



violet



AYELET LUSTGARTEN

THE PROBLEM

- Highly reflective windows cause birds to mistake reflected greenery as the real thing
- Up to 1 billion birds are killed by strikes in the US each year, this is the most costly threat to bird populations
- Birds fly through large cities, such as Toronto on their flight path during migration



EXISTING SOLUTIONS

Stickers



Pattern



Window Film



Bird-Friendly Architecture



Disrupts view
Can be ineffective if
there are not enough

Disrupts view
Must be incorporated into
the design of the space

Blocks view

Not always taken into
consideration when
designing buildings

Does not help existing
buildings

EXISTING SOLUTIONS

ULTRAVIOLET TECHNOLOGY

Decals



\$6.95

Somewhat disrupts view

Decals are placed on outside of window

Coating reflects existing ultraviolet light

Needs to be replaced every 6-9 months

Stop Bird Attack



\$13.45

Eliminates bird's window reflection, preventing attacks of territorial bird species

UV Liquid



\$19.45

Designed to fill the gaps between decals

Completes visual barrier

<https://windowalert.com/uv-liquid-1-5oz-bottle/>

CRITICAL PROJECT DRIVERS

MUST HAVES

1. **Safety** – Ultraviolet lights must be safe for people living in and visiting the building.
2. **Innovation** – The ultraviolet rays must be visible to birds. The product must be effective at stopping them from flying into windows.
3. **Product features** – The product must not create an easily noticeable obstruction on the view out of the window.
4. **Installations**– Product should be as simple to install as competition products. ex. stickers
5. **MSRP** - \$10-\$25 in order to compete with Window Alert window treatments

CRITICAL PROJECT DRIVERS

SHOULD HAVES

- 6. **Product features** – Minimal aesthetic design to be ‘hidden’ in the space.
- 7. **Product User Experience** – product should use electricity to power it in an efficient way. Product should have flexibility in where it can be placed and on the area size covered.
- 8. **Target Market** – Bird-loving people that want to make a difference in their homes. Modern houses with large windows.
- 9. **Timing** - Product should perform its function as soon as it is turned on (has access to electricity).

NICE TO HAVE

- 10. **Recyclability** – The housing should be made from recyclable materials and include replaceable/repairable parts.
- 11. **Attractive marketing** – The product should encourage people to install it in their homes to make a difference and help a cause.
- 12. **Product Weight** - The product should be lightweight to be help with easy installation.

RESEARCH

- Many species of birds are tetrachromatic, with dedicated cone cells for perceiving wavelengths in the ultraviolet and violet regions of the light spectrum.
- Tunnel test: experiment in which patterns are placed on glass to examine how birds will react
- Most birds will not try to fly through:
 - vertical lines placed 4" apart
 - horizontal lines placed 2" apart



