

# Horizon Hoverboards

## DEVELOPMENT OF A CONSUMER-GRADE LEVITATING HOVERBOARD

TEAM 20 – DESIGN REVIEW PRESENTATION 2

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# PRESENTATION OVERVIEW

- ▶ Background and Project scope
- ▶ Review Ideal Design
- ▶ Illustrate hovering concept
- ▶ Review the current prototype
- ▶ Final Components
- ▶ Challenges
- ▶ Proposed Mount Fix
- ▶ Remaining Work
- ▶ Proposed Testing
- ▶ Scheduling
- ▶ Summary

# BACKGROUND & PROJECT SCOPE

- ▶ Advanced hoverboards are very expensive (over \$10,000) and there is no simpler inexpensive product in the market.
- ▶ Our goal is to create an inexpensive hoverboard that can be used for recreational purposes and targets a wide market of people. This board will use air as levitating medium.
- ▶ Our main objective is to ensure proper inflation that would provide adequate lift and allow for smooth hovering.

# Review Ideal Concept

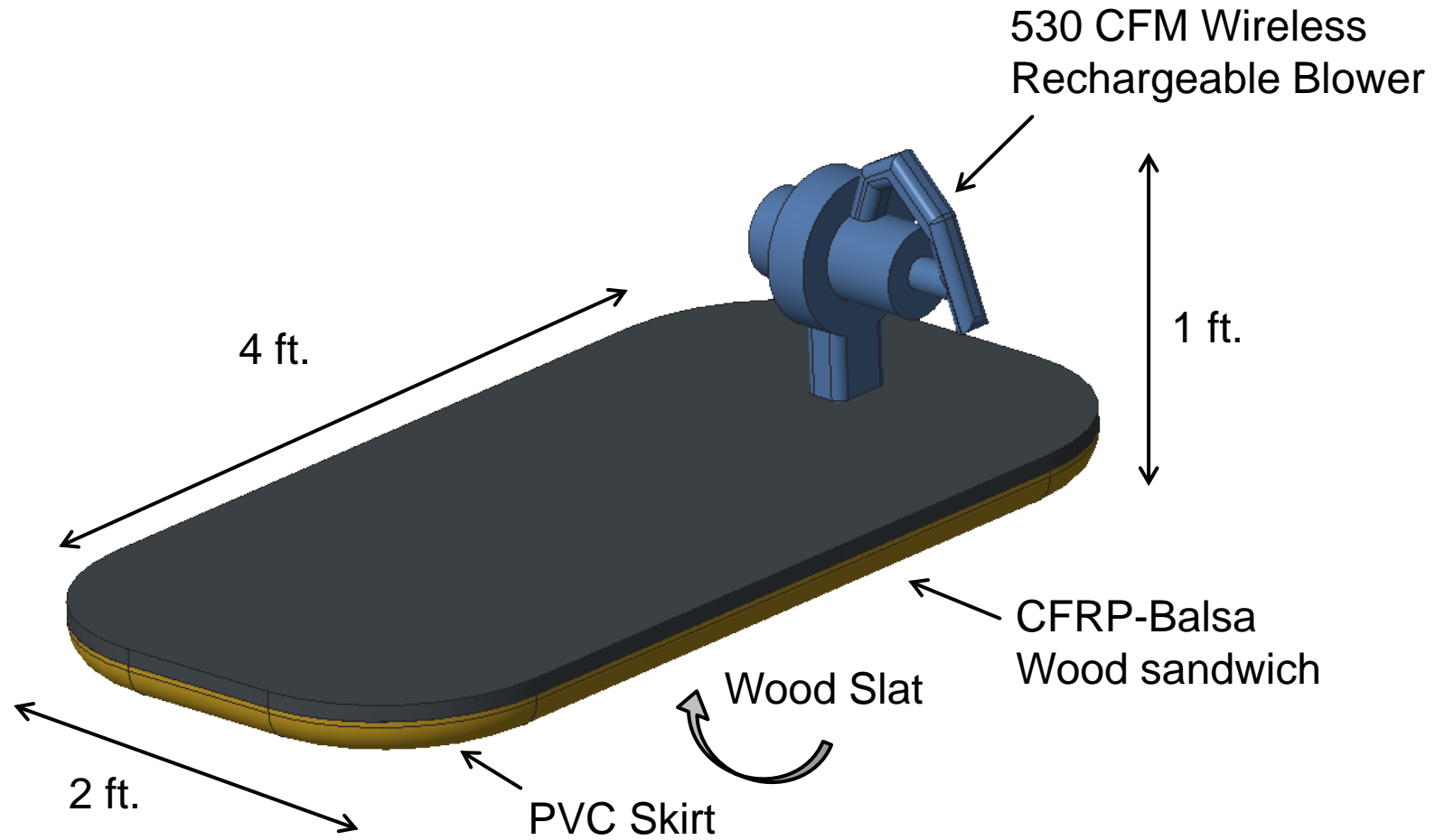
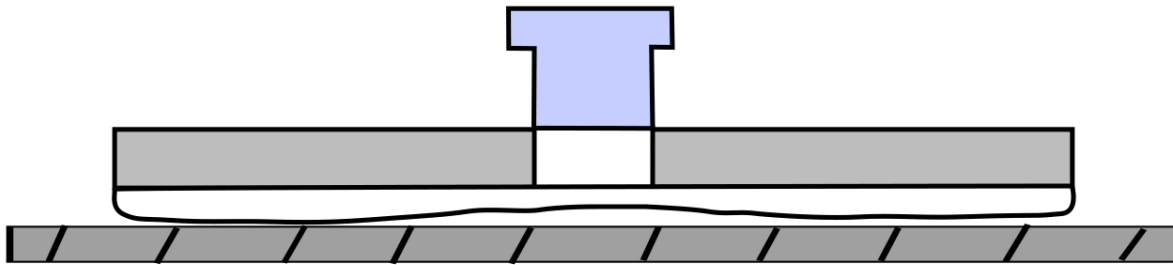


