Revision of Lockheed Martin Human Type Target for Manufacturability

Team 7

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Introduction and Background

- Lockheed Martin is designing a Human Type Target System for training Law Enforcement and Military personnel as a part of their Urban Operations Training System
- Lockheed Martin is currently purchasing a competitor's product for use
- This product does not meet their standards for realism or durability
- Lockheed Martin has a basic prototype

Need Statement

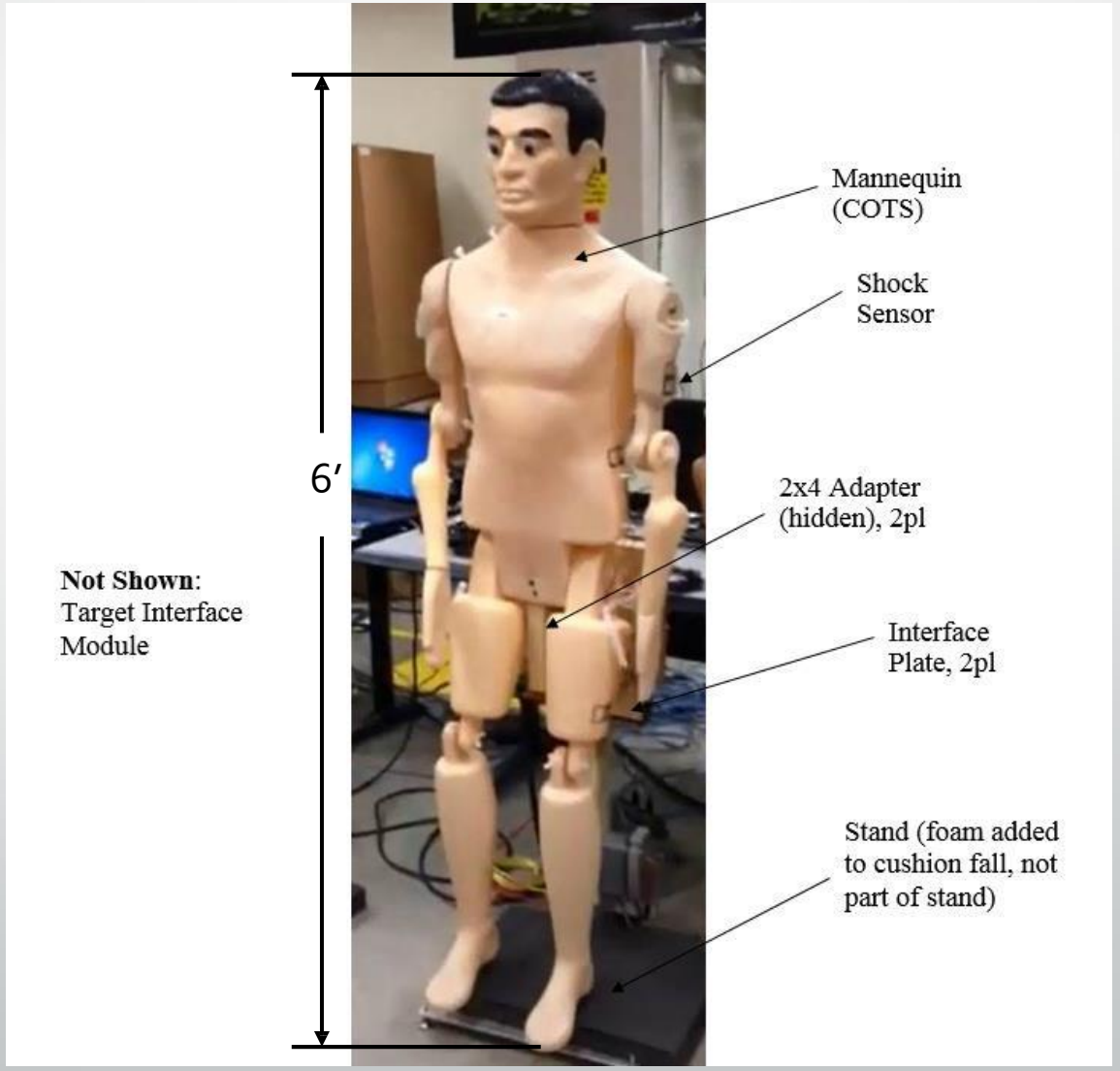
"Lockheed Martin's current human type target system is incomplete and requires further design for manufacturability and durability."

Goal Statement

"The goal of this project is to revise Lockheed Martin's current prototype and take it to a production-ready-state."

