

Horizon Hoverboards

DEVELOPMENT OF A CONSUMER GRADE LEVITATING HOVERBOARD

TEAM 20 – DESIGN REVIEW PRESENTATION

Bradshaw, Evelyn

Drawdy, Shawn

Levy, Jonathan

Ross, Brian

Sison, Kevin

FACULTY ADVISOR:

Dr. Chiang Shih

SPONSOR:

Dr. Michael Devine

PRESENTATION OVERVIEW

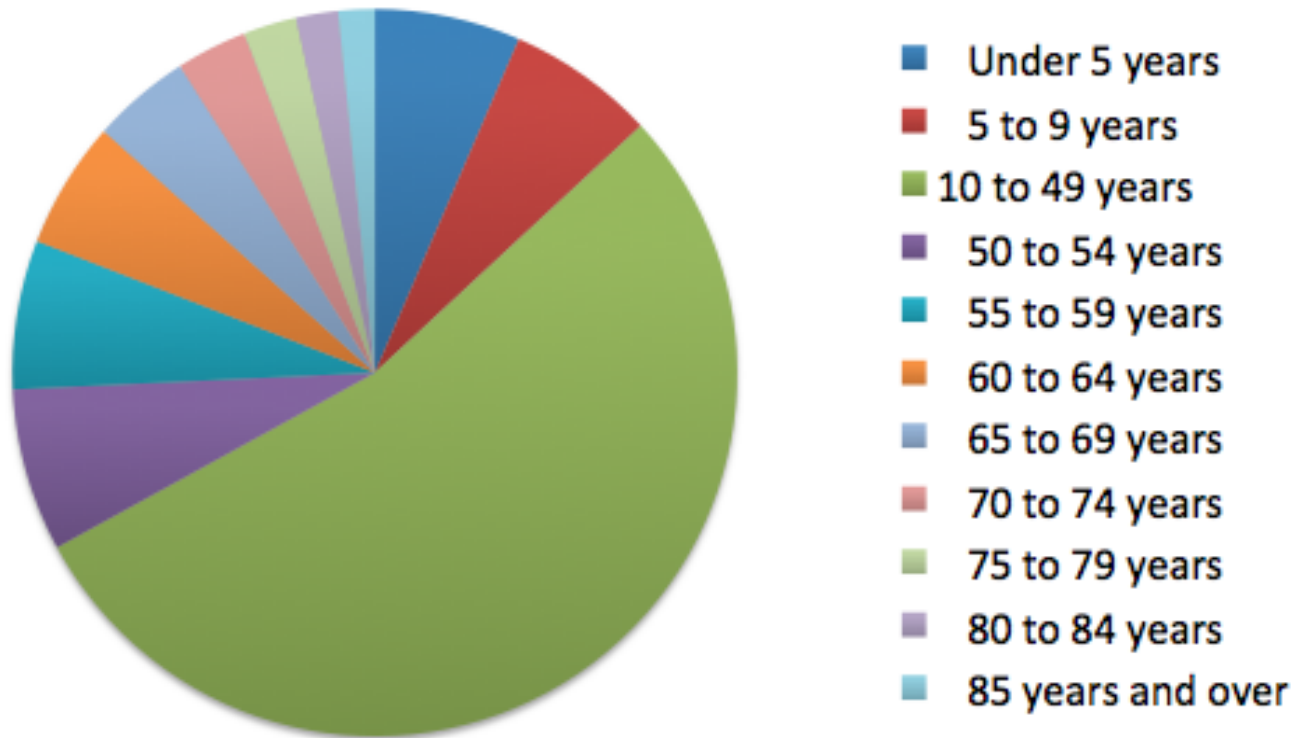
- ▶ Background and Project scope
- ▶ Entrepreneurial Aspect
- ▶ Review
- ▶ Current State
- ▶ Design Specifications
- ▶ Challenges
- ▶ Future Work
- ▶ Scheduling
- ▶ Summary

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.

