

Team: P18347 Engineer: Christina Pensabene
Entering Phase: IV, Detailed Design

What do I plan on doing to ensure that Team P18347 has a successful Phase (IV) review?

1. Work with team to determine what needs to be ordered before the end of phase 4/beginning of MSD II (2 hrs)
2. Make a more detailed test plan and identify owners for each test that will be carried out (3 hrs, 11/27)
3. Work with MECE team members to develop CAD drawings (4-6 hrs, 11/29)
4. Ensure that all physiological questions outlined from phase 3 are answered
5. Make sure EDGE page is updated
6. Work with team to create a progress report before break to send to our customer

You will answer these three questions when you submit at the end of Phase (III).

2. What did I actually do?
 - a. Answered physiological questions such as breaths/minute, tidal volume, skin temperature, etc. to help answer ventilation/heat transfer questions
 - b. Worked with MECE team members on ventilation questions
 - c. Talked with customer about how to ventilate the pod/where to place a ventilation system
 - d. Worked with Emily to create a preliminary BOM
 - e. Created a preliminary test plan
3. What did I learn?
 - a. It is too hard for us as a team to commit to too many deliverables in terms of a final product, and we should limit ourselves to things that can be accomplished in the amount of time/money we are given
 - b. A way to simulate and test breathing/moisture that will be given into the pod by the baby
4. What do I plan on doing to ensure that Team P18347 has a successful Phase (V) review?
 - a. Communicate with my team members before the start of MSD II
 - b. Determine what needs to be ordered before MSD II
 - c. Make sure our customer and guide know our progress and what we plan to do at the start of Phase V

Team: P18347 Engineer: Danielle Labelle
Entering Phase: 4 (Detailed Design Review)

What do I plan on doing to ensure that Team P18347 has a successful Phase 3 review?

1. Assist the team in starting CAD modelling.
2. Increase understanding of humidity input from baby's breathing.
3. Work with Mechanical/Biomedical team to design ventilation system.
4. Identify mounting points for electrical components.
5. Assist team in updating EDGE.
6. Meet with electrical engineers to learn more about their systems.

You will answer these three questions when you submit at the end of the System Design Review.

1. What did I actually do?
 - Identify free body diagrams for analysis
 - Work with Maura to calculate heat generated in electric blanket as a function of spacing between Nichrome A "coils"
 - Work with Maura to calculate the heat lost from the stroller to be used in battery calculations
 - Documented Matlab code on EDGE
 - Met with Josa to discuss ventilation possibilities and ideas to test ventilation
2. What did I learn?
 - While theoretical calculations are important, there may be a way around them with concept testing to save time
 - We can't forget about testing costs when planning out our budget
 - We will need to do dynamic testing to make sure we haven't significantly changed the center of gravity on the stroller and made it difficult to use
3. What do I plan on doing to ensure that Team P18347 has a successful Detailed Design review?
 - Figure out what materials can be ordered before we leave; if something can't be ordered yet, identify what questions still need to be answered and be aware of lead times
 - Update our customer and guide with our progress at the end of MSD I

Team: P18347

Engineer: Emily Heitzhaus

Entering Phase: IV (Final Detailed Design)

What do I plan on doing to ensure that Team P18347 has a successful Preliminary Detailed Level review?

1. Assist with the CAD modeling of the battery encasements (2 hours, Wednesday, 11/29)
2. Finalize the BOM (2 hours, Monday, 12/04 with teammate Christina)
3. Work on component sourcing (4 hours, Monday and Wednesday 11/18, 11/20 with Maura, Danielle and Prince)
4. Finalize material decisions (1 hour, Wednesday 11/15)
5. Continue to update engineering requirements, schedule and risk assessment as needed (1 hour, Wednesday, 12/06)
6. Assist teammate Christina with the preliminary test plan to ensure that we are meeting all requirements (3 hours, Monday 11/20)

You will answer these three questions when you submit at the end of the System Design Review.

1. What did I actually do?
 - Read through lots of information on different types of material
 - Researched different types of “bubble” ventilation systems
 - Updated engineering requirements, schedule, and risk assessment
 - Decided what types of materials need to be used for the seat, the cover, and the plastic covering
 - Went on a Fisher Price tour
 - Made a preliminary version of the BOM
2. What did I learn?
 - I learned different fabric materials are very complex. When it comes to fabric, they are composed of multiple fabrics. That came make it very tricky to determine what the fabric properties are.
 - There are many different types of plastic foams.
 - The seat should be composed of foam and covered in an additional material.
3. What do I plan on doing to ensure that Team P18347 has a successful Final Detailed Design review?
 - I will be sure that everyone is following through with their work, staying on top of their calculations, and meeting their deadlines.
 - I will continue to make sure our team keeps good communication amongst each other.
 - I will continue to update the schedule and make the adjustments accordingly.

Team: P18347 Engineer: Maura Keyes
Entering Phase: 4 (Detailed Design Review)

What do I plan on doing to ensure that Team P18347 has a successful Phase 3 review?

