

## Risk Assessment Safety Plan

Project information:		
Aftermarket Child Detection for Car Seats		3-1-2018
Name of Project		Date of submission
Team Member	Phone Number	e-mail
Troy Brumm	352-598-8550	tjb14g@my.fsu.edu
Stephen Carr	850-832-3611	sjc15g@my.fsu.edu
Justin Craig	443-605-2651	jc14t@my.fsu.edu
Charlie Cruzan	561-573-6086	charliecruzan@gmail.com
Spencer Nguyen	850-590-2391	shn13@my.fsu.edu
Faculty mentor	Phone Number	e-mail
Dr. Shayne McConomy	850-410-6624	smcconomy@eng.famu.fsu.edu
Dr. Michael Devine	850-410-6378	mdevine@eng.famu.fsu.edu
Dr. Simone Peterson Hrada	850-410-6372	peterson@eng.famu.fsu.edu

### I. Project description:

In the United States, an average of 37 child fatalities occur each year due to heat stroke after being left unattended in parked vehicles. When a vehicle's air conditioning is shut off, interior air temperature rapidly rises to dangerous levels. As of December 2017, 42 cases were reported, suggesting that this is a growing problem. A need has developed for a device to aid in preventing this tragedy. The objective of this project is to design a system that detects when an infant is in a vehicle subject to dangerous temperatures and alerts the designated parties.

### II. Describe the steps for your project:

Electronics Assembly: We will be soldering multiple components for each module and also working with batteries.  
 Housing Design and Prototyping: We will be 3D printing our prototype housings.  
 Testing: To test the prototype, we will be using the product as a consumer would. We will also be performing experiments with our device in hot vehicles to gather data.

### III. Given that many accidents result from an unexpected reaction or event, go back through the steps of the project and imagine what could go wrong to make what seems to be a safe and well-regulated process turn into one that could result in an accident. (See examples)

- Burns (3D Printer/ Soldering)
- Battery Catastrophic Failure
- Heat Stroke
- Electric Shock
- Fires

### IV. Perform online research to identify any accidents that have occurred using your materials, equipment or process. State how you could avoid having this hazardous situation arise in your project.

When working with fused deposition modeling printers, usually the heated nozzle and heated print bed are exposed. Many burns have occurred from the user touching the nozzle or the bed. Another hazard is fires created by printers for various reasons. To avoid these hazards we could place the printers in protected areas with low foot traffic where they won't be able to get brushed or knocked over. Soldering uses high temperatures and burns and fires can occur due to inattention and negligence. To avoid this, we could place the soldering station away from cluttered areas. We will be working with batteries and battery failures can occur due to improper charging and use. To avoid this we will ensure that our design is appropriate with research before we assemble.

**V. For each identified hazard or "what if" situation noted above, describe one or more measures that will be taken to mitigate the hazard. (See examples of engineering controls, administrative controls, special work practices and PPE).**

3D Printing: We will place the printers in secure areas and have them monitored at all times. We will also verify on the printer that the temperatures have cooled sufficiently before removal of the part.

Soldering: We will place the soldering station in an uncluttered area away from flammable objects or fabrics. The user must be present at all times and cannot leave until the soldering iron has cooled.

Testing (Heat Stroke): During our testing phase, to mitigate heat stroke, all tests will be conducted with at least one other member. Both members must stay hydrated and be aware of symptoms of overheating.

**VI. Rewrite the project steps to include all safety measures taken for each step or combination of steps. Be specific (don't just state "be careful").**

Electronics Assembly: When assembling and soldering the electronic components, the user will be attentive of the soldering iron Temperature of the components at all times. The user cannot leave the area until each item has sufficiently cooled. Research on appropriate battery operation must be performed before working with the batteries.

Housing Design & Prototyping: During the housing prototyping phase, multiple parts and components will be 3D printed. The member that is operating the printer must monitor the print at all times and ensure that the temperatures have cooled before removing the part.

Testing: To gather data from hot vehicles, the experiments must be conducted by at least two members. Each member will be attentive of the symptoms of heat stroke. These tests will be performed during various parts of the day.

**VII. Thinking about the accidents that have occurred or that you have identified as a risk, describe emergency response procedures to use.**

Burns: Have a first aid kit ready. Depending on the severity of the burn, be prepared to call emergency services.

Fires/Explosions: Immediately contact emergency services. Determine locations of fire alarms. Determine locations of fire extinguishers.

Heat Stroke: Contact emergency services immediately. Low body temperature using AC, cool water, fans.

Electric Shock: Contact emergency services immediately. Do not touch the person if they are still in contact with electrical current. Do not move a person with electrical injury unless they are in immediate danger.

**VIII. List emergency response contact information:**

- Call 911 for injuries, fires or other emergency situations
- Call your department representative to report a facility concern

Name	Phone Number	Faculty or other COE emergency contact	Phone Number
Emergency Services	911	Dr. Shayne McConomy	850-410-6624
FSU PD Medical Response Unit	850-644-1234		

**IX. Safety review signatures**

- Faculty Review update (required for project changes and as specified by faculty mentor)
- Updated safety reviews should occur for the following reasons:
  1. Faculty requires second review by this date:
  2. Faculty requires discussion and possibly a new safety review BEFORE proceeding with step(s)
  3. An accident or unexpected event has occurred (these must be reported to the faculty, who will decide if a new safety review should be performed.
  4. Changes have been made to the project.

Team Member	Date	Faculty mentor	Date
<i>Bonnie Dyer</i>	3-1-18		
<i>SB</i>	3-1-18		
<i>Tracy</i>	3-1-18		
<i>Justin Greig</i>	3-1-18		

**Report all accidents and near misses to faculty mentor.**