Figure 1- Ideal Design of Hoverboard

# Hovering Concept Explained



*Figure 2 - Hovering Concept Animation*

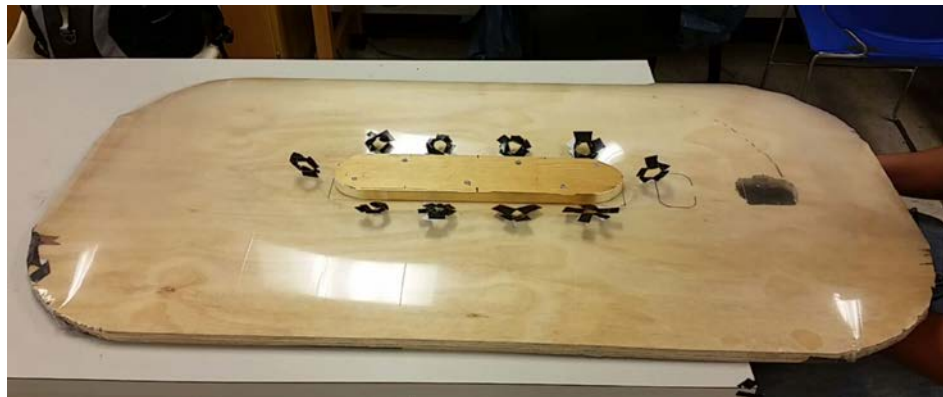
1. Blower inflates the skirt
2. Air flows through holes in skirt
3. Pressure builds up underneath and lifts board

# REVIEW - of actual board we have

- ▶ LULU 3.0
  - ▶ Plywood as the deck
  - ▶ Vinyl shower curtain as the skirt
  - ▶ Staples and Duct tape as the seal
- ▶ Using a ~200 CFM leaf blower.
- ▶ No thrust device as of now