Components to be Redesigned for Manufacturability

- Interface Plates
- 2x4 Adapter
- Stand



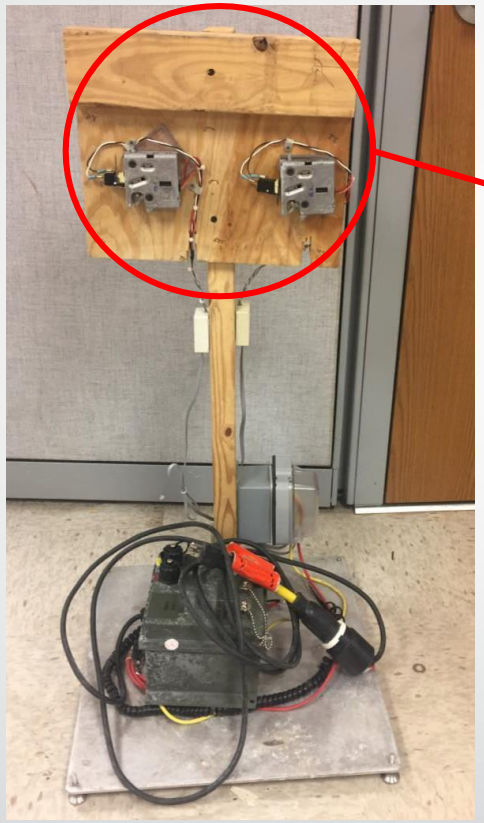
Objectives

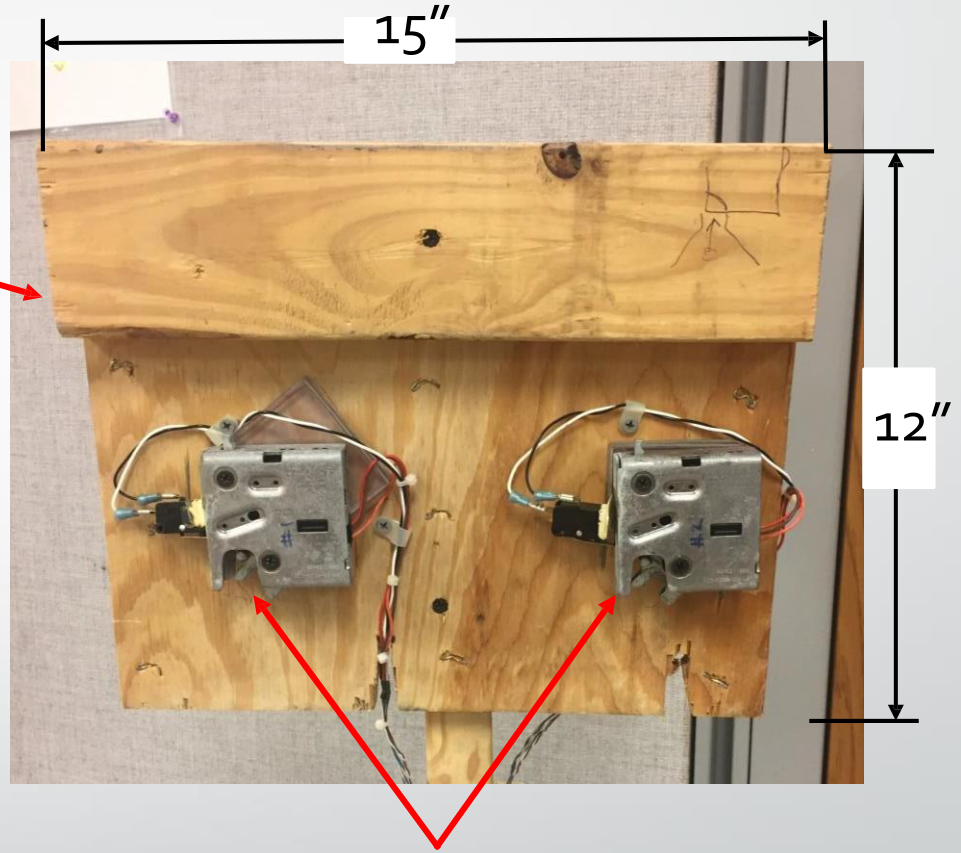
- Perform at least 1000 drops before failure
- Ricochet averse
- Moveable by 1 person
- Max 2 ft x 2 ft base plate
- Capable of withstanding impacts from 7.62 mm, 5.56 mm, and airsoft BB rounds
- Operable in a variety of environmental conditions

Objectives Continued

- Target prices (maximum) – batches of 100
  - Interface plate - $50.00 each
  - 2x4 interface adapter - $25.00
  - Stand - $70.00