TECHNOLOGY

LASER LEVEL



RYOBI Air Grip Compact Laser Level

\$26.98

wavelength 630-670nm

113g

ULTRAVIOLET LASER

Star UV Ultraviolet Blue Violet Laser Pointer Straight Beam Purple Lazer 5mw



C \$11.99

Free Shipping

Get it by Mon, Dec 10 - Fri, Dec 14 from Alberta, Canada

• New condition
• 30 day returns - Buyer pays return shipping | Return policy
[Read seller's description](#)
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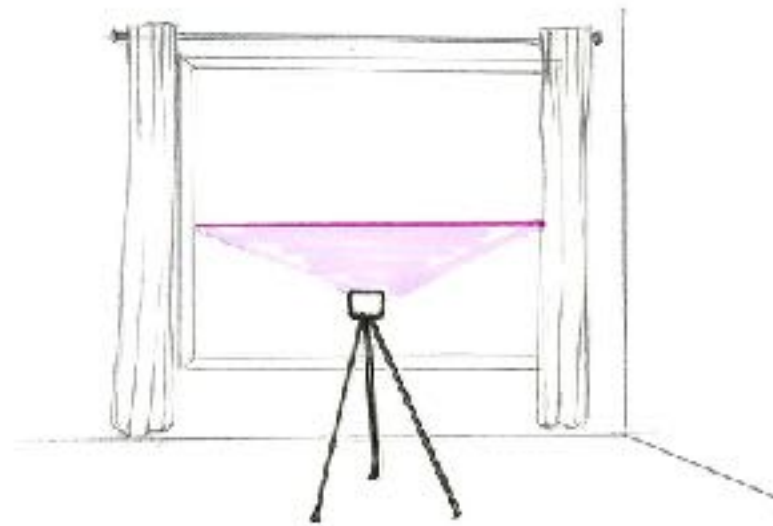
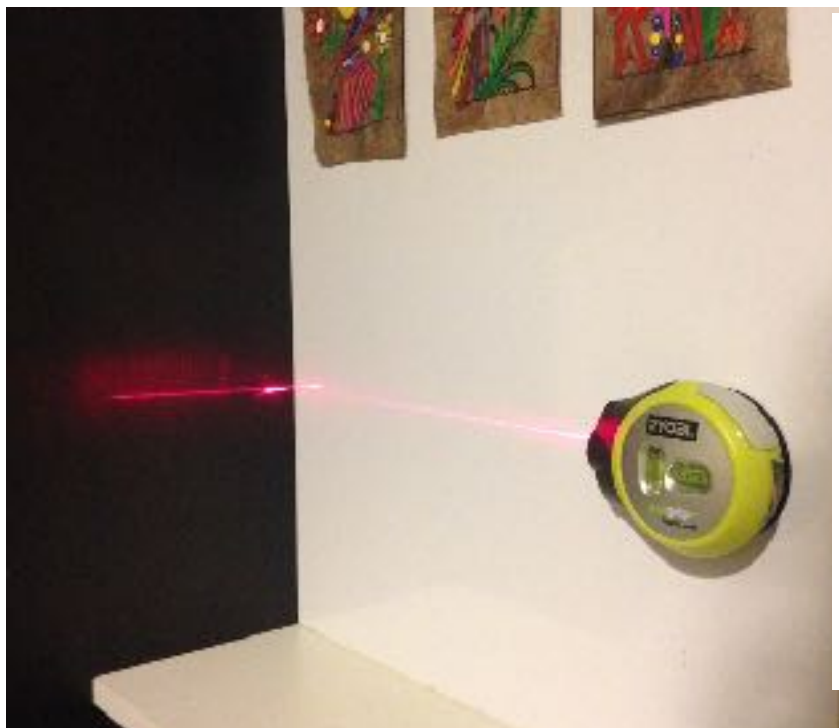
ebay MONEY BACK

Qty: 1

[Buy It Now](#)