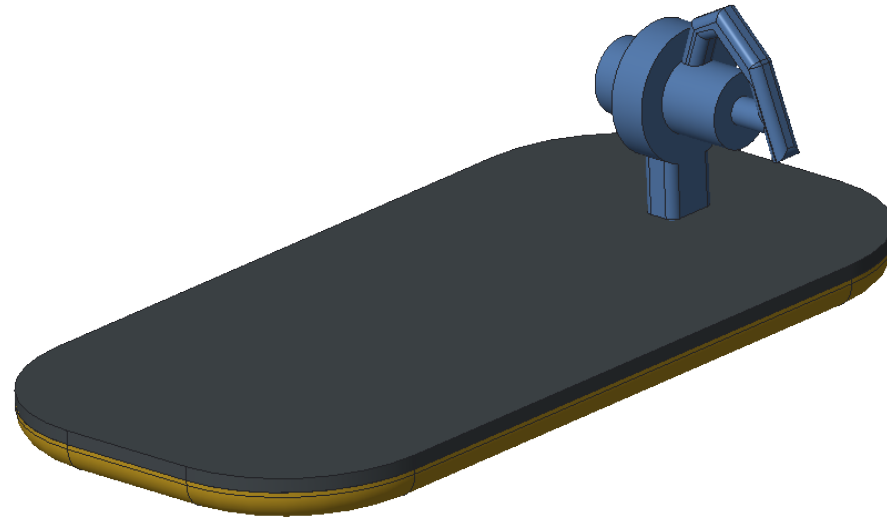
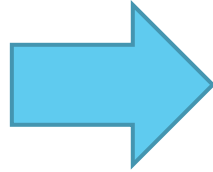


*Figure 3 - Hoverboard, Top View*



*Figure 4 - Prototype Hoverboard, Underside View*

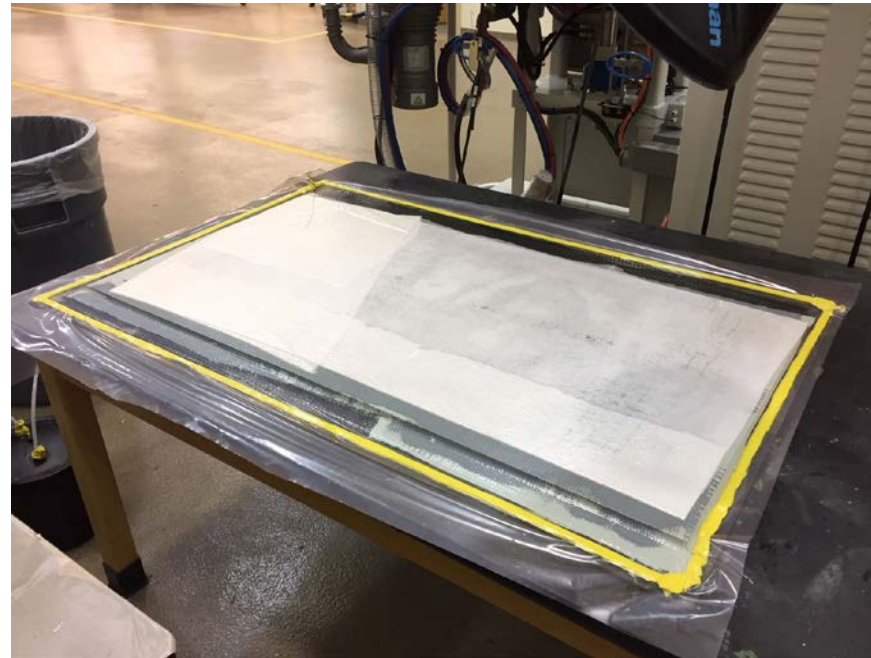
# Achieving a Finished Product



*Figure 5 – Prototype to Ideal Design*

# Final Product- Deck

- ▶ Carbon fiber reinforced plastic was manufactured by the team at the High Performance Materials Institute, and is ready to work with.
- ▶ Specifications:
  - ▶ Dimensions:
    - ▶ (2x) sheets
    - ▶ 2ft. by 4ft.
  - ▶ Weight
    - ▶ 4.67 lbs or 2.12 kg