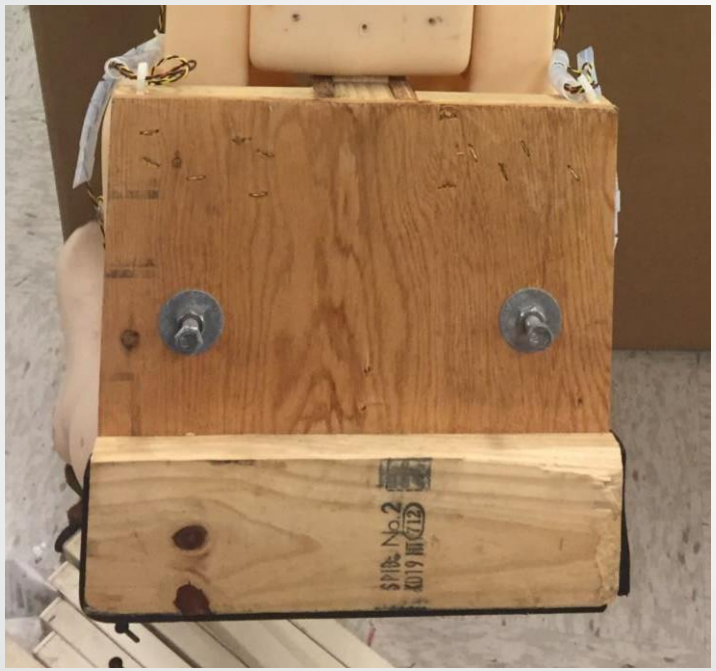
Lockheed Martin Current Prototype

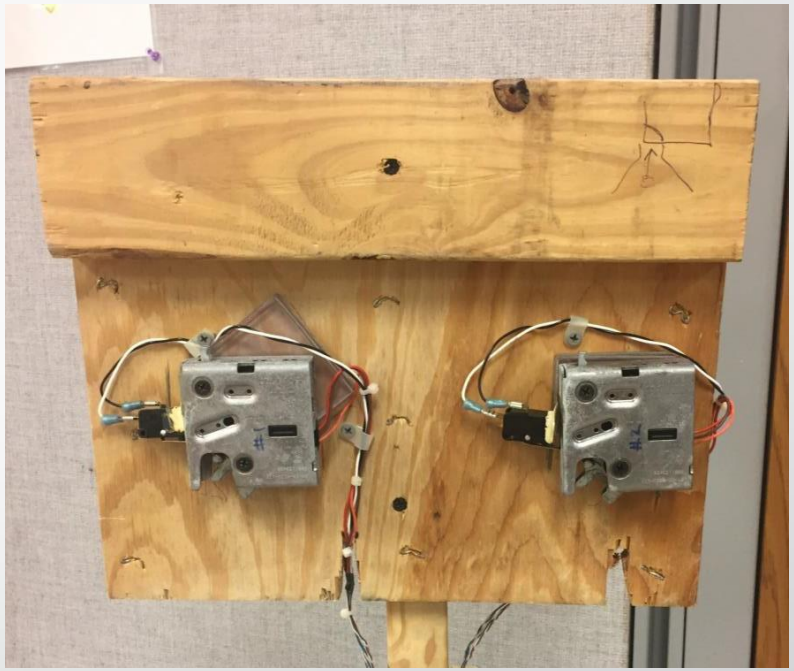




- Issues with binding on clamps
- Difficult to reset

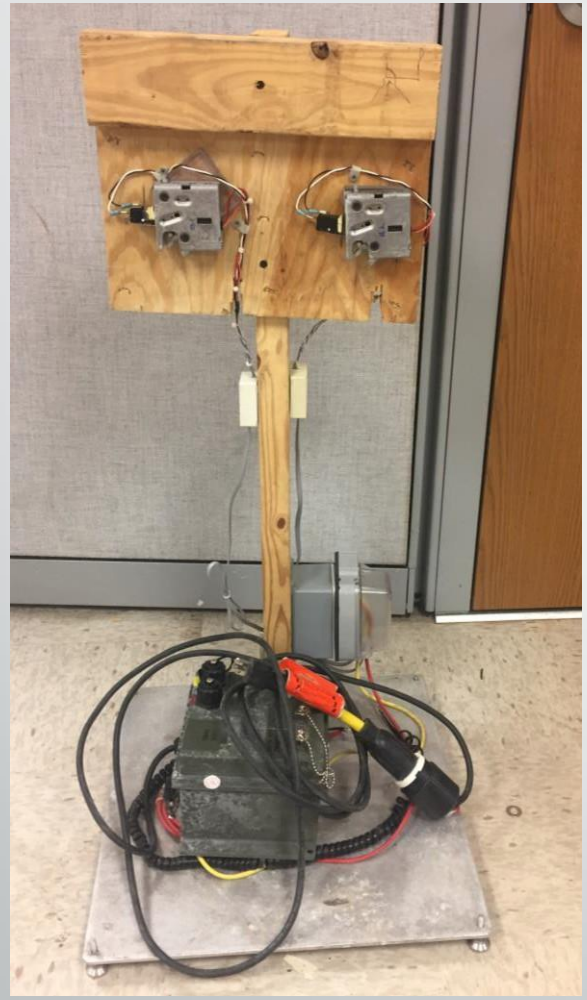
Lockheed Martin Current Prototype (Cont.)

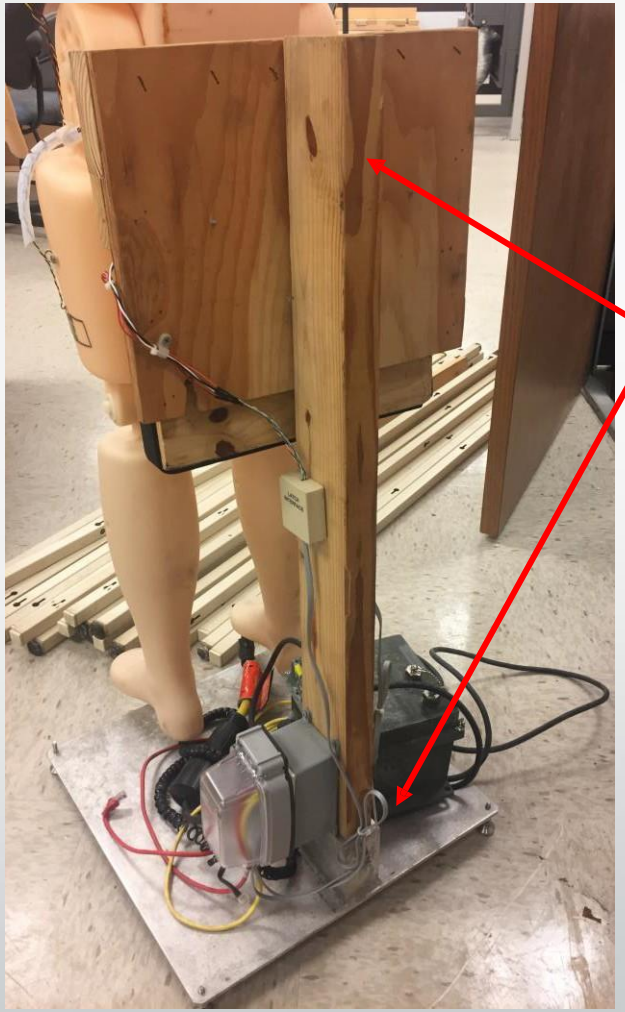




- Design one Interface Plate to be used in both plate locations
- Design Interface Plates with minimal assembly required

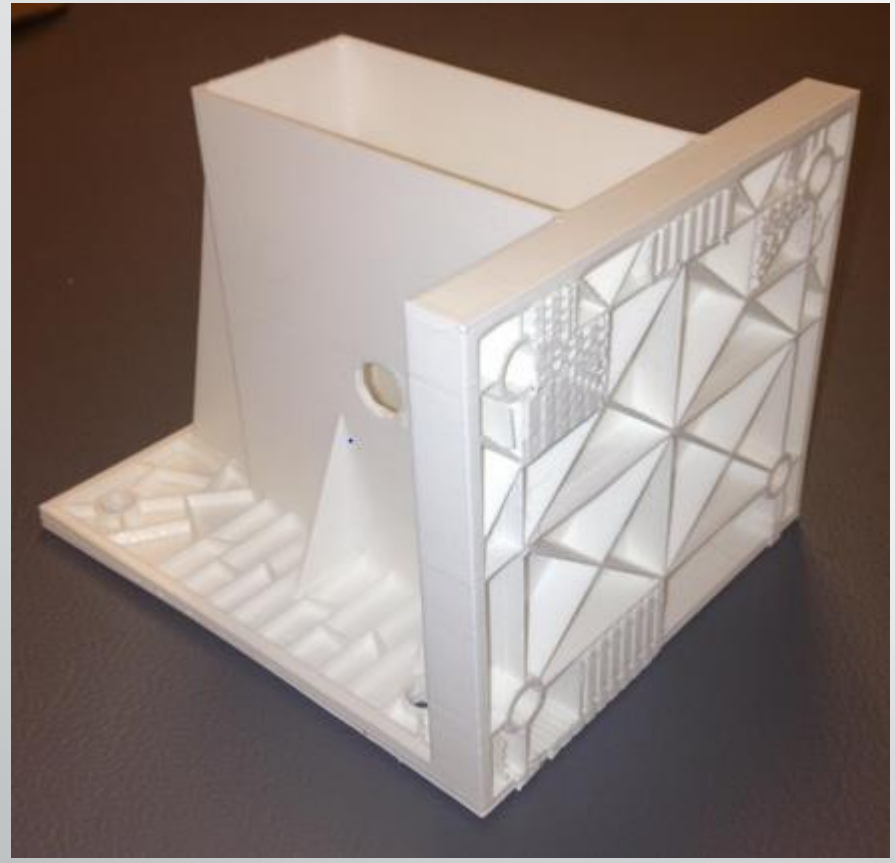
Lockheed Martin Current Prototype (Cont.)