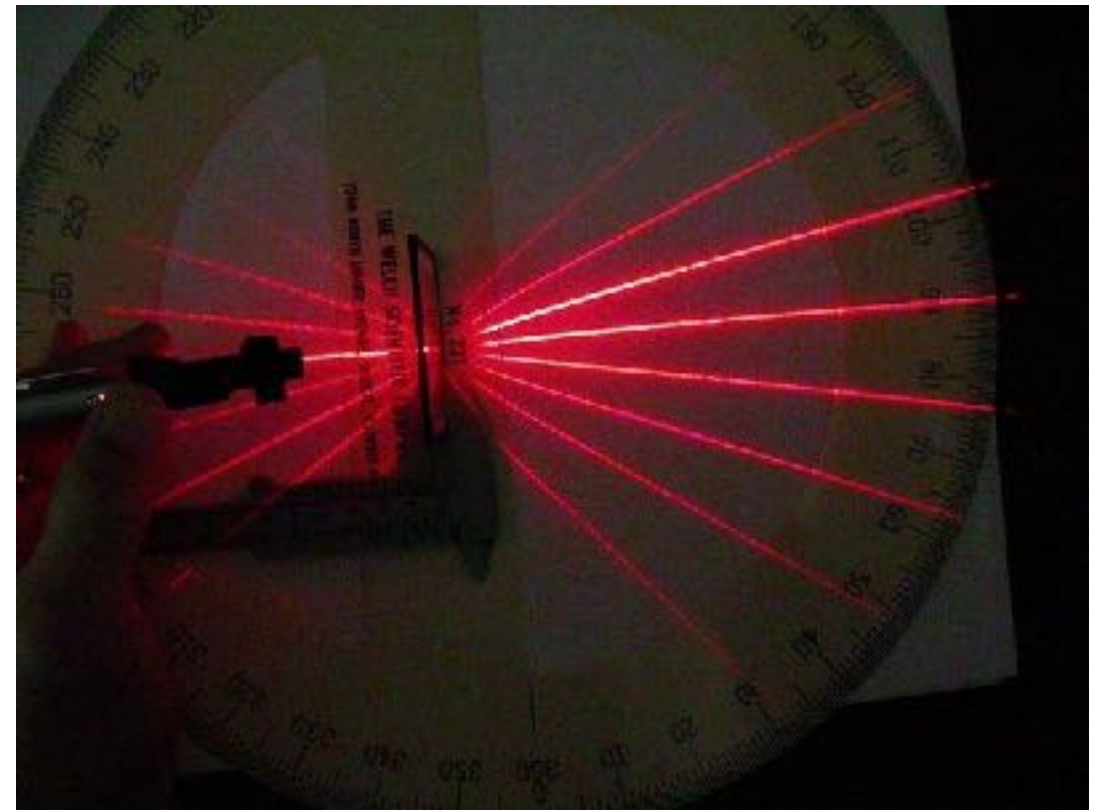
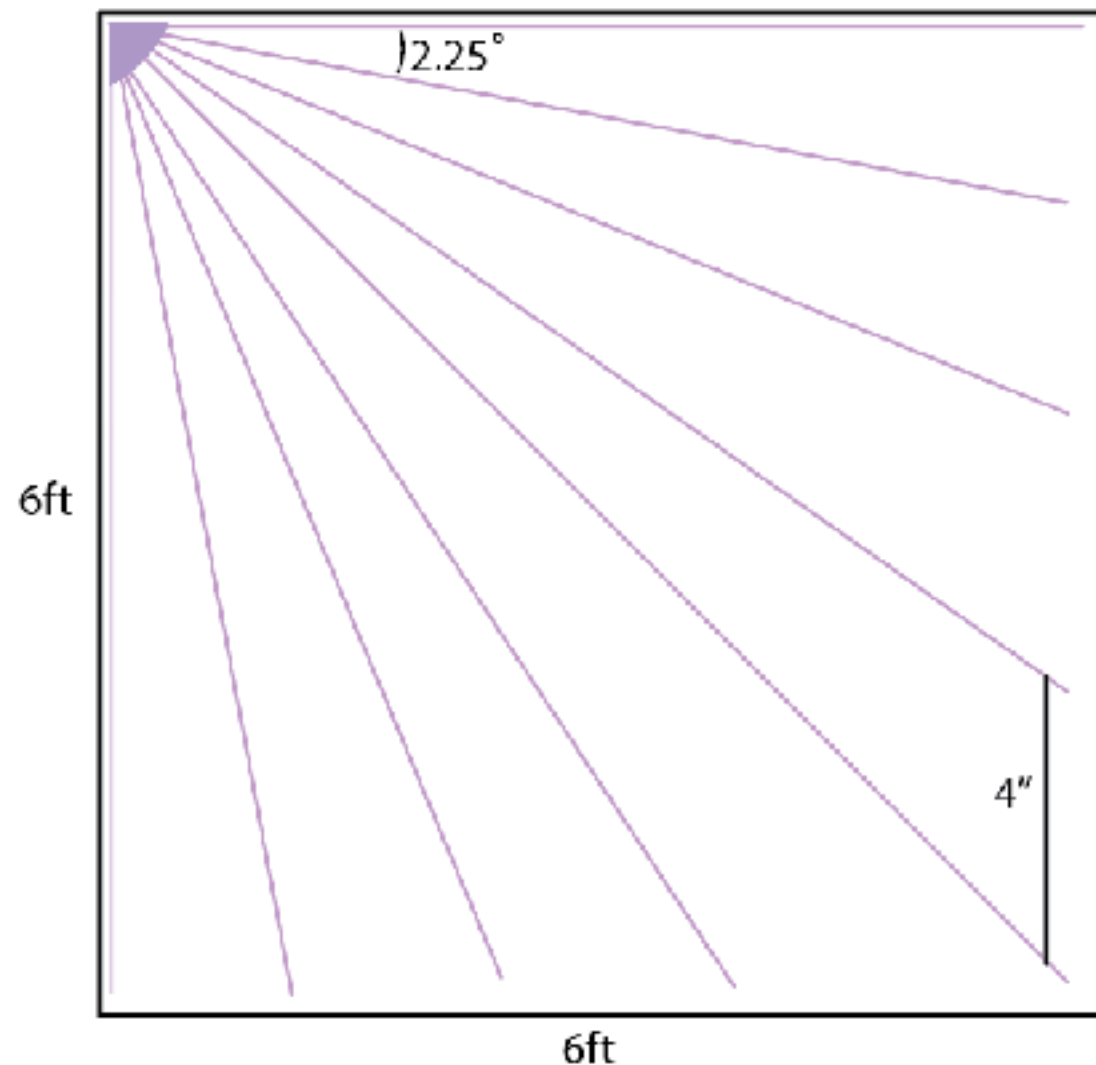
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DIFFRACTION GRATING