*Figure 6 – Constructing Carbon Fiber Board*



# Final Product- Inflator

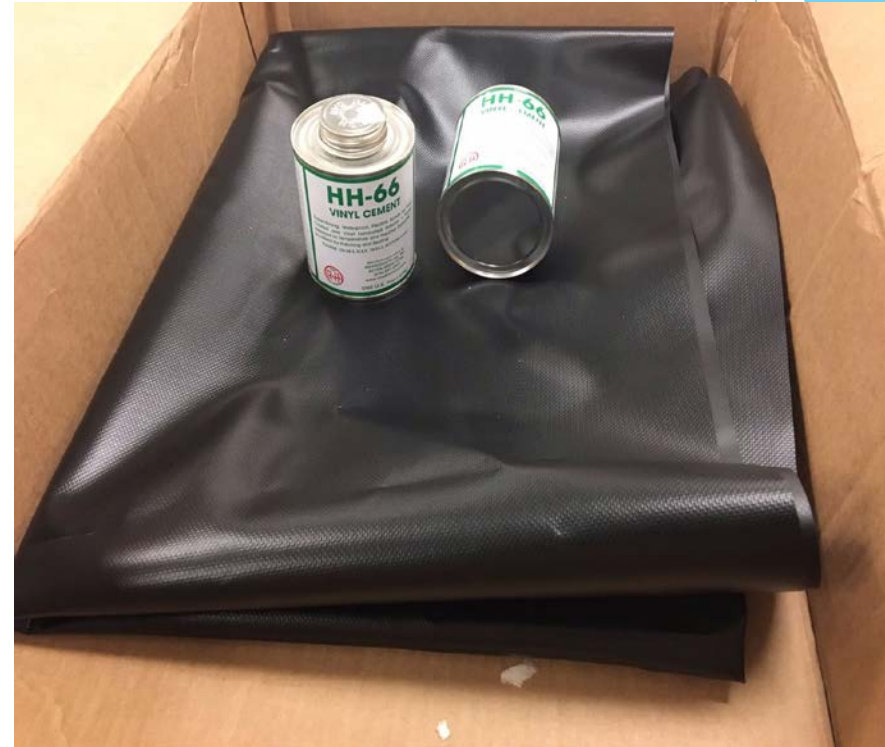
- ▶ Wireless rechargeable blower has been ordered and the team is waiting for its arrival to start building the final prototype.
- ▶ Model specifications:
  - ▶ EGO-110mph
  - ▶ Variable-speed control delivers 250 CFM to 530 CFM
  - ▶ 56 Volt Lithium-Ion battery
  - ▶ Up to 75-minute run time
  - ▶ 50 minute charge time
  - ▶ Weather-resistant construction



*Figure 7 - Wireless rechargeable blower [1]*

# Final Product - Skirt

- ▶ Skirt Materials
  - ▶ 18.5 oz PVC coated Polyester - 61" Wide - Black – 2 Yds
  - ▶ 2 pt HH-66 Skirt Glue
  - ▶ ½" Rubber Tape Gasket
  - ▶ Appropriate bolts, nuts, and washers to attach the gasket and seal the skirt
- Skirt materials have arrived and are ready for cutting and assembly.



