Risk Assessment
Safety Plan

Project information:

Tactile Virtual Camera Controller for Film Production — Name of Project

Date of submission

Team Member	Phone Number	e-mail
Weston Dudley	(850) 544-2426	wkd16@my.fsu.edu
Kayla Miller	(678) 754-2903	kayla1.miller@famu.edu
Keishon Smith	(386) 506-9094	keishon1.smith@famu.edu
Kyle Suarez	(954) 662-3227	kas16f@my.fsu.edu
Daneilla Turbessi	(813) 385-4482	dvt15@my.fsu.edu
Faculty mentor	**Phone Number**	**e-mail**
Shayne McConomy	(850) 410-6624	smcconomy@eng.famu.fsu.edu

I. Project description:

The objective of this project is to design a user-friendly virtual camera controller that can seamlessly couple the user to a virtual free space. The controller itself will be a tactile system that encases a 2018 iPad Pro, that connects through the lightning connection to allow it to accomplish virtual tasks. These tasks will mimic the functions of a physical camera used in film production. Gaming engine, Unreal Engine, will be used as the platform for virtual navigation. The device is intended for virtual film production or as a teaching tool for film schools or programs.

II. Describe the steps for your project:

This project is divided into two main sprints, the mechanical and the software. The steps for the mechanical sprint are as follows: 1) Identify VIP for controller, 2) cardboard prototyping, 3) 3D Printing prototyping, 4) and final print and installation of hardware. For software the sprints are: 1) Sync iPad Pro with Unreal Engine using the virtual camera plugin 2) achieve basic camera functions (i.e. record, playback), 3) write camera function, 4) connect with iPad controls, and 5) connect iPad controls with input from tactile controls

Steps 3 of both the mechanical and software sprints are iterative processes. When both sprints are completed, they will be joined to the final sprint which will compose of two main steps 1) installation and 2) testing.

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)

The possibility for potential hazards will only be seen in the mechanical aspects of our project. All installations and 3D printing use machinery that pose potential hazards. If the user is not careful when cutting support material from the printed models the blade can slip potentially harming the user or someone within reach.

A second potential to a hazard is the extreme heat of the dremel tip to the 3D printer. During the prototyping steps of this project if the user was to try to reach for the 3D model prematurely and accidently hit the dremel nozzle, there could be a resulting 2-3 degree burns. The nozzle can get to temperatures above 160 degrees Celsius and can be hazardous if not handled appropriately.

Lastly, a potential hazard could come from using soldering tools in the pcp board of the final project when connecting tactile controls to the iPad via the lightning cable. Soldering irons can get to around 350 degrees Celsius and can be hazardous if not handled properly. Besides the soldering iron itself, metal can spark from the pcp board while soldering creating danger for uncovered skin, especially around the eyes. Once the solder is heated and applied to wire or component it remains hot before dissipating its energy. Burning is possible if not enough time is allotted for cooling.

In addition to exposure to elevated temperatures, soldering creates hazardous fumes that can be dangerous for the user to inhale. The fumes from the solder is not generated from the lead but instead is flux fumes which is an acid substance that should not be inhaled. Those that are soldering and those in close proximity will be exposed to said chemical fumes.

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.

In March 2017, a user was 3D printing a model at his house. When he was not present, the heated nozzle detached from the printer and caught fire to the model, printer, and surrounding equipment. The user was not harmed, but almost lost his house due to this incident. To avoid this, the printer should use high quality components and the prints should always be monitored.

There has been a large number of users that have been burned from the nozzle. To avoid this from happening, appropriate PPE should be used when handling the printer and the model should not be touched until it has properly cooled (15-20 minutes).

In some cases, users have been shocked when installing components. This is avoided by not supplying power while working.

Extended exposure to soldering fumes has lead to several chronic illnesses and asthma.

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).

To mitigate hazards presented, the appropriate PPE should be used when working with 3D printer and model. This includes safety rated eye protection and thermally insulated gloves.

When cutting the user must cut away from the body and any others. Fingers should be kept away from the blade at all times and mesh gloves are to be worn.

When operating with 3D printer or circuits for the control, the users should follow lock-out-tag-out methods if possible.

The person handling the soldering iron should always have clothing that covers the legs and should not have any loose clothing. Hair should also be pulled back and secured. For those handling and surrounding the soldering iron, safety goggles should be worn at all times.

When fumes are present an approved fume extractor or fan should be used. The workplace should be well ventilated with a source of air flow.

Regardless if the system is not able to be locked out, all power supplies should be un energised when working on components or systems.

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").

The mechanical steps to this project are: 1) Identify VIP for controller, 2) cardboard prototyping [when cutting cardboard please see article V of this document for blade use and PPE must be worn], 3) 3D Printing prototyping [for 3D printing, allow allotted time of 15-20 minutes after model has been printed before handling, and use appropriate PPE], 4) and final print and installation of hardware [when cutting plastic and adding components, de energise all systems and cut away from the body or other users, and PPE is to be worn]. Ventilation is required when fumes are present and PPE is to be worn when soldering.

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

In the case that a user is burned, the user must contact faculty advisor and use first aid kit to tend to injured area. If the burn is severe, the user must contact faculty advisor and then seek medical help.

In the case that a user is cut, the user must contact faculty advisor and use first aid kit to tend to injured area. If the cut is severe, the user must contact faculty advisor and then seek medical help.

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
Donald Hollett	(850) 410-6600	Facility Coordinator	
Jerris Hooker	(850) 410-6463	Teaching Faculty	
Donte Ford	(850) 410-6472	Senior teaching lab specialist	

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

Report all accidents and near misses to faculty mentor.