

Mechanical Overview

Year: 2020 **Semester:** Fall **Team:** 6
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Project: Snow-weAR Goggles
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Assignment Evaluation:

Item	Score (0-5)	Weight	Point s	Notes
Assignment-Specific Items				
Commercial Packaging Analysis 1		x2		
Commercial Packaging Analysis 2		x2		
CAD Model Illustrations		x4		
Project Packaging Specifications		x2		
PCB Footprint Layout		x2		
Writing-Specific Items				
Spelling and Grammar		x2		
Formatting and Citations		x1		
Figures and Graphs		x2		
Technical Writing Style		x3		
Total Score				

5: Excellent 4: Good 3: Acceptable 2: Poor 1: Very Poor 0: Not attempted

Comments:

Comments from the grader will be inserted here.

1.0 Commercial Product Packaging

1.1 Product #1



Figure 1: AR Ski Goggles by RideOn [1]
View [2]



Figure 2: RideOn Goggle User

RideOn's Augmented Reality Ski Goggles offer a true AR experience with a transparent display that spans the wearer's full field of vision [1]. They include many of the features we plan to include in our design as well as smartphone integration via Bluetooth and directional assistance on screen. The hardware components that enable these features are stored in blocks on the sides of the goggles that connect to the straps.

The full display allows for many customizable formatting possibilities to display data to the wearer [2]. For our project, we are looking to maximize the display size to show the user useful data at a size that is easy to read. We will be using a transparent display on one side that is 3.5cm x 1.8cm and can display multiple metrics at once.

The hardware components are stored in blocks on the sides of the goggles. They are bulky, but fit under the straps so that they rest on the wearer's temple and don't get in the way. We plan to store components in a similar way on one side of the goggles.

A downside of this packaging is that it is much heavier than a regular pair of ski goggles. The extra hardware more than doubles the weight of the goggles and a portion of this can be attributed to the battery. In our design, the battery will rest in the wearer's coat to minimize weight added to the head.

1.2 Product #2



Figure 3: Oakley Airwave Snow Goggles[3]



Figure 4: Airwave Goggle User View [4]

The Airwave Snow Goggles from Oakley feature a heads-up display in the bottom right corner of the goggle lens. It can display an array of different metrics one at a time and the wearer has the ability to cycle through via a remote control that attaches to the wearer's wrist [3].

The goggles are similar in weight and bulk to normal ski goggles. This is advantageous as there is no limit to the type of helmet that can be worn with the goggles and they are not too heavy to cause discomfort throughout a day of skiing.

A downside of this design is the size of the display that limits the amount of information that can be displayed at one time [4]. The wearer is forced to manually toggle between metrics using the remote control, which is inconvenient to do while skiing. The display for our project is larger and will take up a larger portion of the screen to avoid this issue.

In our design we are implementing a user toggleable function to request GPS information from a buddy. This is the only feature that will be toggleable in our design to minimize the wearer's need to stop and mess with the goggles.

2.0 Sources Cited

- [1] "RideOn Ski Goggles," *RideOn LTD*. [Online]. Available at: <https://www.rideonvision.com/new/ski-goggle.php#support-section>. [Accessed: 22 September 2020].
- [2] "RideOn AR Ski Goggles Demo," *YouTube.com*. [Online]. Available at: https://www.youtube.com/watch?v=2cR9Eo0Zcyg&ab_channel=RideOn. [Accessed: 23 September 2020].
- [3] "AirWave Snow Goggle," *Oakley*. [Online]. Available at: <https://www.oakley.com/en-us/product/W0007049?variant=700285844411&fit=GLOBAL&lensShape=STANDARD>. [Accessed: 22 September 2020].
- [4] "Oakley Airwave Snot Goggle," *The Ski Monster*. [Online]. Available at: https://www.youtube.com/watch?v=2cR9Eo0Zcyg&ab_channel=RideOn. [Accessed