*Figure 8 - PVC-Polyester Skirt Material and Skirt Glue*

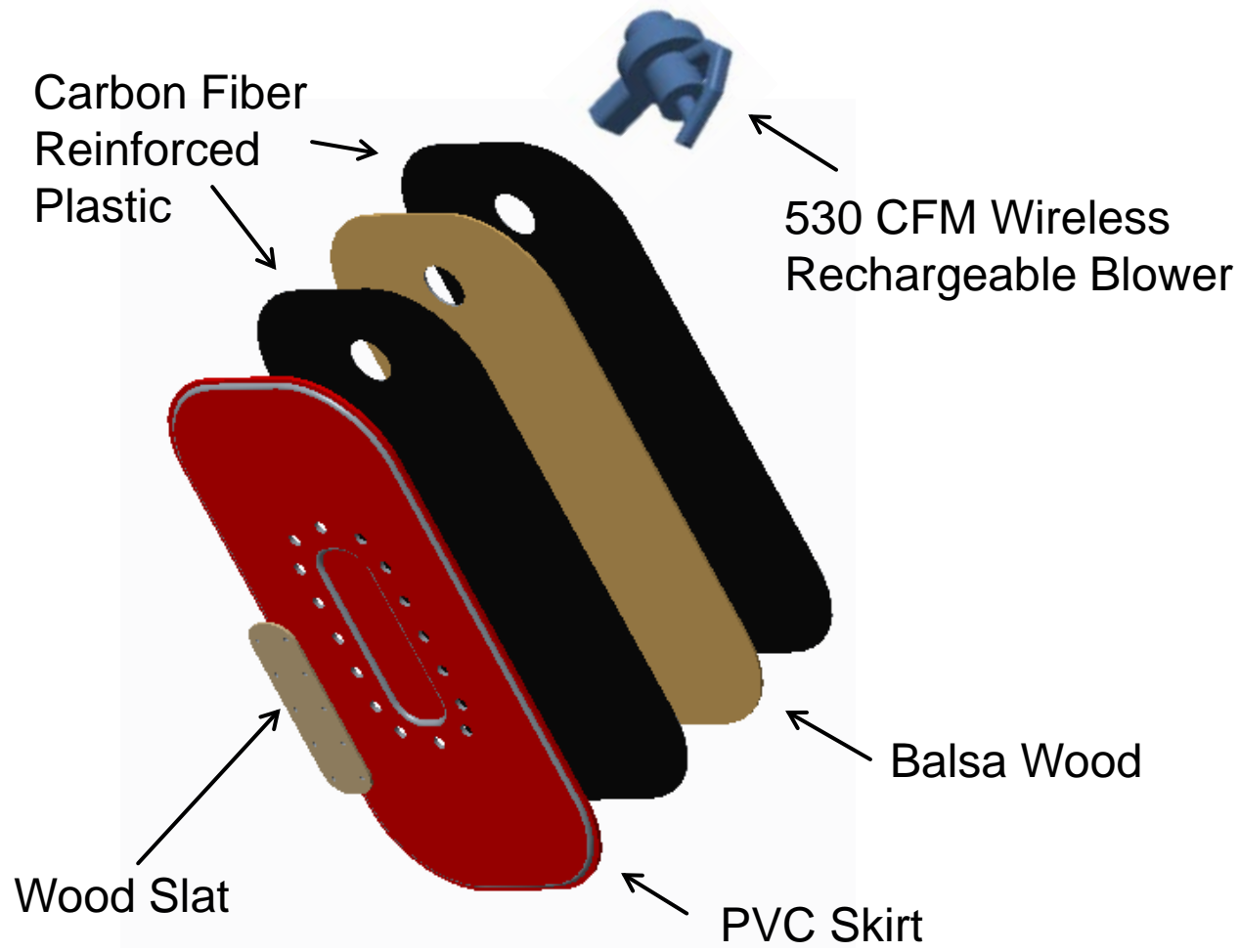


Figure 9 – Hoverboard assembly.

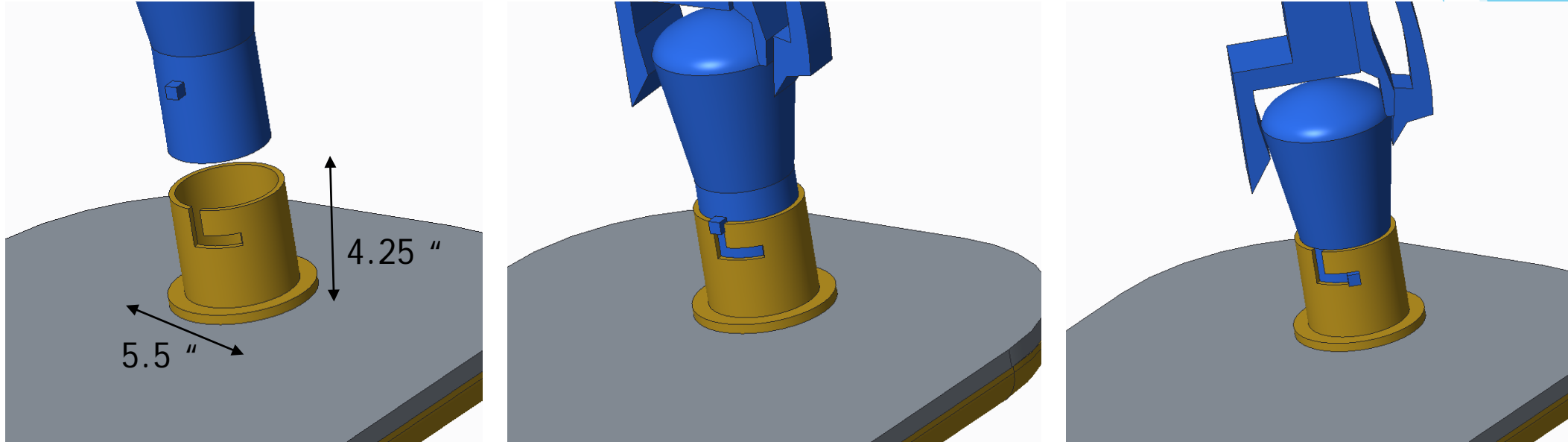
Figure 10 – Hoverboard exploded view.