- Splits one beam of light into many beams
- Violet uses a diffraction grating of 97 lines/mm



$$d \sin \theta = m \lambda$$

$$m \text{ (order of beam)} = 1$$

$$\lambda = 405 \text{ nm}$$

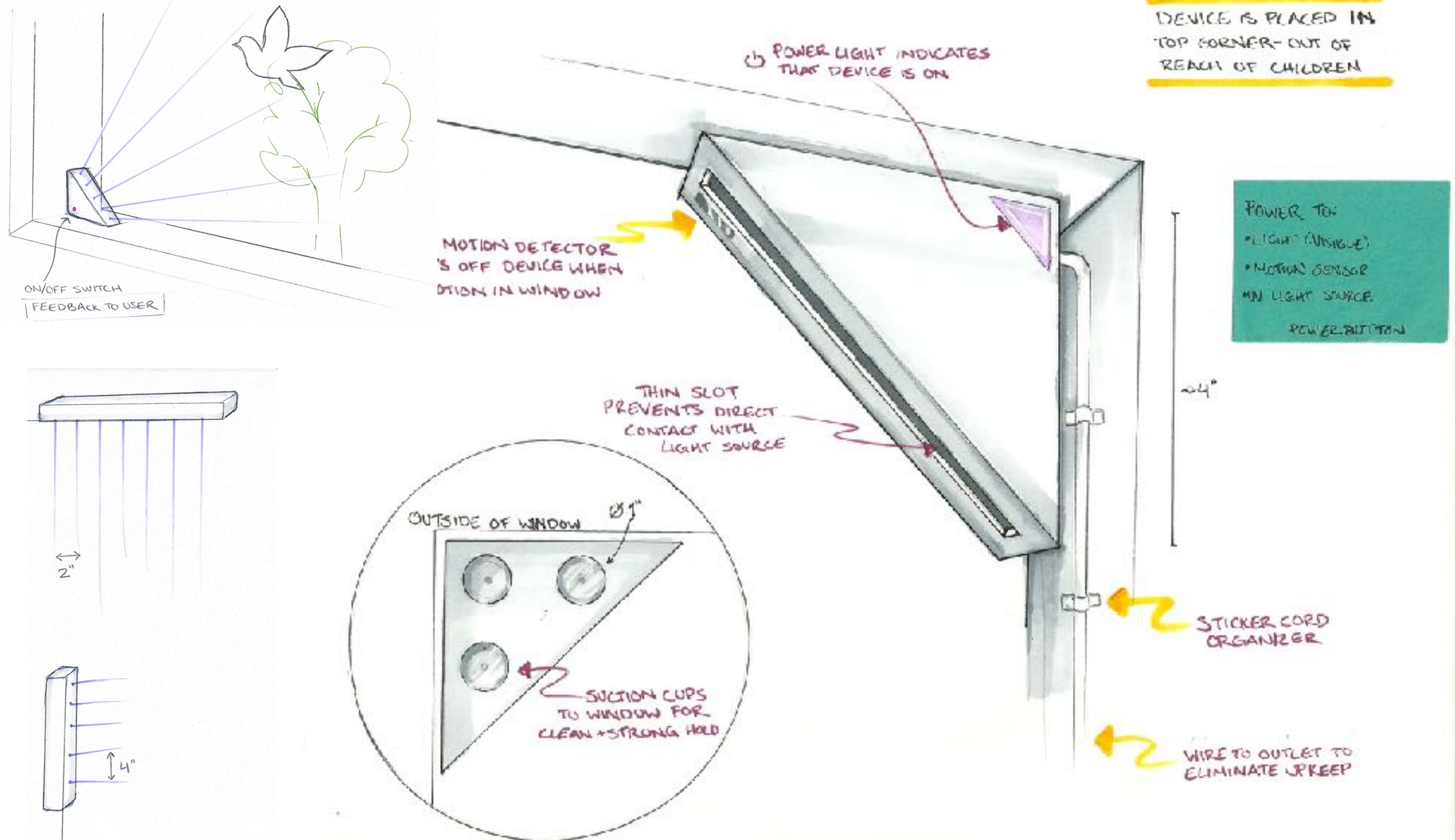
$$d = 97 \text{ lines/mm}$$