Appendix 1: CAD Model Illustrations

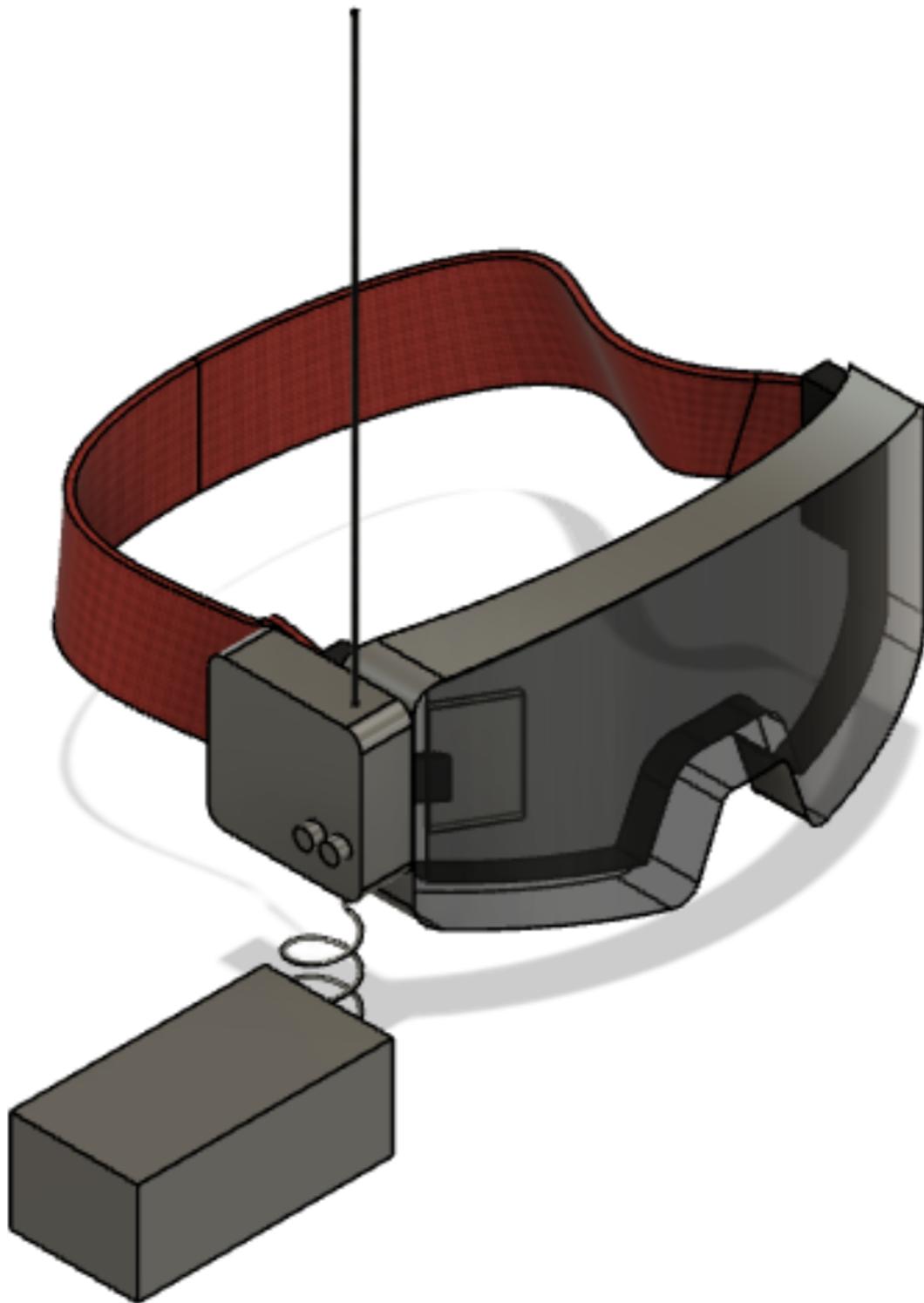


Figure 5: Overall view of the goggle front