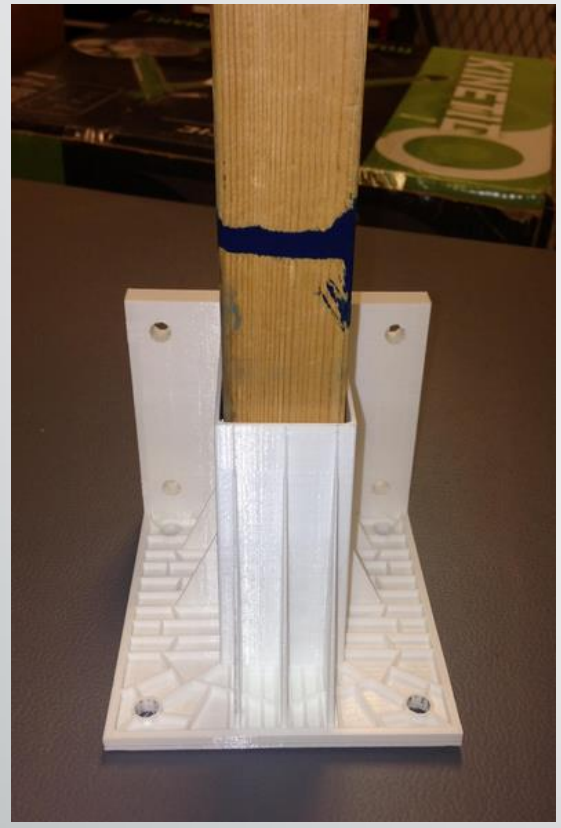
- Design a single 2x4 adapter to be used for attaching different components

Current 2x4 Adapter Design

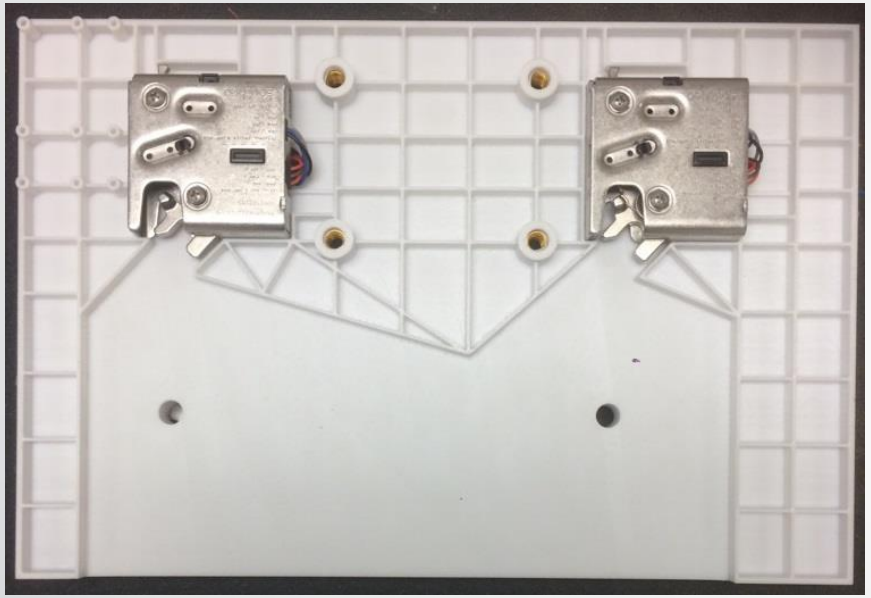


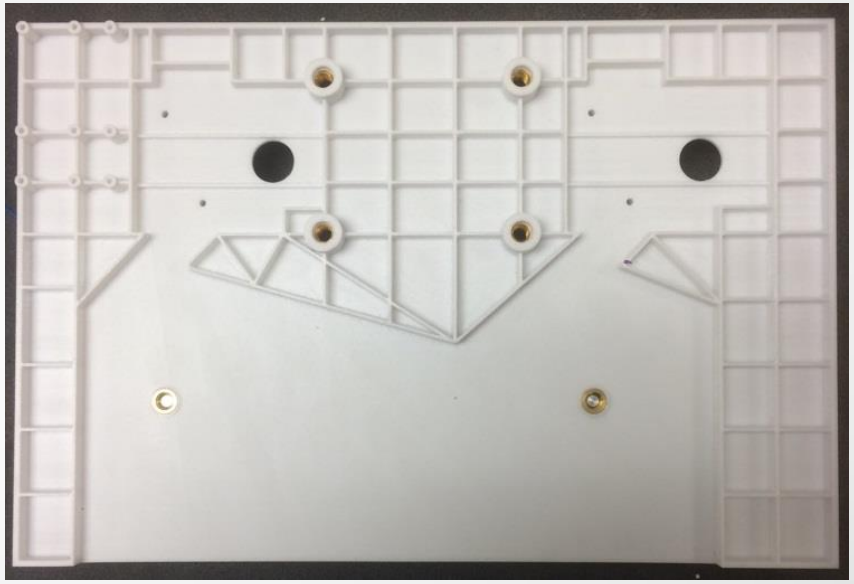
- Designed so that this one 2x4 adapter can be used in several locations
- Design made to injection molding standards
- Changes made from past design
  - Ribbing added to back
  - Hole size increased

