semi-Flexible-Off-Grid/dp/B077DK1K9F/ref=pf_rd_ipo_17pd_rd_i=B077DK1K9F&th=1	\$60.00
6	Vehicle Headlight	1	2x Halogen lightbulbs, 60/55W, 12V	Harvesting system will power this component	Buy	N/A	N/A	Walmart	Walmart	Pickup @ Walmart	https://www.walmart.com/ip/2x-H4-9003-HB2-Halogen-60-55W-12V-Dual-Beam-Low-High-Headlight-Replacement-Bulbs/510952534	\$8.00
7	Charge Controller	1	Charge controller for Solar Film, 12V, 30A	Protects battery from overcharging and discharging	Buy	Part will be ordered	6.45in x 4.31in x 1.76in	Amazon	Renogy	7 days to ship from Amazon	https://www.amazon.com/Renogy-Charge-Controller-Compatible-batteries/dp/B07G1PL1B9/ref=asc_df_B07G1PL1B9?tag=hiphopinpa-Z0&linkCode=df0&hvadid=808828757984438&hvnetw=c&hvqmt=e&hvbmt=be&hvdv=c&hylocin=t&hvcophys=h&hvtarget=pla:4584482455205921&th=1	\$31.59
8	Charge Controller	2	Charge controller for TEG and generators, 12V, 30A	Protects battery from overcharging and discharging	Buy	Part will be ordered	5.23in x 2.75in x 1.02in	Amazon	Thelevel	4 days to ship from Amazon	https://www.amazon.com/Thelevel-Controller-Intelligent-Multi-Function-Adjustable/dp/B089LDZ6LN/ref=pf_rd_ipo_37pd_rd_i=B089LDZ6LN&psc=1	\$28.00
9	Battery	1	Duralast 24 Deep Cycle Battery, 10ft, Female to Male Connector, Red & Black cables included, 12AWG	Stores harvested energy	Buy	Part will be ordered	N/A	AutoZone	Duralast	Pickup @ AutoZone	https://www.autozone.com/miscellaneous-non-automotive/marine-battery/p/duralast-24mf-df-group-24-deep-cycle-marine-and-rc-battery/298374_0_0	\$95.00
10	Solar Cable	1	Extension Cable, 10ft, Female to Male Connector, Red & Black cables included, 12AWG	extends solar film's cable length	Buy	Part will be ordered	10ft in length	Amazon	BougeRV	14 days to ship from Amazon	https://www.amazon.com/BougeRV-Extension-Female-Connector-Adaptor/dp/B0753Z1L0B?th=1	\$17.00
11	Electrical Tape	1	Scotch Electrical Tape	protect exposed wires	Buy	N/A	.75in x 52ft	Walmart	Scotch	Pickup @ Walmart	https://www.walmart.com/ip/Scotch-Super-33-Vinyl-Electrical-Tape-3-4-in-x-52-ft-Black-1-Roll/39138902	\$4.32
12	Electrical Wires	1	12 Gauge Speaker Wire, 12AWG	extend wires for the TEG and generators	Buy	Part will be ordered	100ft length	Amazon	GearIT	7 days to ship from Amazon	https://www.amazon.com/Speaker-GearIT-Meters-Theater-Speakers/dp/B082Q1GKf4?th=1	\$28.00
Total Cost Estimate:											\$520.91	

Table 1: BOM Purchased Items



Figure 2: Thermoelectric Generators



Figure 3: Monocrystalline Solar Film



Figure 4: DC Generator



Figure 5: Vehicle Headlights



Figure 6: Charge Controller for Solar Film

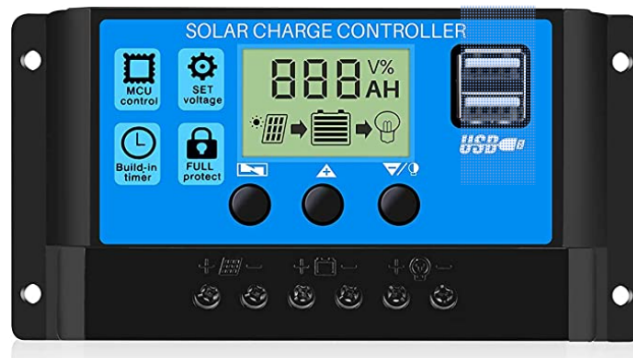


Figure 7: Charge Controller for Generator and TEGs



Figure 8: Deep Cycle Battery



Figure 10: Extensions Cables for Solar Film



Figure 11: Electric Tape



Figure 12: Wires for TEG

- All of the items above have not been purchased yet.
- The team plans to start purchasing items within the next week.
- Once items have been received, the team will test each item and make sure all components function properly.
- The team will be planning how to test each component while waiting for its arrival.

Manufacturing Plan

The only two parts of our system that is going to be manufactured is going to be the nozzle and

the blade for the generator. The nozzle will be designed by the team in modular pieces and printed in the makerlab, then assembled by the team members. This will allow for the team to cut costs and make sure that we are getting the desired outcome for the design that we are intending. The team was not able to find a blade that could match the shaft diameter of the generator. So, the team will be designing and using a 3D printer to manufacture the blades.

Bill of Materials (Manufactured Items)											
TEAM			EV Moghaddam								
Part #	Part Name	Qty	Description	Functions	Make/Buy	Raw Materials Needed	Dimensions	Primary Vendor	Manufacturer/Location	Estimated Time of Arrival	Cost
1	Generator Fans	2	Fan blades for generator	Uses blades to turn generator	Make	PLA (Polylactic Acid)	7 in diameter	EV Moghaddam Team	EV Moghaddam / Team meeting location	N/A	\$0
2	Nozzle	1	3D Printed	Holds DC Generator mounts and controls flow rate	Make	PLA (Polylactic Acid)	20in x 20in x 10in	NAU MakerLab	NAU MakerLab	10 days to print from NAU MakerLab	\$ 80.00
3	3D printer	1	Ender Pro 3D printer	Used to printer project parts	N/A	PLA (Polylactic Acid)	N/A	N/A	Team location	Arrived	\$0
										Total Cost Estimate	\$80.00

Table 2: BOM Manufactured Items

- The team will be working on CAD models this week to start printing with the items above.
- For the blade, the team will design multiple blades and test them. They will choose the best blade that will work with the nozzle.
- The nozzle will be printed in the NAU MakerLab and it will be broken down into multiple parts to fit the dimensions of the 3D printer.