Figure 6: Overall view of the inside of the goggles

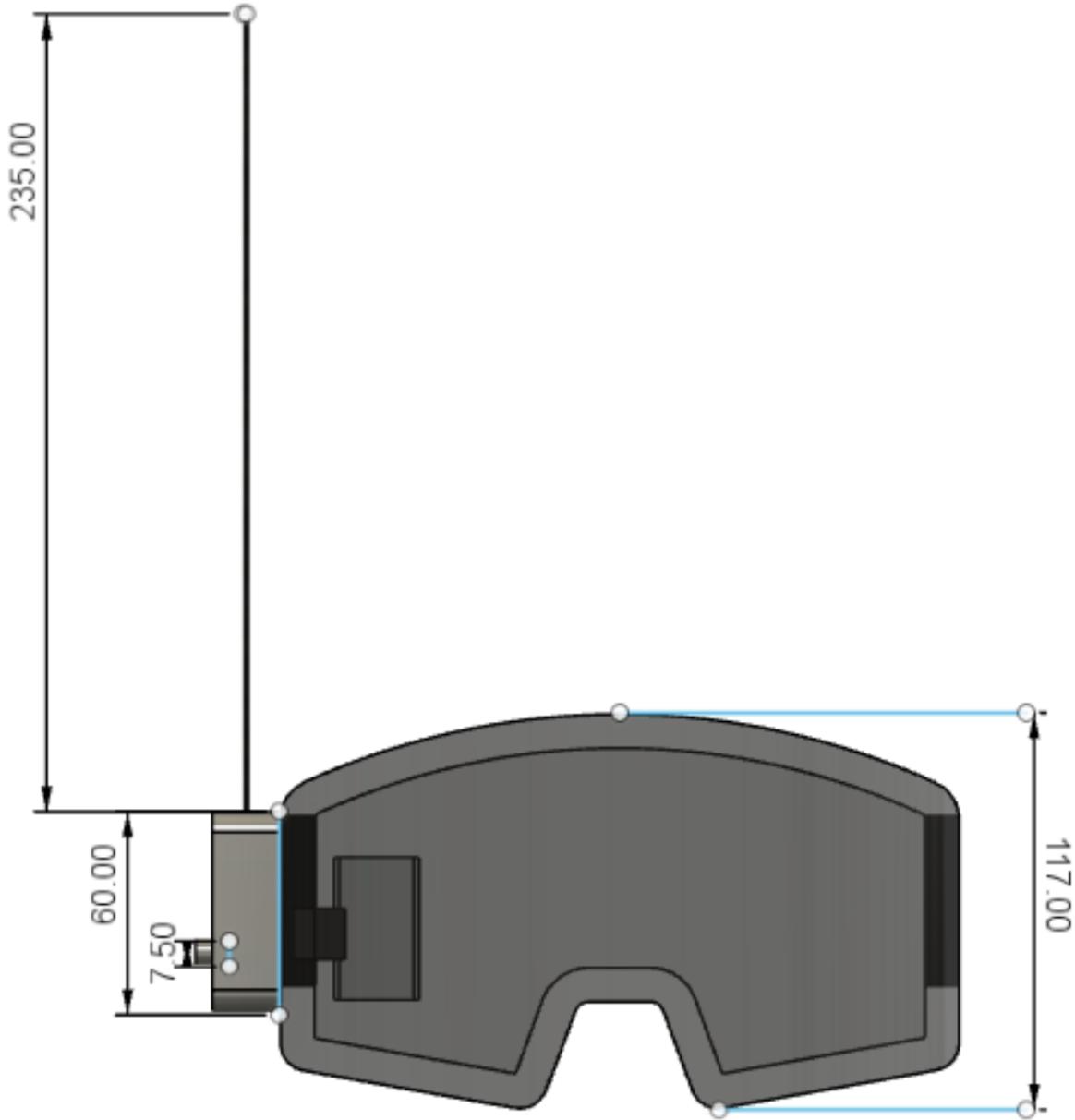


Figure 6: Front view of the goggles (all dimensions in mm)