CREATING A BEAM USING ACRYLIC

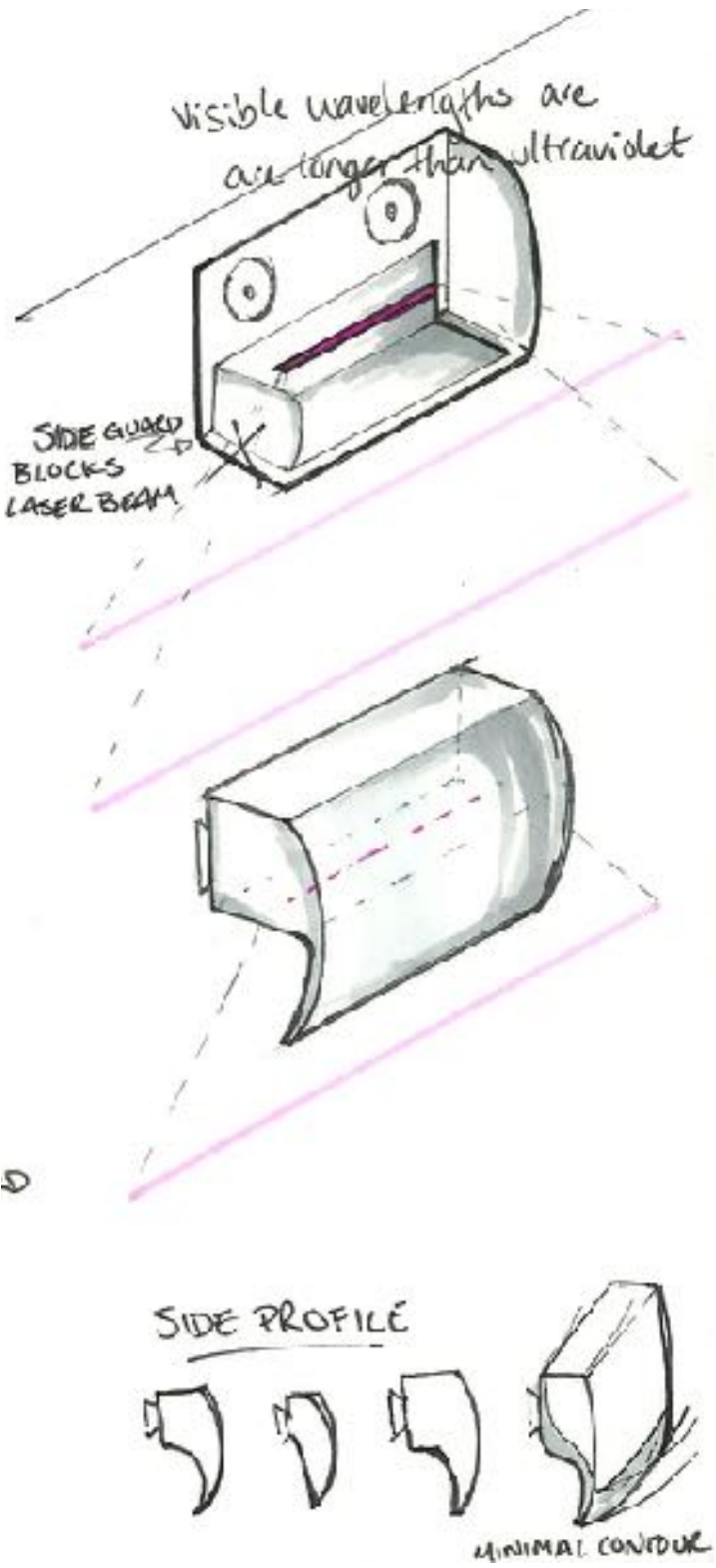
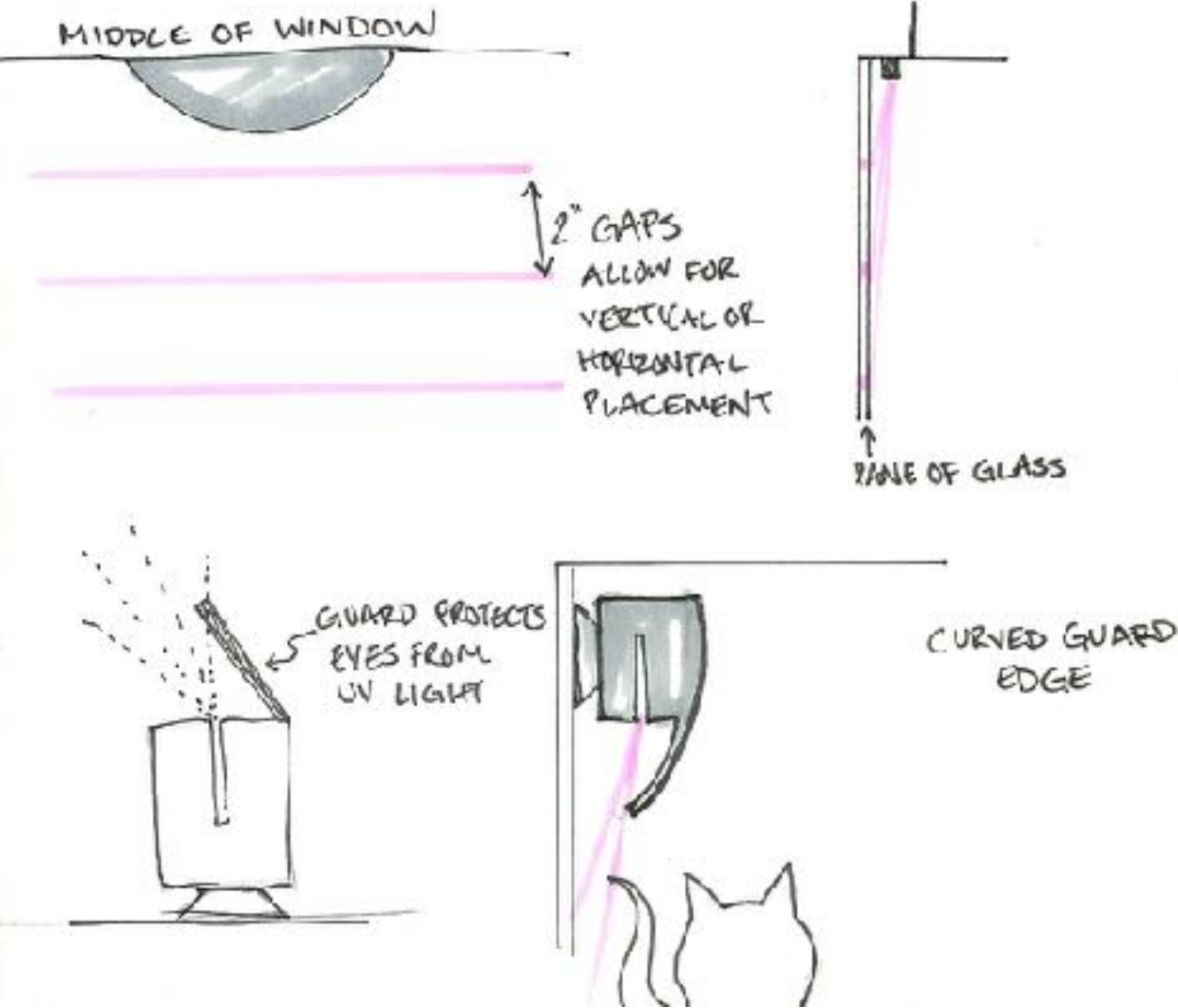


