

BABY STROLLER WITH HEATING SYSTEM

PROJECT OVERVIEW

Our project is a baby stroller with heating capabilities to assist families living in cold weather climates. Our design creates a contained and controlled environment that is able to protect children and keep them warm on the coldest winter days.

PROJECT GOAL: Create an enclosed environment on the stroller to keep a baby warm in transit.

FUTURE PLANS: Next fall, a follow-on MSD team will add a cooling system to the stroller for families in warm weather climates.

DESIGN SPECIFICATIONS

- ✓ Heated seat created with Nichrome wire on ¼" thick polyurethane foam
- ✓ Heated seat powered by rechargeable battery mounted underneath stroller seat
- ✓ Enclosure made from low density polyethylene plastic
- ✓ Stroller controlled by user interface located in tray on top of stroller: contains temperature readout, temperature control buttons, and emergency stop

SYSTEM DESIGN

BENCHMARKING

We observed different products that operate similarly to how we wanted our stroller to work.



Heated Blanket



Heated Car Seat



Space Heater



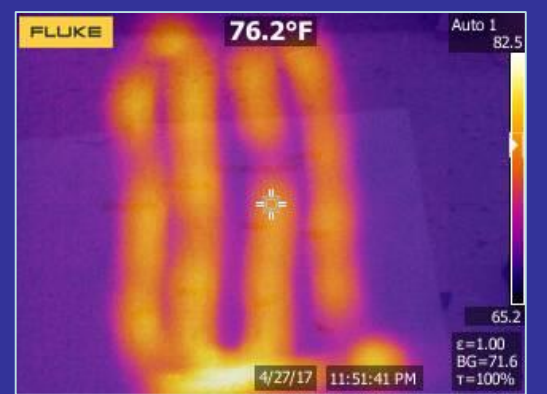
Potential design concept



Completed stroller



Heated Seat Wire Mapping



Heated Seat Thermal Image

HEATER SYSTEM

The final heater system is constructed of four separate 7.5 Ohm heating systems which were connected in parallel to form one large heating element. The Nichrome wire was bent and arranged to have 1 inch of space between the wire for optimal heat output.

ELECTRICAL SPECIFICATIONS

Heating Element	28 AWG Nichrome Wire
Temperature Operating Range	75°F to 109°F
Battery Life	2 hours
Heater Output	78 Watts

FUNCTIONALITY TESTING

ACHIEVED OUTCOMES

1. **AMBIENT TEMPERATURE TESTING** – determine and monitor the ambient temperature of the stroller environment with the heated seat turned on
2. **FOAM THICKNESS TESTING** – determine the desired foam thickness to properly heat and insulate the seat
3. **HEATED SEAT FUNCTIONALITY** – test how long it takes for the seat to heat up and cool down, allowing us to determine cycle time
4. **USER INTERFACE TESTING** – test that the controller system is intuitive and user friendly
5. **USABILITY TESTING** – test the agility of the stroller with the added components
6. **EMERGENCY SHUTOFF** – test that the system shuts down when the big red button is pushed

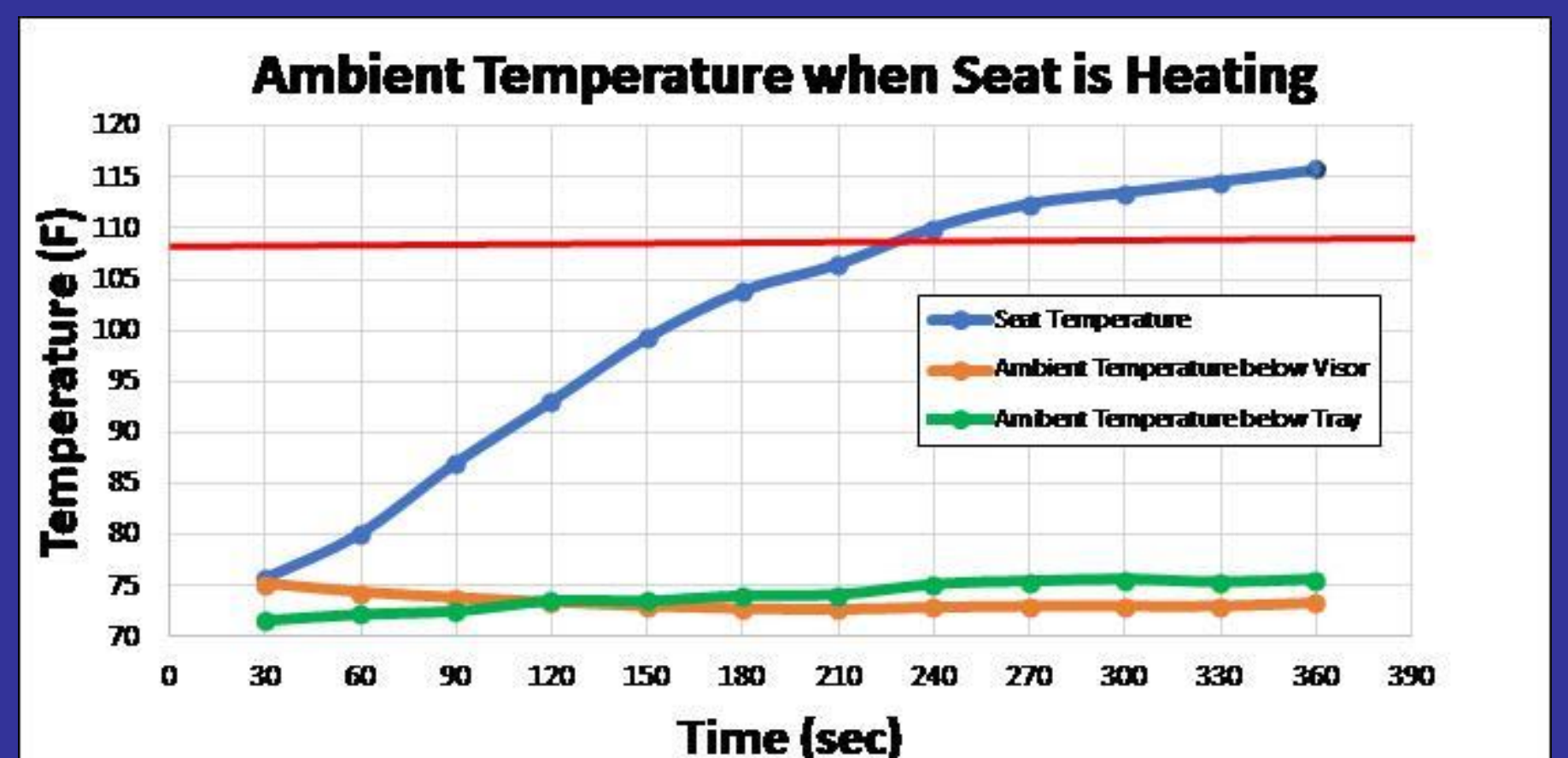


Figure 1: Ambient Temperature Test Results with maximum operating temperature displayed

TEAM P18347: CLIMATE CONSTROLLER

Members (left to right):

- Ian Smith**
Electrical Engineering
- Prince Rex**
Electrical Engineering
- Christina Pensabene**
Biomedical Engineering
- Danielle Labelle**
Mechanical Engineering
- Emily Heitzhaus**
Industrial Engineering
- Maura Keyes**
Mechanical Engineering



THANK YOU:

Ed Hanzlik
Senior Design Guide

Dr. Josa Hanzlik
Customer and Sponsor

Keyes Family
Sponsor