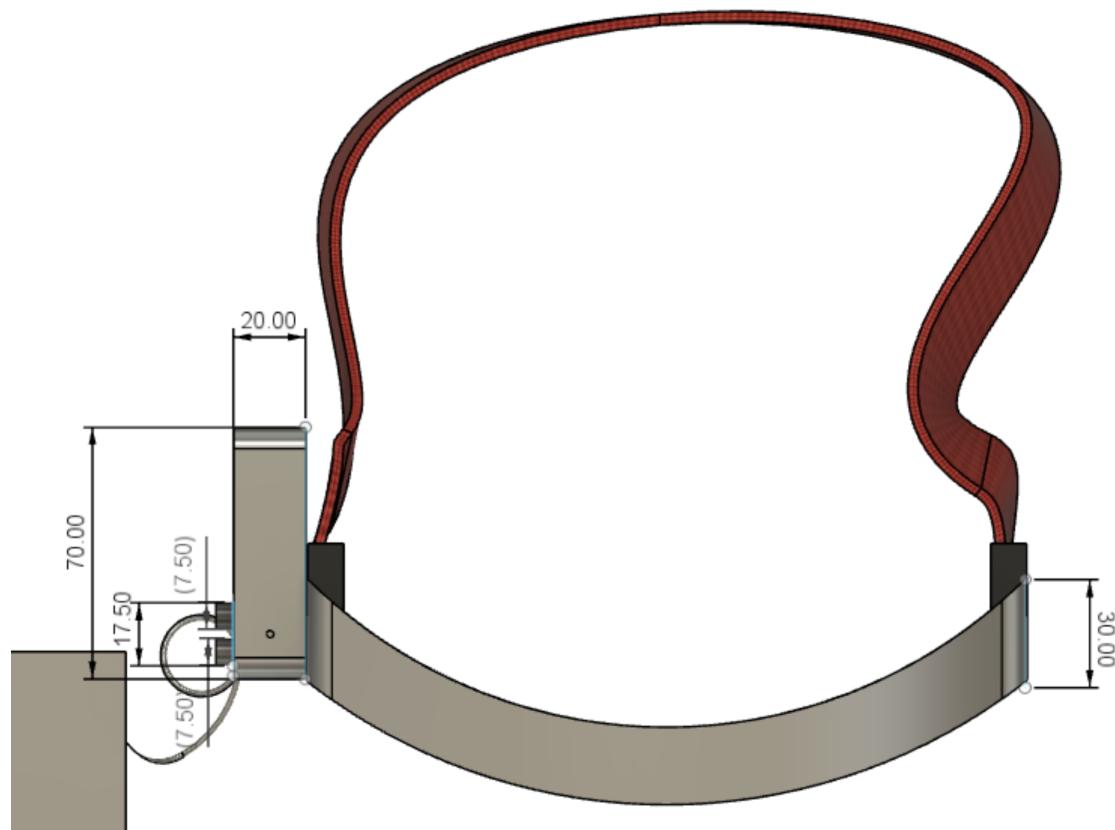


Figure 7: Top view of the goggles (all dimensions in mm)

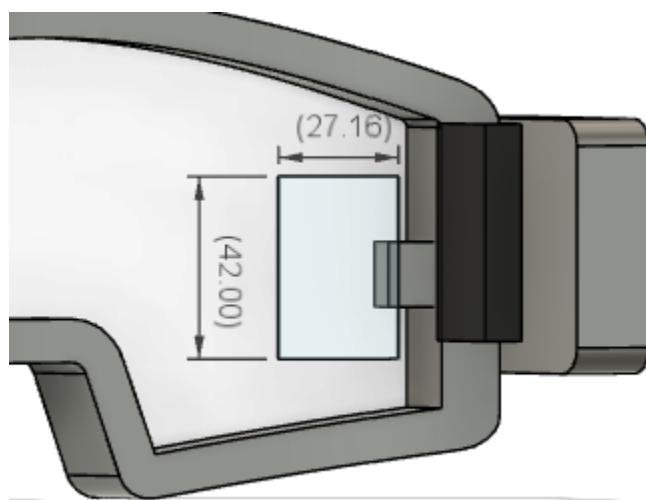


Figure 8: Inside view of the OLED display (all dimensions in mm)

Appendix 2: Project Packaging Specifications

Material	Tooling	Weight	Cost
Ski Goggles	none	140g	\$20
Component Casing	3D printer	100g	Free through Purdue
Battery Case	none	50g	\$20
Bolts 0.5" length (x4)	none	20g	\$5

Appendix 3: PCB Footprint Layout