ENTREPRENEURIAL ASPECT - CUSTOMERS

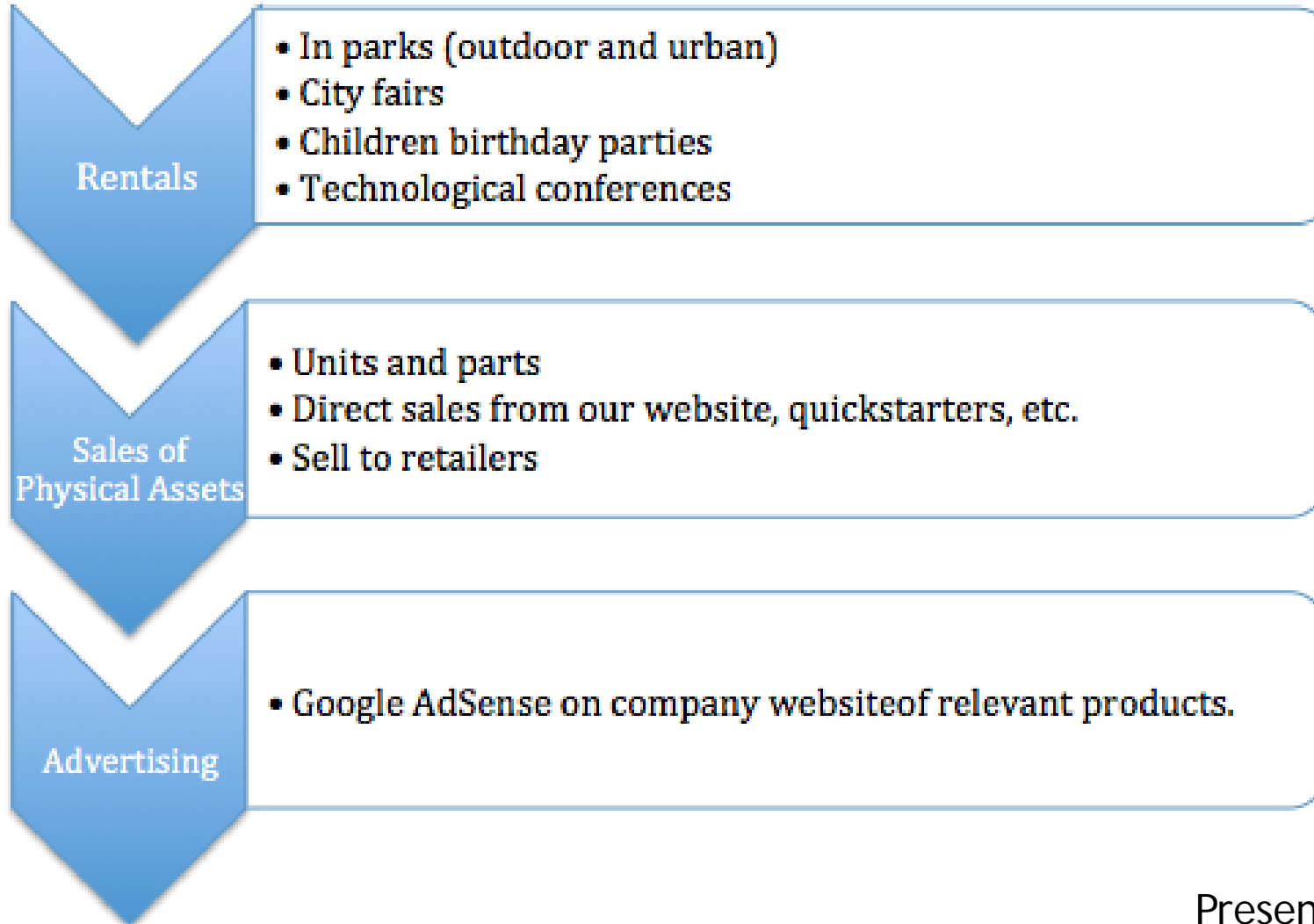
2012 US Census by Age



- ▶ Targeting ages 10 to 49 years old provides a wide possible market.
- ▶ Anyone that can ride a skateboard can use our product.