1. Lead Mechanical/Biomedical team to design ventilation system
 - a. Read ASHRAE Handbook for calculations/tables to assist with design
 - b. Meet with Dr. Bailey for input/validation
 - c. Reach out to Rob Hudson (ASHRAE engineer interested in starting student chapter of ASHRAE at RIT) for project funding opportunities and input on ventilation design
 - d. Increase understanding of humidity input from baby's breathing
2. Identify mounting points of components with an integrated system level view in mind
3. Meet with electrical engineers to learn more about their systems for integration
4. Assist the team in starting CAD modelling of components we plan to fabricate
 - a. Mounting Fixtures
 - b. Electrical Enclosures
5. Assist team in updating EDGE

You will answer these three questions when you submit at the end of the System Design Review.

1. What did I actually do?
 - Met with Dr. Stevens in identifying free body diagrams and thermal resistance circuits for heat transfer analysis
 - Worked with Danielle to
 - Calculate heat generated in electric blanket as a function of spacing between Nichrome A "coils"
 - Calculate the heat lost from the stroller to be used in battery calculations
 - Debug/optimized Matlab code
 - Met with Josa to discuss ventilation possibilities and ideas to test ventilation
2. What did I learn?
 - Proof of concept testing in the next phase may be able to save us time on designing the ventilation system where theoretical calculations set us back
 - Testing costs need to be factored into our budget when planning
 - Try to reach out to engineering departments to borrow testing equipment to save money

- Try to mock up “cheaper” or simplified tests to save money while maintaining quality
 - We need to factor in a few weeks of dynamic testing to ensure
 - Vibrations do not impact the system detrimentally
 - The center of gravity is maintained to ASTM standards
- 3. What do I plan on doing to ensure that Team P18347 has a successful Detailed Design review?
 - Lead design of ventilation system and ventilation component sourcing
 - Compile component sourcing information so we can have BoM items ordered over winter break
 - If items cannot be ordered:
 - Determine unidentified criteria preventing items from being ordered before leaving for break
 - Complete calculations/answer questions over break to have components ready for MSD II
 - Update our customer and guide with our progress at the end of MSD I and plans for MSD II

Team: P18347 Engineer: Prince Rex
Entering Phase: 4 (Detailed Design Review)

What do I plan on doing to ensure that Team P18347 has a successful Phase 3 review?

1. Assist the team in benchmarking various batteries and helping to decide what to choose.
2. Understood the use of various insulating materials and methods.
3. Set up arrangements to start finalizing on what parts to order.
4. Looked and found enclosure solutions for components.
5. Assist team in updating EDGE.
6. Get data from the mechanical team to finalize various calculations.

You will answer these three questions when you submit at the end of the System Design Review.

1. What did I actually do?
 - Identified various battery enclosures and also benchmarked various insulation tapes.
 - Work with Ian in finalizing the microcontroller.
 - Started on the electrical component aspect of the preliminary BOM.
 - Documented findings on EDGE in various forms.
2. What did I learn?
 - Identifying the right type of material is key.
 - Always keep the budget in mind.
 - Learnt to search energy from the environment in a useful way and use that energy to power a sensor system, or make the overall system efficient.
3. What do I plan on doing to ensure that Team P18347 has a successful Detailed Design review?
Confirm and find out what materials can be ordered before we leave for fall break.
 - Order the materials finalized on the BOM.
 - Finalize the battery size.
 - Help with testing various test plans.
 - Update content on edge.
 - Help with the stroller breakdown to model the parts which need to be modified or fabricated.
 - Make a price comparison table to help team members understand how various items are looked and compared from the vendor list before purchasing.

Engineer: Ian Smith

What do I plan on doing to ensure that Team P18347 has a successful Phase 4 review?

When will each task take place? Does sequencing matter?

1. Assist the team in editing the EDGE page and review it before the next design review.
2. Compile a list of potential components for the electrical system BOM. (3-6hrs)
3. Create Software flowchart and begin pseudocode or actual code.
4. Work with team in finalizing the list of I/O for microcontroller
 - a. Investigate digital inputs via buttons for Arduino.
5. Finalize battery calculations and specify a battery.

You will answer these three questions when you submit at the end of Phase 4.

1. What did I actually do?

- Created and filled out Microcontroller Selection matrix
 - Began developing code/ planning software flow
 - Began developing a list of all microcontroller inputs and outputs
 - Experimented with temperature sensors and Arduino
 - Began looking into safety shutdown system
 - Began looking into LCD display shield with integrated buttons
 - How to use LCD display for Battery life indication
 - How to use integrated buttons as inputs for climate control
- Created Electrical system block diagram
- Began filling out BOM for future electrical component needs

2. What did I learn?

- Coding may or may not be easy depends on how lucky i get with finding already written code.
- Component selection is more difficult than imagined.

3. What do I plan on doing to ensure that Team P18347 has a successful Detailed design review?

- I will review the edge page prior to the design review to check for any errors or last minute changes needed.
- I will work with the rest of the team to add any needed information/ help where needed
- I will perform all needed calculations to get an estimated battery size (oversized if needed) for the system
 - Additionally I will determine if the system will run off one or two batteries

- One battery for microcontroller/sensors and one for the power hungry heated seat. (depends on voltage used in design of seat heater)
- I will do my best to ensure as many sub-systems of the electrical system are completely defined and have schematics created before winter break.
 - Some software work will be completed with this as well. I plan to look into components that other people have already used with the arduino before so that i have a reference for my code.
- I will complete a preliminary software flowchart for how the arduino will run once programmed.