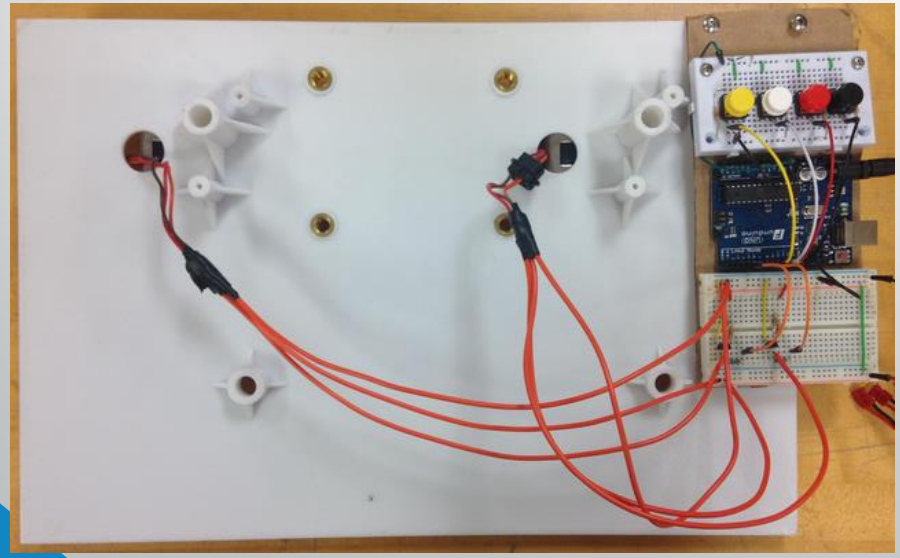
2x4 Adapter Part

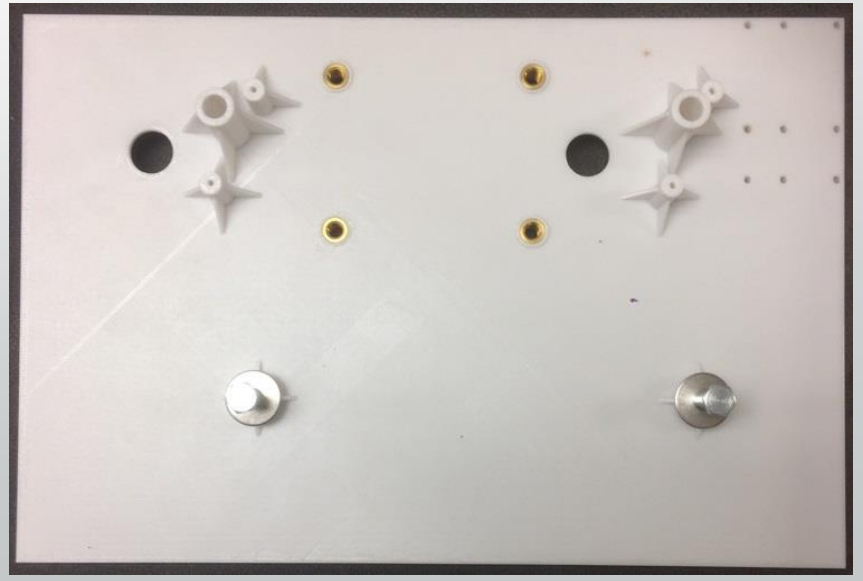


Interface Plate



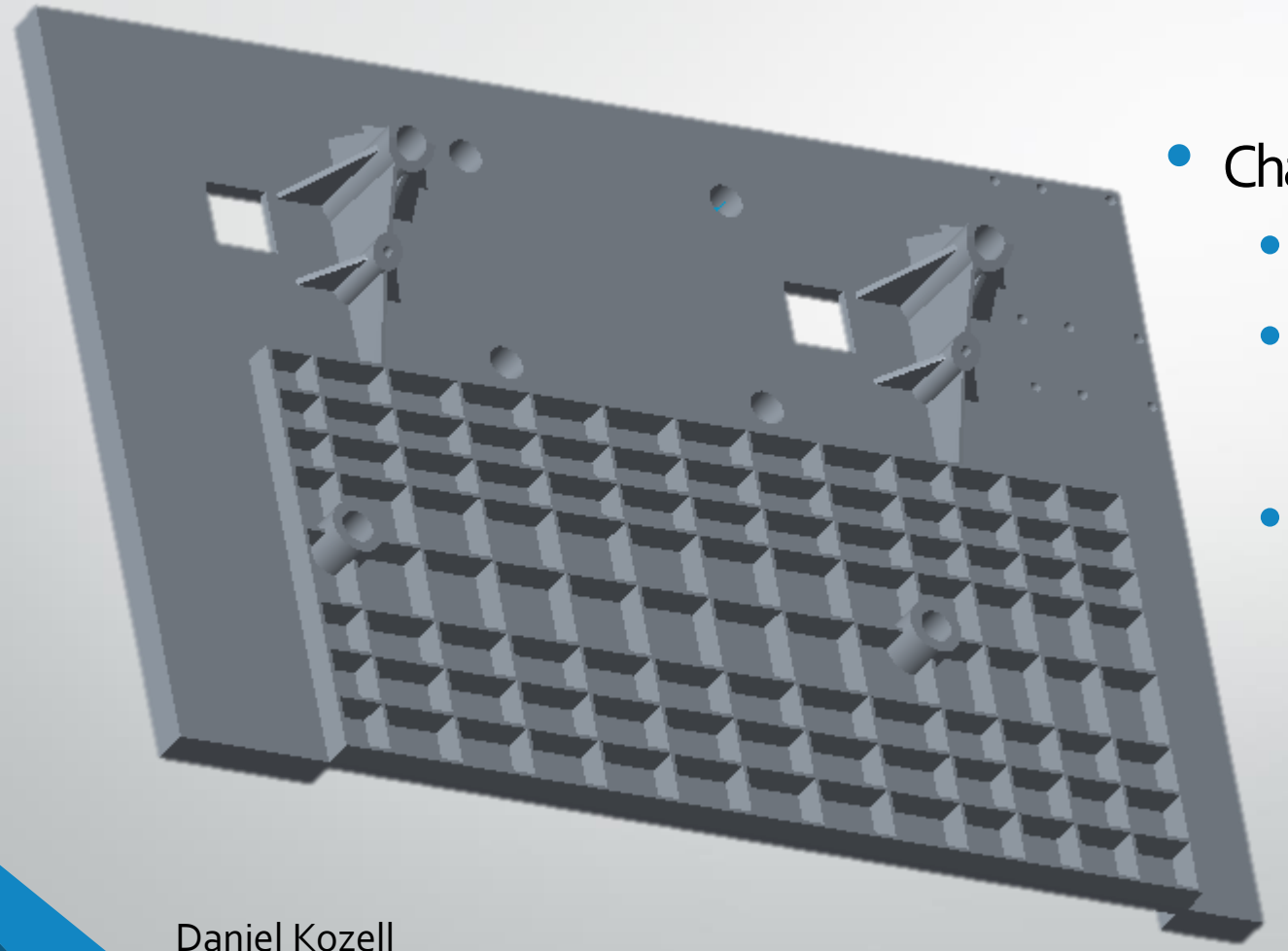






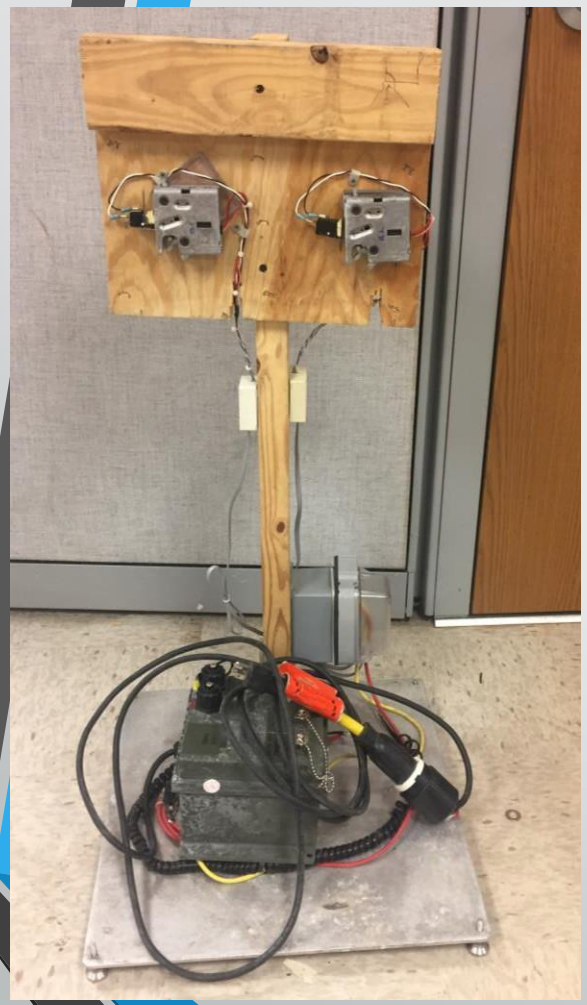
Daniel Kozell