CONCEPT EVOLUTION

WINDOW CORNER

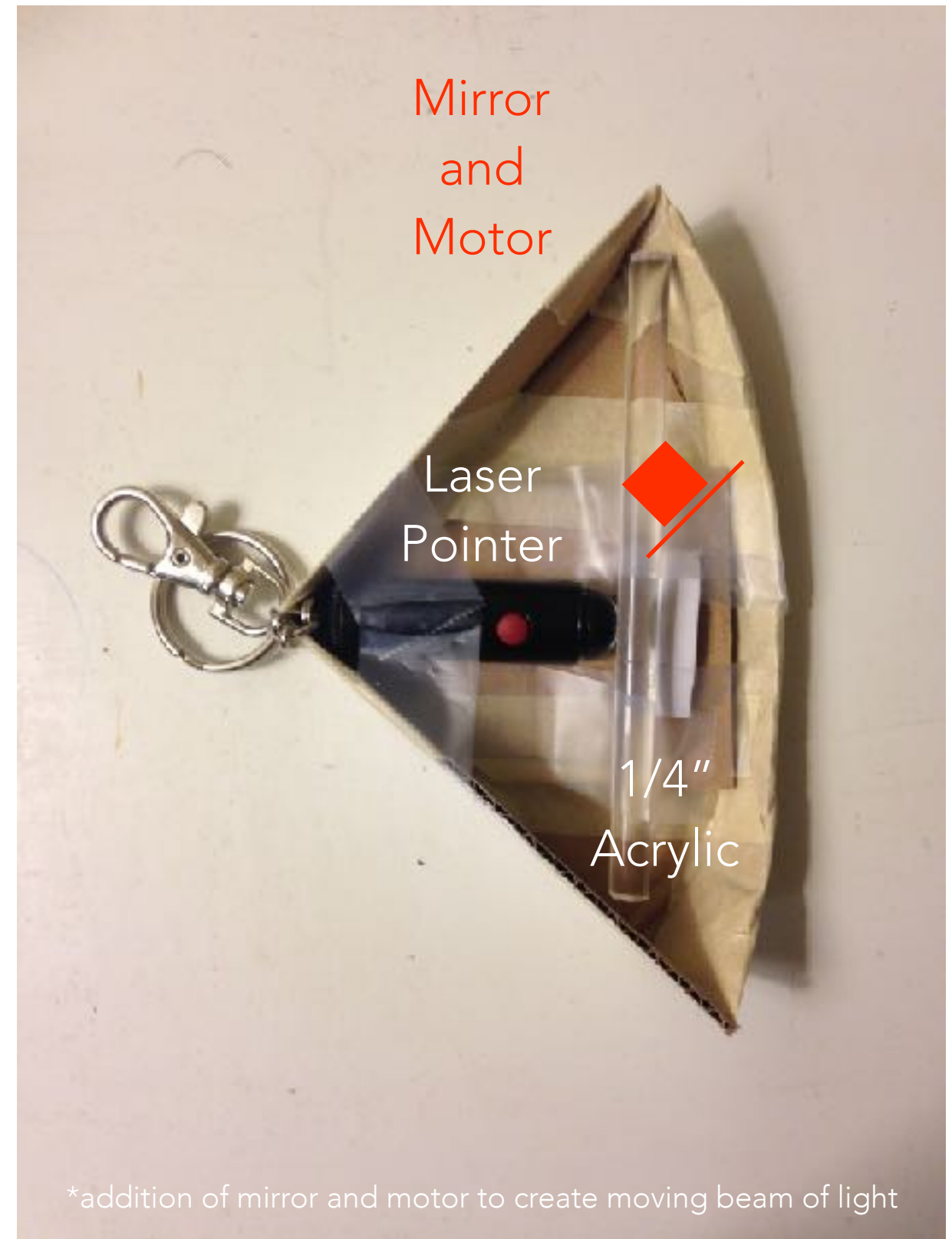


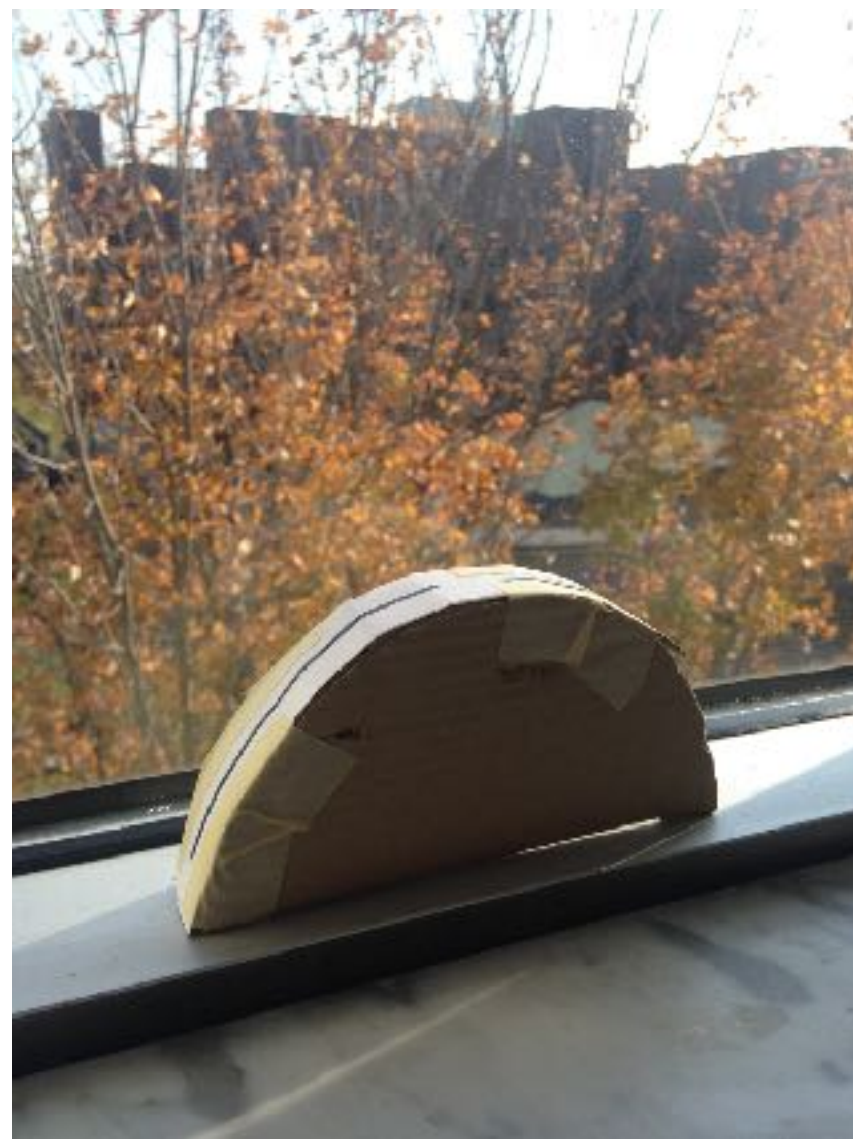
WINDOW MIDDLE



MOVING LASER LINE

- Use of flashing lights at airports to deter birds from dangers
