NG, Andrew

# Abstract

Who am I? What is the trapdoor project about?

### Who am I

I am Andrew Ng, a senior Entertainment Technology major specializing in Lighting and Technical Direction. I have 6 year of experience participating and mentoring in FIRST Robotics, and I want to work with automation, AutoCAD design, problem solving, and special effects. I will be the project manager and master carpenter for my project. I will be working with John McCullough to design and construct a life sized model to demonstrate proof of concept.

### The Automated trapdoor

The automated trapdoor will be able to work with a trisket and stud wall platform deck for the theater. It can be triggered remotely from backstage or a control booth by actuating a piston with pneumatic or hydraulic power. It will create an opening in the platform that can allow access to elements under the deck.

#### Issues to address

* **Structural Safety**
* **Construction**
* **time**
* **automation safety**
* **automation mechanism**
* **Power**
* **parts and parameters**

#### Solutions

I will draft a design and make models to test mechanisms for the trapdoor. I will find parts and either obtain or build a proxy for the model. The project will be broken down into phases that should be more manageable. When concept model is put together a can-locking mechanism can be designed. I plan on using physical relays or a deadman switch and e-stop to prevent the trap door from closing on people.

# Table of content

* Abstract
* introduction
* timeline, calendar
* budget
* inventory
* data collection
* summary
* Conclusion
* bibliography

# Process Model of completion

Plan for work and Time table

## work strategy

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### Rough Calendar

* Weeks 1 – 3
  + Planning, Research, design, and modeling
* Weeks 4 – 6
  + Prototyping, refinement, networking, revise budget, and ordering parts
* Weeks 7 – 9
  + Control, safety, custom work, CNC routing, controls and safety
* Weeks 10 – 12
  + Final model, painting, wires, cables.
* Weeks 13 – 15
  + PowerPoint, paperwork, poster, presentation,

### Rough budget

Lumber 100

Fasteners 20

Software 800

Consumables 30

Sensors 250

Motors and pneumatics 400

Tubes and cables 50

### Design cycle

1. Design / Revise
2. Incubate
3. Execute
4. Reflect

#### Refinement

Stretch goals

* Sensors and e-stop
* manual controls
* load test and Working Load Limit numbers

# List Outcomes

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# Resources

Internet sources

Professors

Books

Public domain