# CHALLENGES

- ▶ The major issue for now is the noise.
- ▶ Users must be able to completely balance themselves in order to be able to use it. Having previous knowledge on how to ride a skateboard makes it easier to use.
- ▶ Ensuring the skirt remains leak-free.
- ▶ Blower falls out of position.



# Proposed Solution for Blower Mount



*Figure 11 – Twist lock mount, made from PVC flange*

Attach a dowel to the nozzle of the blower and insert it into a PVC flange with a twist-lock.

# REMAINING WORK

- ▶ Develop the twist and lock mechanism for the blower so it will be locked in position.
- ▶ Attach the skirt
- ▶ Attempt a thrust device.
- ▶ Solve the noise issue.
- ▶ Troubleshoot the performance.
- ▶ Complete Hoverboard assembly.
- ▶ Engineering Shark Tank, April 14th

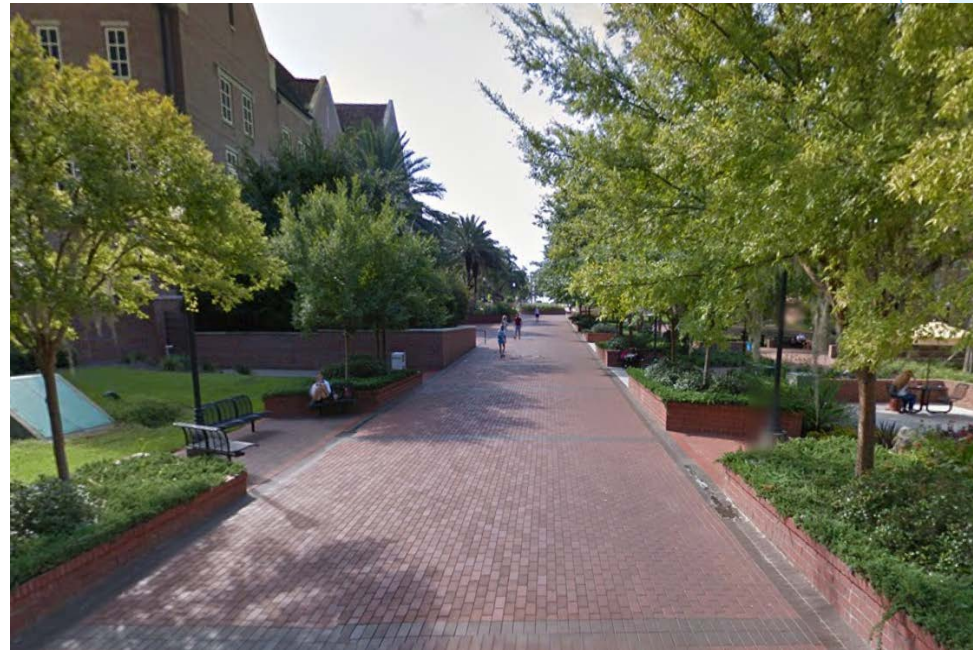
# Testing the Board

We would like to test the board on a couple different surfaces and inclines.