Figure 1 - 2012 US census by Age Pie Chart.

ENTREPRENEURIAL ASPECT – REVENUE STREAMS



REVIEW

- ▶ There were some issues with the skirt of the prototype that didn't allow it to move around. The bag skirt was not properly designed for it to perfectly fit the board design. Hence, the skirt wasn't leveled when inflated.



Figure 2 - Unleveled skirt.

CURRENT STATE

- ▶ Third prototype finally works, which allowed the team to begin building our final product.



Video 1 – Testing third prototype.

CURRENT STATE

- ▶ 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 3 - Wireless rechargeable blower [1]

CURRENT STATE

- ▶ 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.

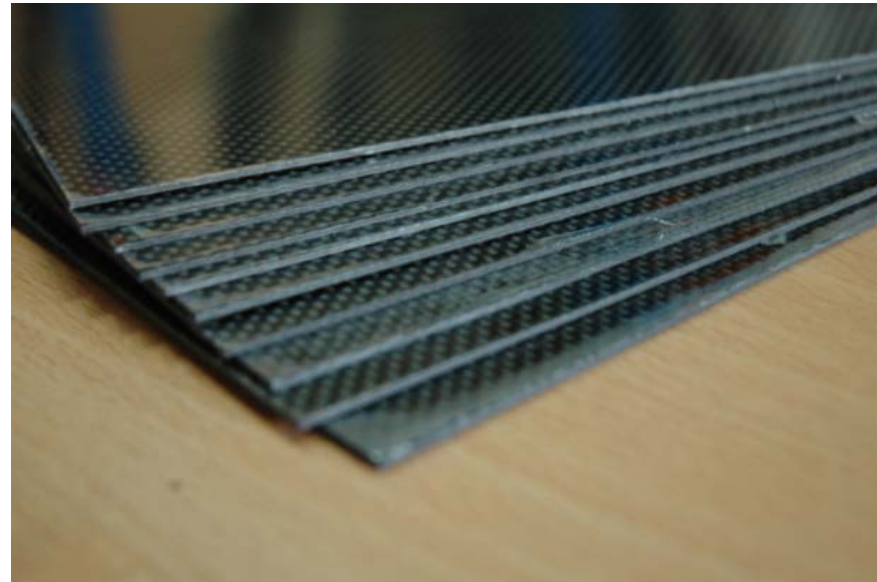


Figure 4 - Carbon Fiber Reinforced Polymer sheets [2].

