



Nome's Child Safety Seat Project

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Project Description

Frequently in the news are stories of children and infants being accidentally left in vehicles. Severe environmental conditions, including heat, humidity and cold often have a fatal effect on these children. Engineering can help solve this issue with a better designed car seat and better automobile and human interactions. Our goal is to create a child seat that will implement an array of sensors and a control board to ensure that these safety features keep the infant safe.

The initial design includes a load sensor, a temperature sensor, a Bluetooth receiver for the car, a Bluetooth transmitter for the seat, a battery, and a solar panel to keep the battery charged. To detect whether or not there is a child in the seat there will be a load sensor installed that will activate the device when there is something placed in the seat. The temperature sensor will be used to detect whether the conditions in the car are safe for the child in both hot and cold environments. The Bluetooth adapters that hook up to the car give us full access on Ford and GM vehicles. With this access we can control the air, honk the horns, flash the lights, set off the alarm, and lock/unlock the vehicle remotely. Our device will be prepared to use these systems in case of an emergency to alert the parents or guardian and save the child. For more specifications please see the "Specifications" section below.

This seat shall be reasonably affordable and allow the seat to be used throughout the entire stages of the infants growth process and we plan to add multiple features to ensure this. The seat needs to be lightweight and unrestrictive so parents can easily move the seat from car to car. Possible features the team is considering are a cheaper model that doesn't connect to the car, an application on apple and android devices that can be used to relay device messages, and a more expensive model that will include ease of access options such as a rotating base and more padding so that the seat can get more use as the child grows up. For more features please see the "Features" section below.

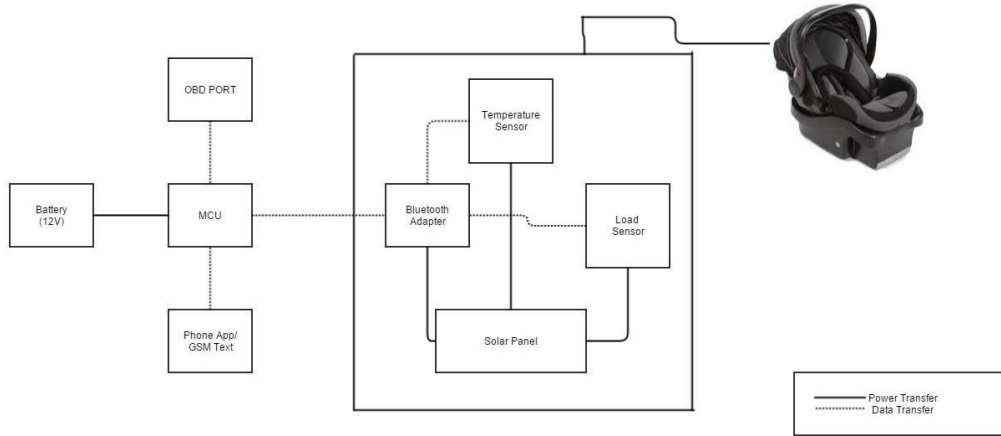
Specifications

The car seat device will be expected to operate with the following specifications:

- The Bluetooth adapters shall operate with a range of up to 32 feet
- If the parent or guardian walks 10 feet away from the car the device shall activate
- The device shall trigger immediately and successfully in an emergency
- The device shall trigger if the temperature becomes too hot or too cold
- When a baby is placed into the seat the load sensor will activate
- A 12V Battery will power the system and be charged using solar panels