*Figure 12 – HCB at FSU*

Smooth Concrete and Flat Surface



*Figure 13 – Traditions Way at FSU*

Brick Surface and a slight decline

# SCHEDULING

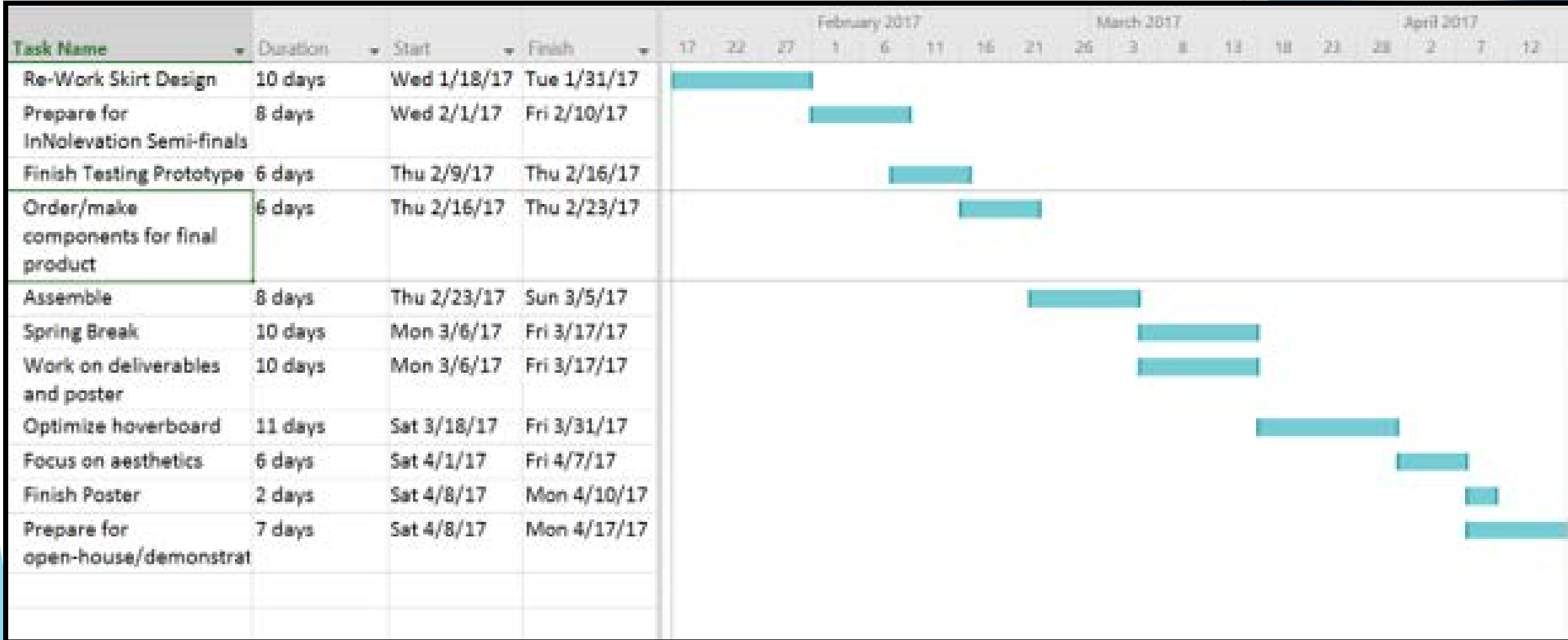


Figure 14 - Gantt Chart



# SUMMARY OF GOALS

- ▶ Keep working and testing alternatives to provide users more:
  - ▶ Balance
  - ▶ Safety
- ▶ Do research to find out what is causing the loud noise and find ways in how to reduce it.
- ▶ Finish assembly and testing.

# REFERENCES

- ▶ [1] "EGO 110 Mph 530 CFM Variable-Speed Turbo 56-Volt Lithium-ion Cordless Electric Blower-LB5302." *The Home Depot*. Home Depot Product Authority, LLC, n.d. Web.
- ▶ [2] Bow, Wangbow Violin. "Carbonfiber Pernambuco Ebony." *Bow Materials | Pernambuco | Ebony | Brazilwood | Carbon Fiber*. 2017 WangBow, n.d. Web. <<http://www.wangbow.com/shop/carbonfiber-pernambuco-ebony-ezp-22.html>>.
- ▶ [3] "Learning Center - Vacuum Bagging Equipment & Techniques for Room-Temp Applications." *Fibre Glast*. N.p., n.d. Web. <[http://www.fibreglast.com/product/vacuum-bagging-equipment-and-techniques-for-room-temp-applications/Learning\\_Center](http://www.fibreglast.com/product/vacuum-bagging-equipment-and-techniques-for-room-temp-applications/Learning_Center)>.
- ▶ [4] Burchell, Graham. "Composite Panels." *Composite Panels, Flat Panel Laminates And Sandwiches | Fibrefusion*. N.p., n.d. Web. <<https://www.fibrefusion.com/composite-panels>>.

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*QUESTIONS?*