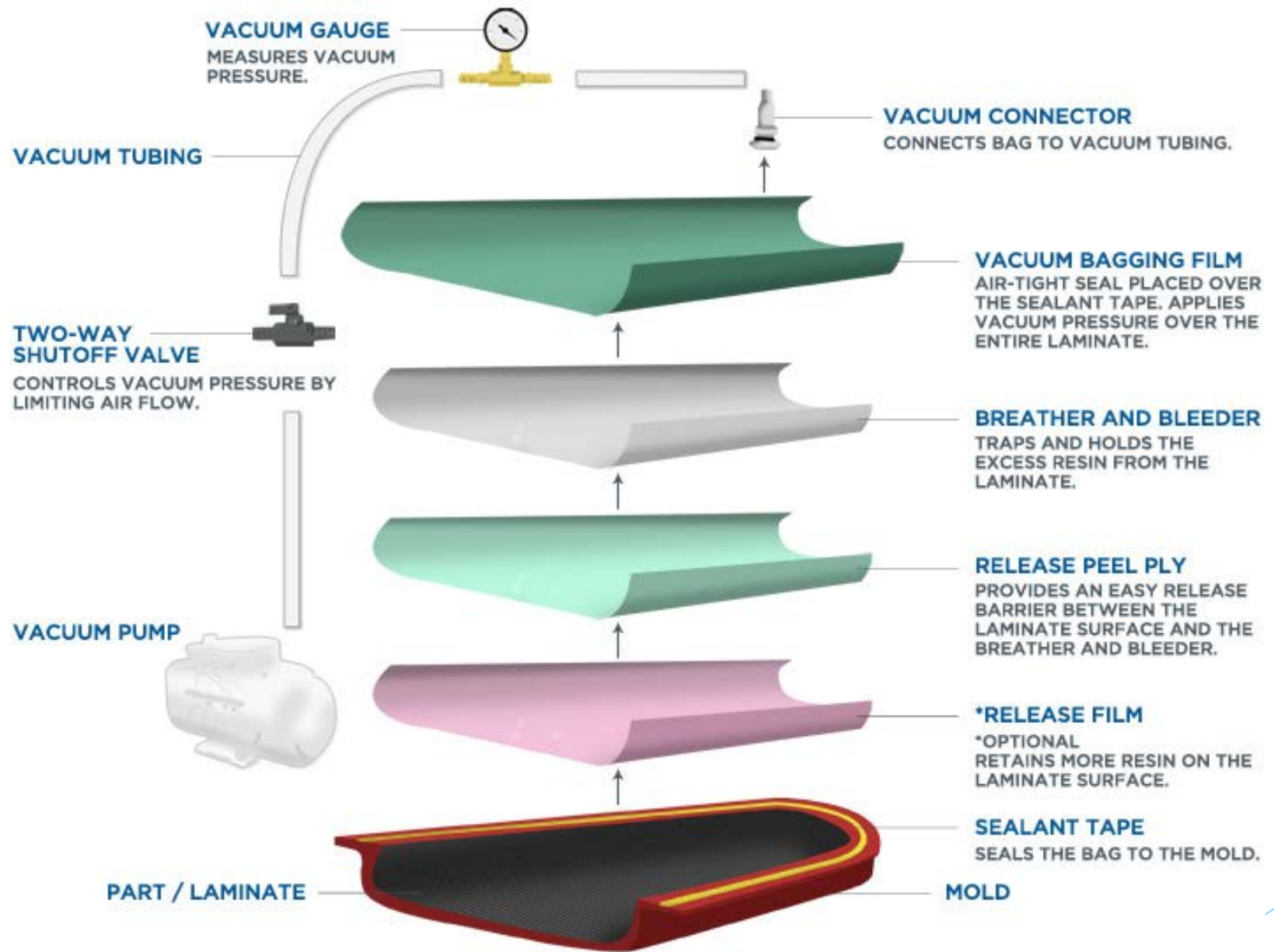


Figure 5 - Manufacturing Process for Carbon Fiber Reinforced Polymer [3].

CURRENT STATE

- ▶ The team has order multiple pieces of EVA foam of variable thickness
- ▶ A sandwich structure with the EVA foam in the middle and the two sheets of CFRP manufactured on both sides will be implemented to decrease possible bending.
- ▶ Figure 6 shows a reference for this concept.