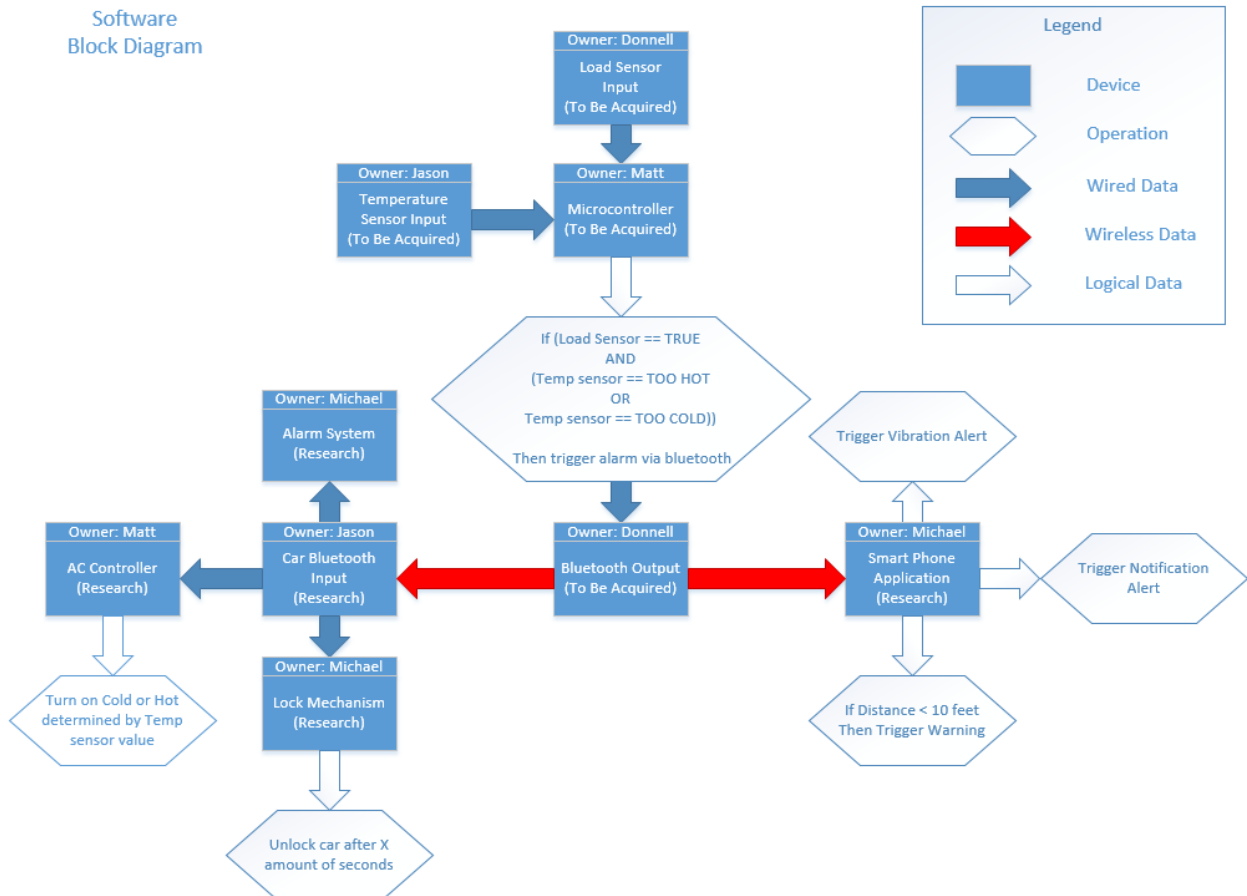
- The device must be able to attach to a car seat and not hinder its function.

Hardware Block Diagram



Software Block Diagram

Software Block Diagram



Project Budget

Our sponsors have agreed to a project budget of \$500 for the car seat which integrates into the car. However initial research has given us a price estimate on the following parts:

Part	Estimated Price
Baby Car Seat	\$150
Basic Microcontroller	\$10
Bluetooth Car Adapter	\$100
Bluetooth Car Seat Adapter	\$15
Temperature Sensor	\$5
Load Sensor	\$40
Rechargeable Battery	\$20
Solar Panel	\$40
Total Estimated Price:	\$380

Features

Upon early completion of the project our team has decided to include possible additional features that may be desirable to add to the final device. Below is a list and a brief description of our ideas:

1. Connectless Design (cheapest model): no car connection, warning system built directly into car seat
2. Adjustable Design (expensive model): rotating base for baby insertion convenience and additional pads to add for a growing child.
3. Phone Application: notifications, alerts, and setting available on smart devices
4. Contacting Authorities: Car seat also alerts police as a last resort
5. Connecting to Onstar: Will provide detailed information about location
6. Buckle Sensor: A cheaper alternative to the load sensor to detect if a baby is in the car seat

