

NAU ME486C

To: Dr. David Willy and Travis Harrison

From: Boeing Heat Exchanger

Date: 1/19/24

Re: Project Management for ME486C

Reflection

Successes

Overall, the team has attained success in project management for the first semester of the project. The following is the list of beneficial team practices that contributed to project success.

- i. Timely meetings: Conducted regular and productive team meetings, ensuring everyone was on the same page and addressing any concerns promptly.
- ii. Milestone Achievements: Met project milestones, showcasing effective project planning and execution.
- iii. Clear Communication: Maintained clear and open communication within the team and with Boeing staff, fostering collaboration and understanding.

Room for improvements

Although the team was successful in the first semester and had many good areas from a project management standpoint there are several areas for improvement seen below.

- i. Task Prioritization: improve the process of prioritizing tasks to ensure that critical aspects of the project are addressed first.
 1. Action Item: Implement a standardized task prioritization framework, considering urgency, dependencies, and critical path analysis.
 2. How it helps: Clarifies the order of items of focus.
 3. Responsible Team Member: Dennis Decker
- ii. Task accuracy and Quality: Strengthen the focus on accurately completing tasks the first time to avoid the need for rework.
 1. Action Item: Develop a checklist or quality assurance process for tasks to ensure accuracy and completeness before submission.
 2. How it helps: Improves time efficiency and quality of work.
 3. Responsible Team Member: Uriah Whitaker

- iii. Documentation: Enhance documentation practices to ensure that all project-related information is accurately recorded and easily accessible.
 - 1. Action Item: Establish a standardized documentation process, including version control and regular updates, to ensure accurate and accessible project records.
 - 2. How it helps: Improves teamwork by ensuring all work is the most up to date version.
 - 3. Responsible Team Member: Chris Mason
- iv. Timeline adherence: Strengthen adherences to project timelines and deadlines to prevent delays in project milestones.
 - 1. Action Item: Conduct a comprehensive review of the project timeline, identifying potential bottlenecks and adjusting deadlines as necessary.
 - 2. How it helps: Large step in the way of combating time crunches
 - 3. Responsible Team Member: Lorenz Vios

Remaining Design Efforts

Finalize Prototype

- i. Complete the detailed design of the prototype to account for new assembly method, addressing undecided features or requirements.
- ii. Conduct additional prototype iterations if necessary to achieve optimal functionality.
- iii. Develop a comprehensive testing plan covering all aspects of the prototype (e.g. pressure testing, head loss confirmations, temperature reading validation, etc.).
- iv. Perform rigorous testing to validate the functionality, reliability, and performance against predefined criteria prior to demonstrations.
- v. Address any identified issues through iterative testing and refinements.

Integration of components

- i. The manufacturing plan will consist of fabricating the end caps in two parts through the NAU machine shop.
 - 1. Manufacturing will start after team members are properly trained in the machine shop.
- ii. Integrate data collection devices into the overall system.

Optimize for Manufacturing

- i. Finalize CAD
 - 1. Complete the final CAD models, incorporating design changes.
 - 2. Ensure that CAD models are optimized for manufacturing processes considering materials, tolerances, and assembly requirement

Purchasing Plan

Part #	Part Description	Source	Manufacturer	Lead Time (Days)	Part Status	Cost
H-6604	Black Wire Utility Cart - 36 x 24 x 40"	Purchased	Uline	9	TBD	\$165.00
N/A	4.5 in 6061-T6511 Aluminum End Cap	Purchased	Uriah Whitaker	18	Received	\$131.42
B07TLJNSV8	100 PSI Pressure Transducer Sender Sensor with Connector 1/8" NPT Thread	Purchased	Madezz	10	Received	\$13.74
GR-201P2	2 x G1/2 inch flowmeter	Purchased	GRECIA	10	Received	\$15.79
B09ZLBT11R	6 PCS Brass Hose Barb Fittings, 1/2" Barb to 1/2" NPT Male Threaded End Barbed Hose Fittings	Purchased	SUNGATOR	6	Received	\$15.99
B0932JKLLX	Direct Current 3-5v Max6675 Themocouple Module and K Type Thermocouple	Purchased	Weewooday	6	Received	\$16.99
B095ST97PZ	Water Pressure Diaphragm Pump Industrial 115V, Self Priming Pump 4 Gpm 45 Psi	Purchased	Dreyoo	6	Received	\$68.99
B099M8KZ87	Coolerguys 3A 100-240v AC to 12v DC Three (3) Fan Power Supply	Purchased	Coolerguys	6	Received	\$15.95
B08FJFJ53Y	Water Cooling Radiator, 12 Pipe Aluminum Heat Exchanger Radiator	Purchased	Clyxgs	6	Received	\$22.99
B08SNXDMJ5	1/2 Inch ID PVC Clear Vinyl Tubing, 10 Foot Length	Purchased	EZ-FLO	6	Received	\$6.88
N/A	Acrylic Tube 4" (100mm) OD x 2mm Wall Thickness Clear Plastic Pipe Tube 15.5" Length	Purchased	FengWu	6	Received	\$19.99
B09YSJQWRG	DC Power Supply Variable, 30V 10A Adjustable Switching Regulated DC Bench Power Supply with High Precision 4-Digits LED Display	Purchased	Jesverty	6	Received	\$49.49
B093PWRJS96620005-10PK	PCB Double-Layer Wiring Power Distribution Board Kit, 2 x 12 Position Power Distribution Module 2 Inputs 2 x 13 Outputs for DC AC 24V 10A	Purchased	WayinTop	7	Received	\$13.99
	Thrifco 6620005 1/2 Inch X 3 Inch SCH 80 PVC Nipple 10 Per Pack	Purchased	Thrifco Plumbing	6	Received	\$10.38
B07F7Z2YCM31231302	Delta 120mm High CFM Fan AFB1212SHE High Speed 12V DC 120mm 3Pin PC Computer Fan with Metal Finger Guard Grill	Purchased	Delta	27	Received	\$45.12
	3/8in. ID Copper Coil - 5 ft.	Purchased	Streamline	4	Received	\$17.02
3000006575	Coleman 316 Series Insulated Portable Cooler with Heavy Duty Handles, Leak-Proof Outdoor Hard Cooler	Purchased	Coleman	4	Pending	\$58.97

Figure 2: Bill of Materials

Figure 2 shows our updated bill of materials. Most of the teams purchasing was completed last semester due to our second prototype consisting of the same parts. The team has purchased the cooler and are awaiting delivery and are discussing the purchase of a utility cart which will transport the team's final demonstrator.

Manufacturing Plan

Part #	Part Description	Source	Manufacturer	Lead Time (Days)	Part Status	Cost
N/A	End cap coolant in/out Inner	Manufactured	Uriah Whitaker	7	Pending	0
N/A	End cap coolant in/out Outer	Manufactured	Uriah Whitaker	7	Pending	0
N/A	End cap coolant resivor Inner	Manufactured	Uriah Whitaker	7	Pending	0
N/A	End cap coolant resivor Outer	Manufactured	Uriah Whitaker	7	Pending	0
Custom	Acrylic PMMA Clear Tube	Manufactured	BOEDEKER	TBD	TBD	TBD

Figure 3: Manufacturing Plan

The manufacturing plan will consist of fabricating the aluminum end caps in two parts through the NAU machine shop. Manufacturing will start after team members are properly trained in the machine shop. Machine shop plans on starting the advanced training around week 3 of the semester. The team is also considering getting a new heat exchanger shell custom made by a manufacturer. More details regarding cost and lead time will be determined once Boedeker Plastics provides a quote.