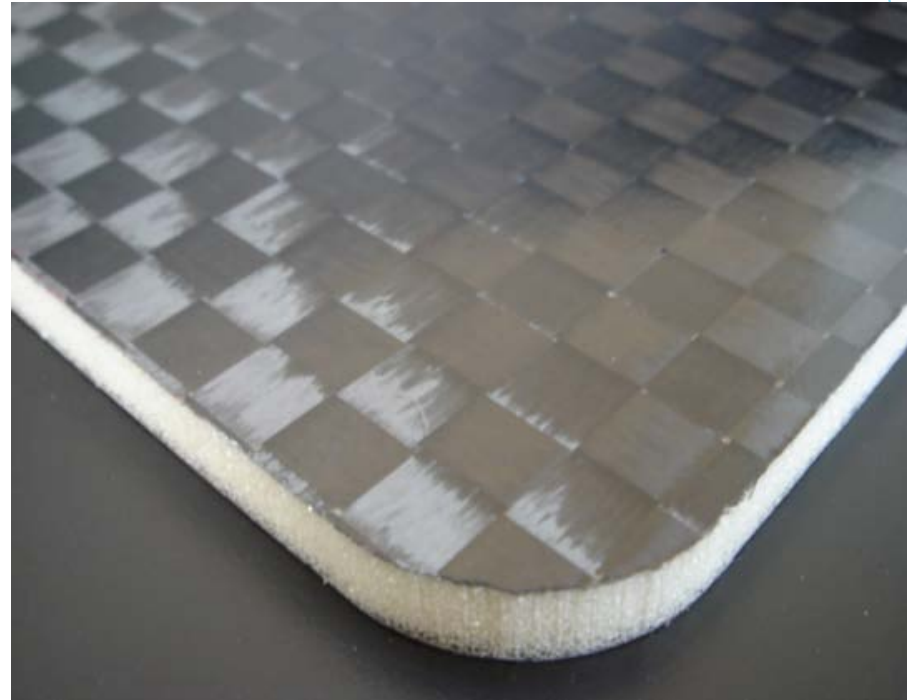


Figure 6 - Sandwich structure with CFRP in the outside and EVA foam in the middle [4].

DESIGN SPECIFICATIONS

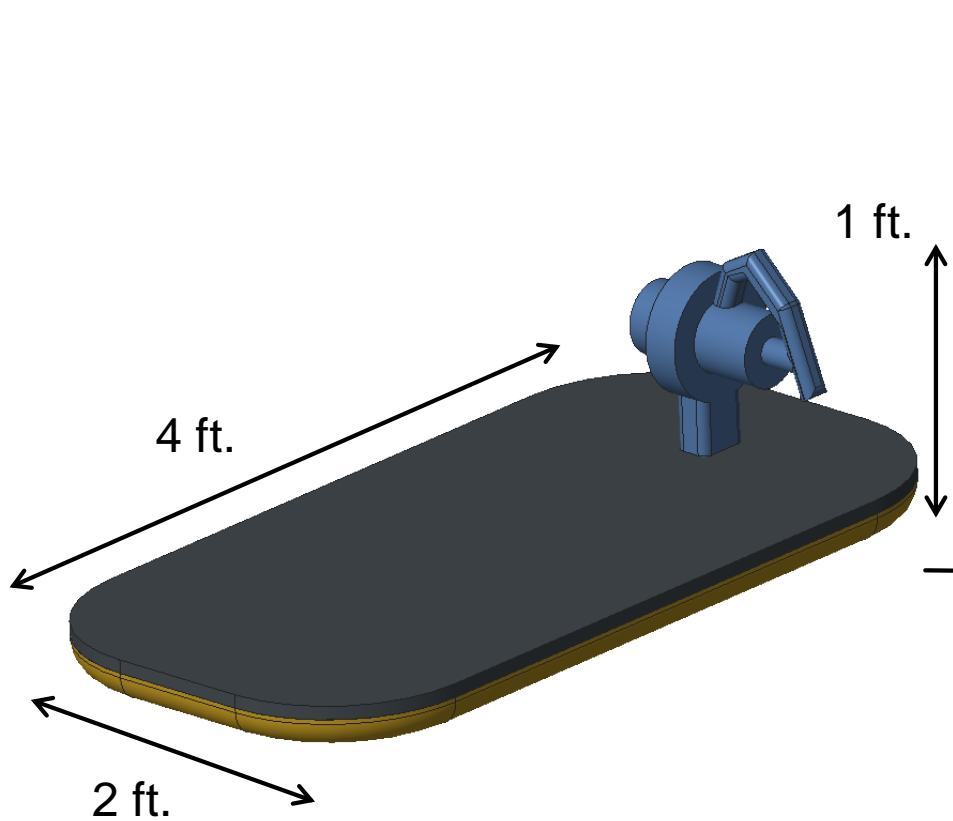


Figure 2 – Hoverboard assembly.