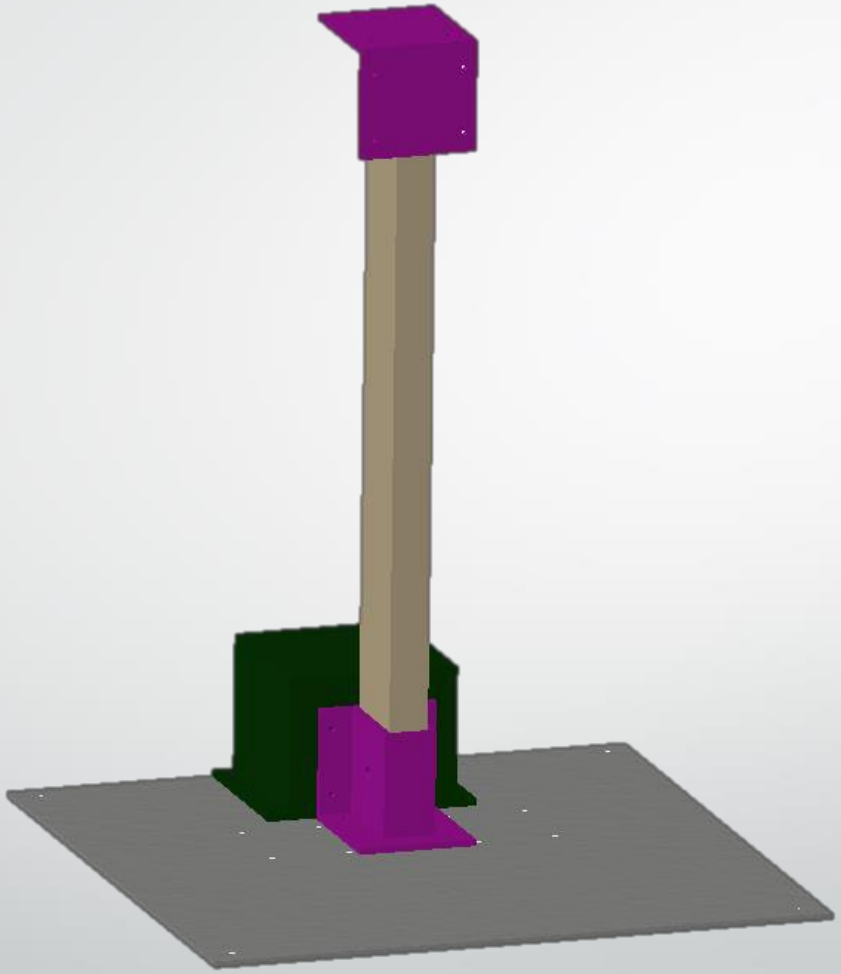
Desired Design Modifications

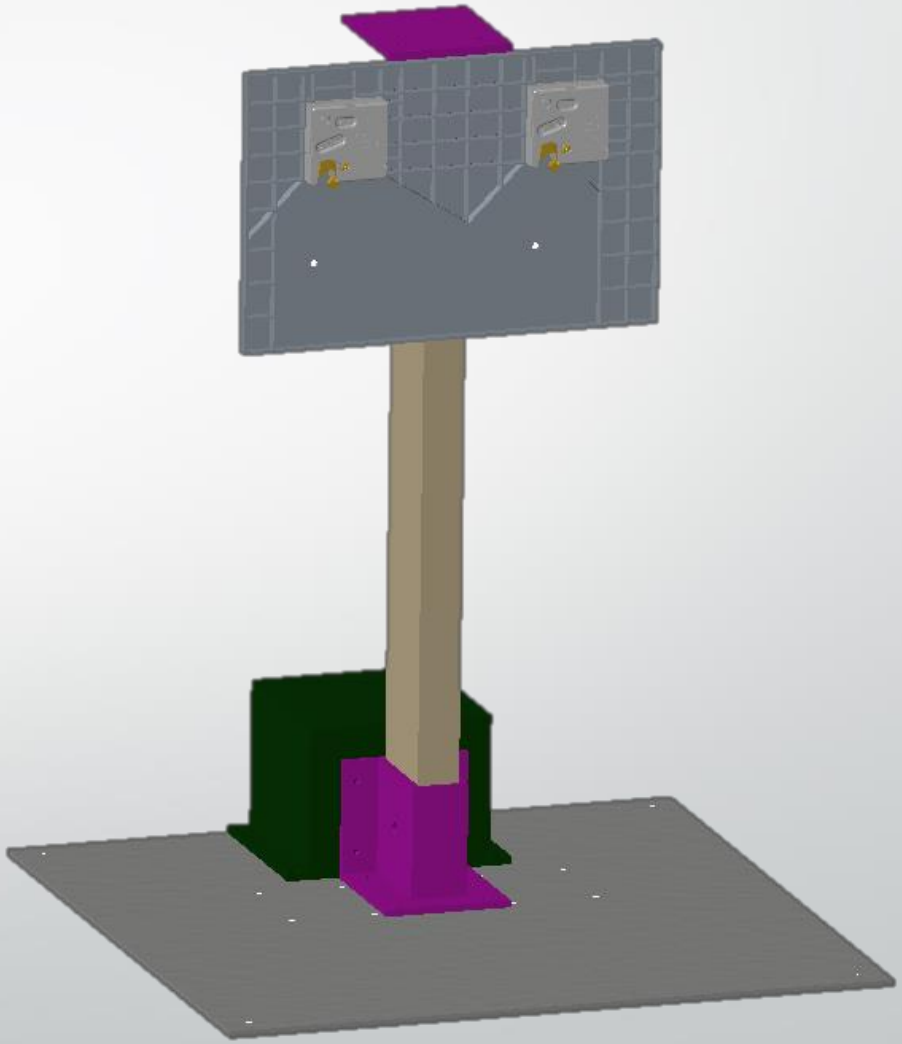


- Changes Made
  - Ribbing added to back
  - Material added to eliminate problems resetting
  - Wire holes reshaped to square