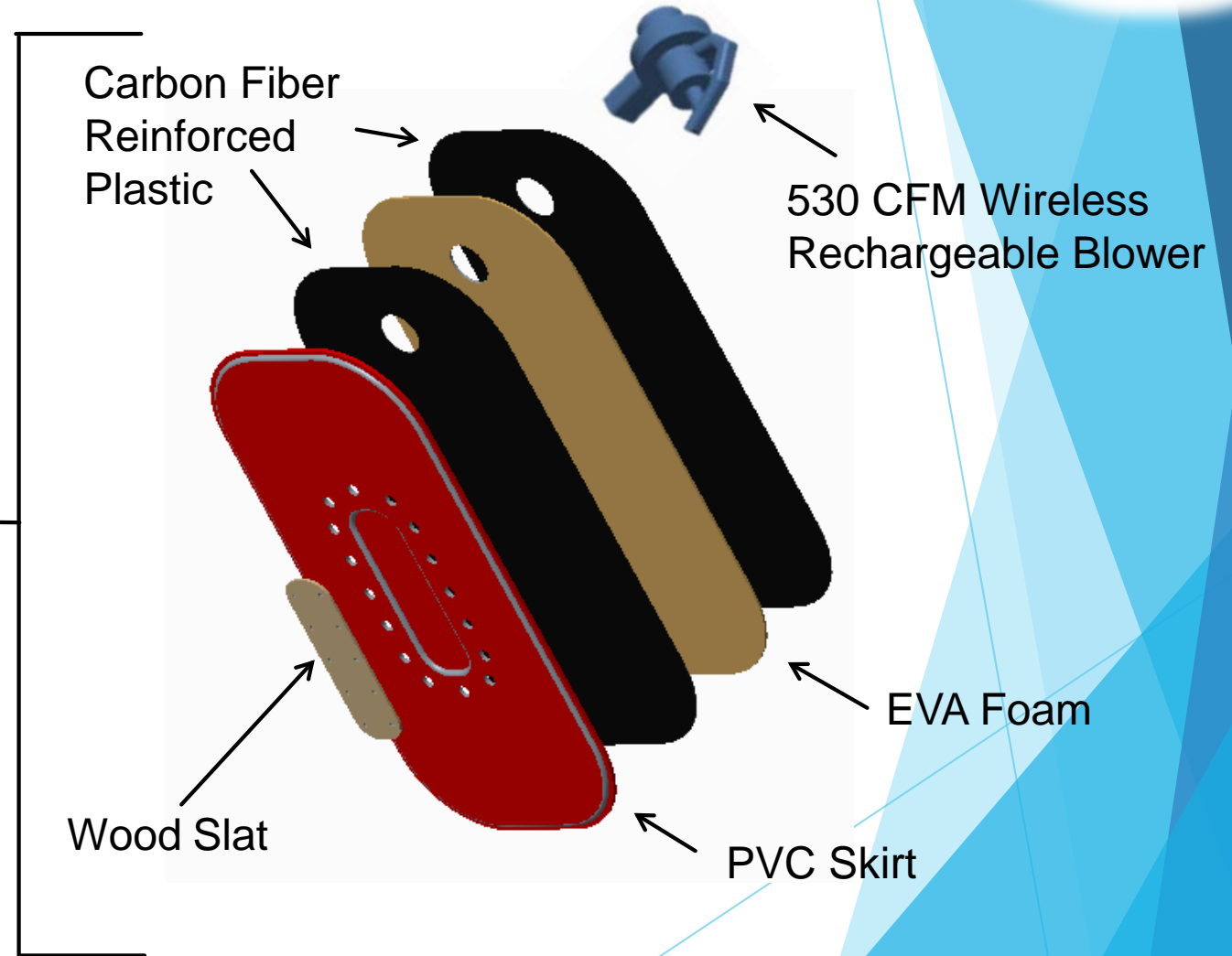


Figure 7 – Hoverboard exploded view.

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.
- ▶ Blower keeps falling out of place after several uses.



FUTURE WORK

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

SCHEDULING

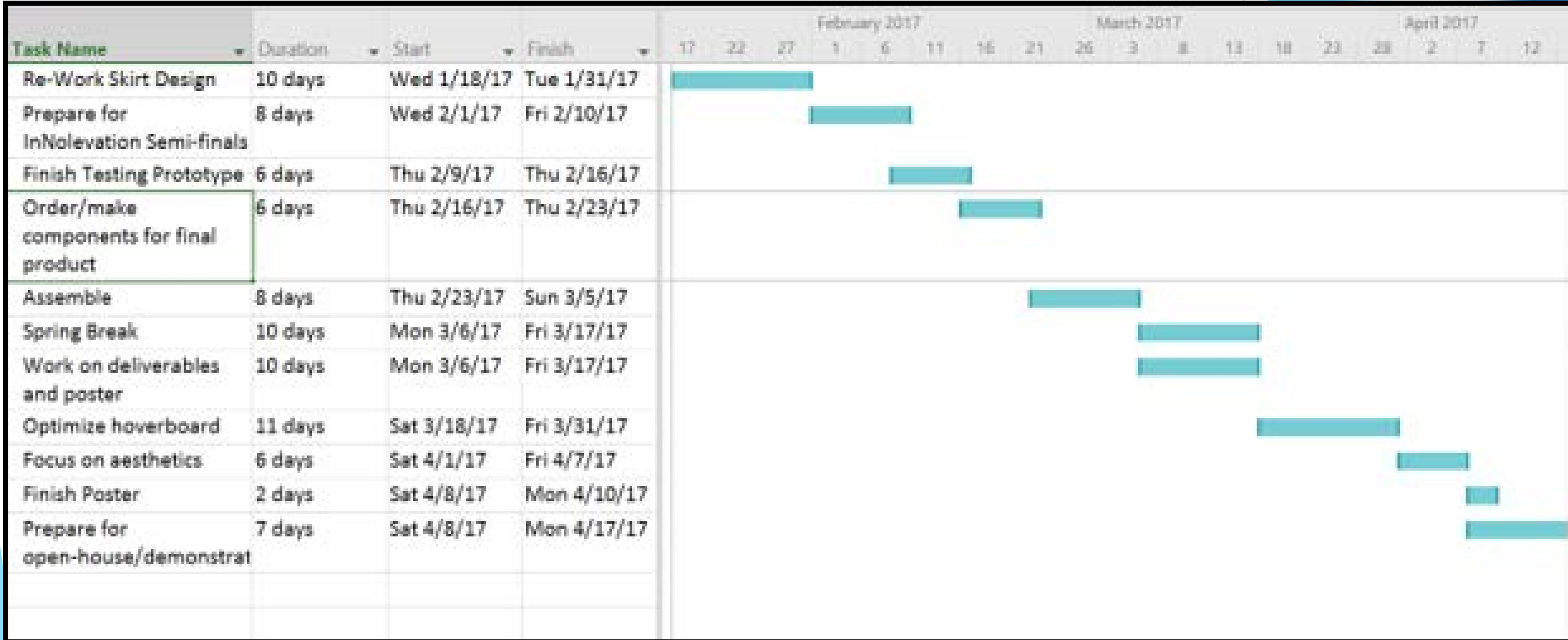


Figure 8 - Gantt Chart

SUMMARY

- ▶ Once parts arrive, final design will begin.
- ▶ Solve the noise issue.
- ▶ Create a fixture for the blower so it will be locked in position.

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>.
- ▶ [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?