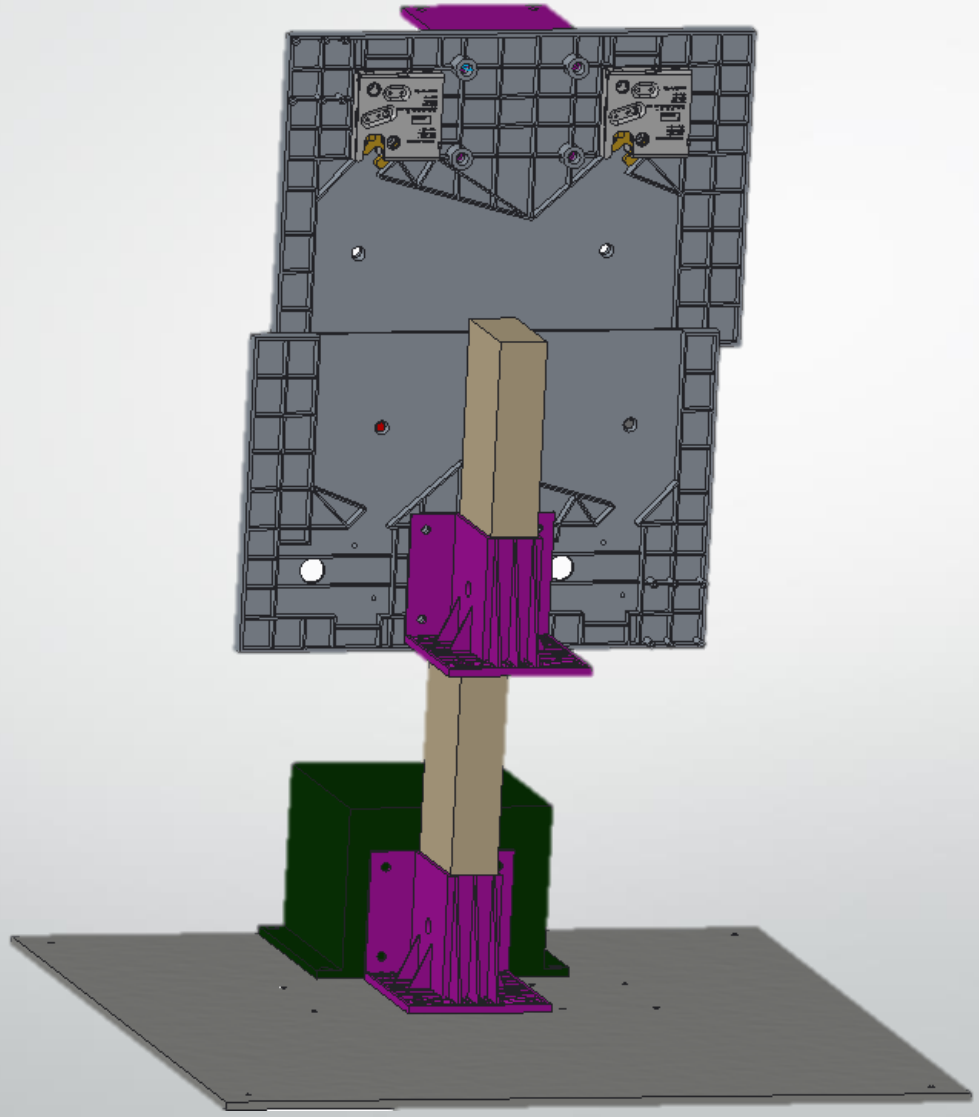
Stand Design







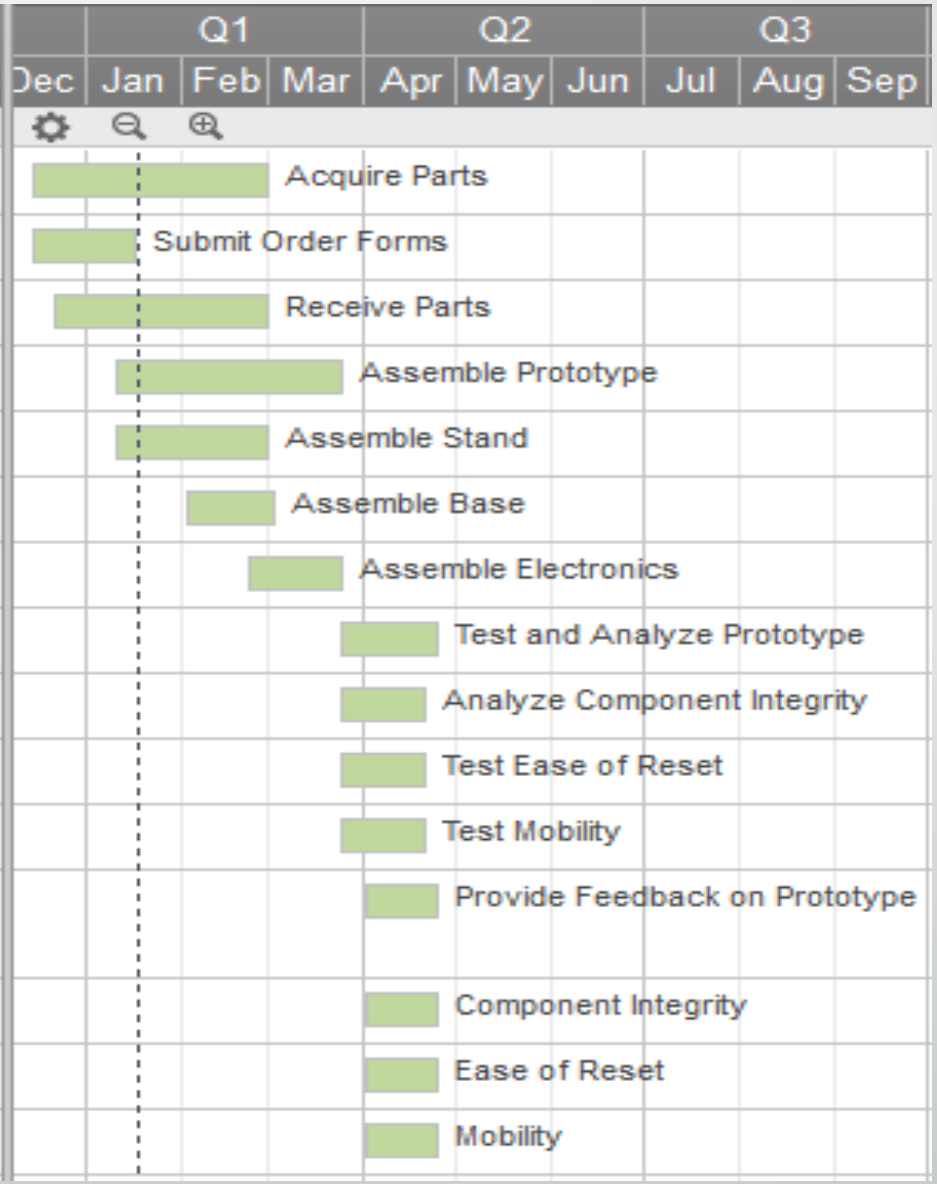
Full Assembly



Cost Analysis for Molded Parts

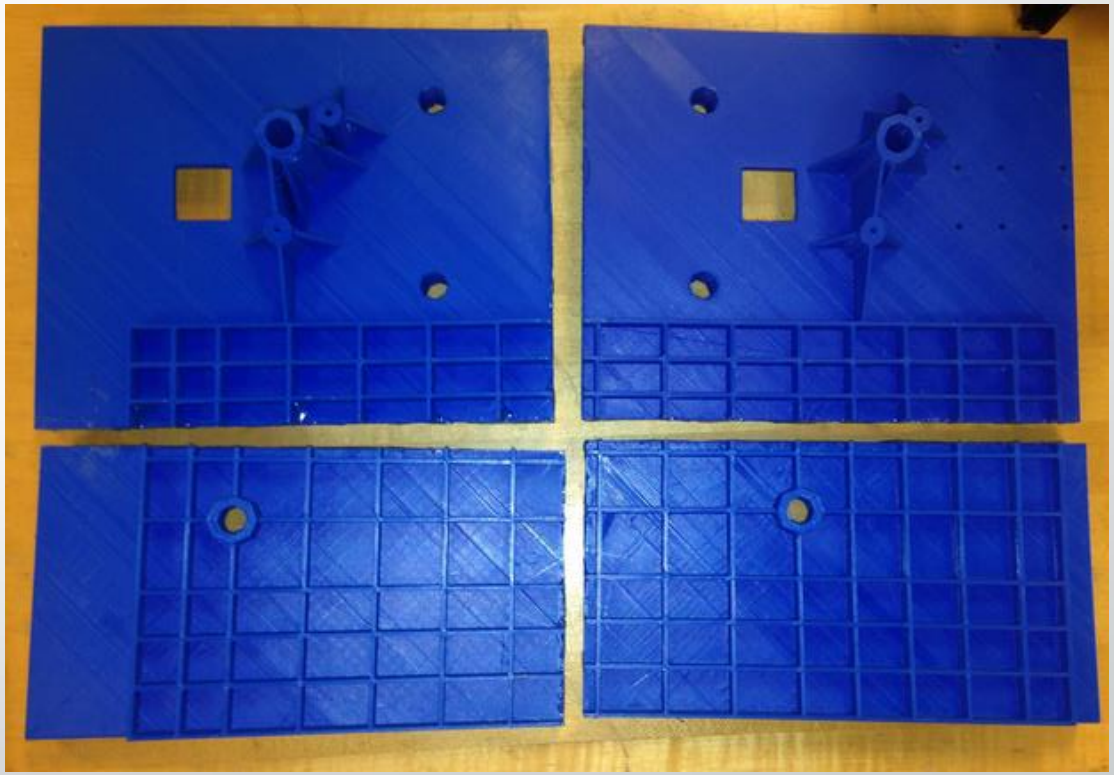
- Factors to Consider
  - Cost of Material and Size of Part
  - Number of inserts needed
  - Number of manual operations
- Target Price
  - 2x4 Adaptor = $25.00
  - Interface Plate = $50.00
- Total Cost
  - 2x4 Adaptor = $15.00
  - Interface Plate = $25.00
- Equation used to Estimate Cost
  - Cost($) = (4*(Cost of material($ / lb)*Weight of Part(lb)))
    +($2*Number of inserts)
    +($1* Number of manual operations)

Task Name	Start Date	End Date
Acquire Parts	**12/14/16**	**02/28/17**
Submit Order Forms	12/14/16	01/16/17
Receive Parts	12/21/16	02/28/17
Assemble Prototype	**01/10/17**	**03/24/17**
Assemble Stand	01/10/17	02/28/17
Assemble Base	02/02/17	03/02/17
Assemble Electronics	02/22/17	03/24/17
Test and Analyze Prototype	**03/24/17**	**04/24/17**
Analyze Component Integrity	03/24/17	04/20/17
Test Ease of Reset	03/24/17	04/20/17
Test Mobility	03/24/17	04/20/17
Provide Feedback on Prototype	**04/01/17**	**04/24/17**
Component Integrity	04/01/17	04/24/17
Ease of Reset	04/01/17	04/24/17
Mobility	04/01/17	04/24/17



Problems Encountered

- Interface Plate too large to 3D print
  - Too costly to print in one complete part
  - Printed in sections
    - Risky reattachment
- Received parts incompatible with project
  - Warped APLA material
  - Failed binding of sections



Next Steps

- Reprint new interface plate
- Continue assembly with current components
- Test and analyze prototype

Summary

- Introduction and Background
- Need and Goal Statement
- Objectives
- Lockheed Martin Prototype
- Injection Molding Components
  - 2x4 Adapter
  - Interface Plate
- Stand Design
- Design Modifications
- Cost Analysis
- Timeline