- Use one moving laser beam to cover the window instead of many diffracted beams
- Will break up the reflection in the window, without attracting the birds



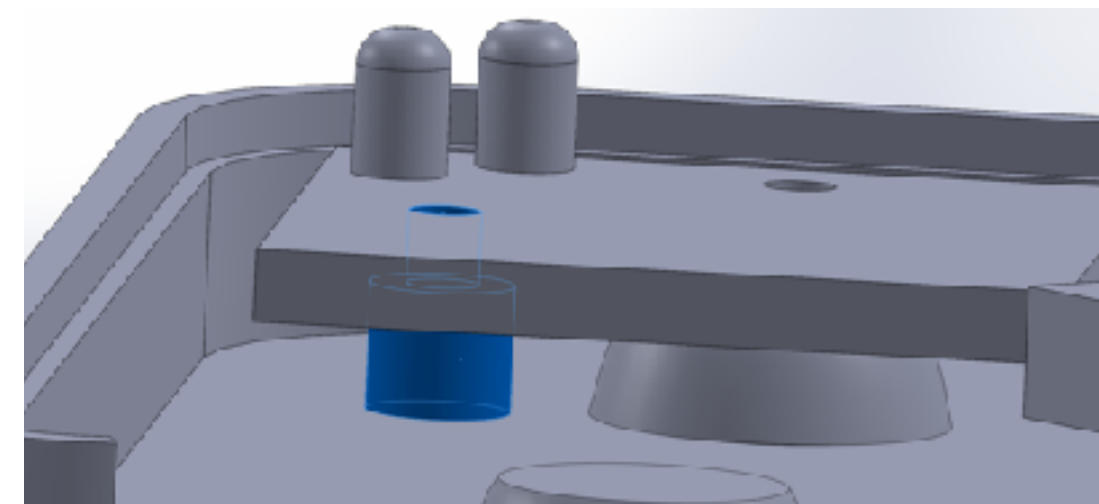
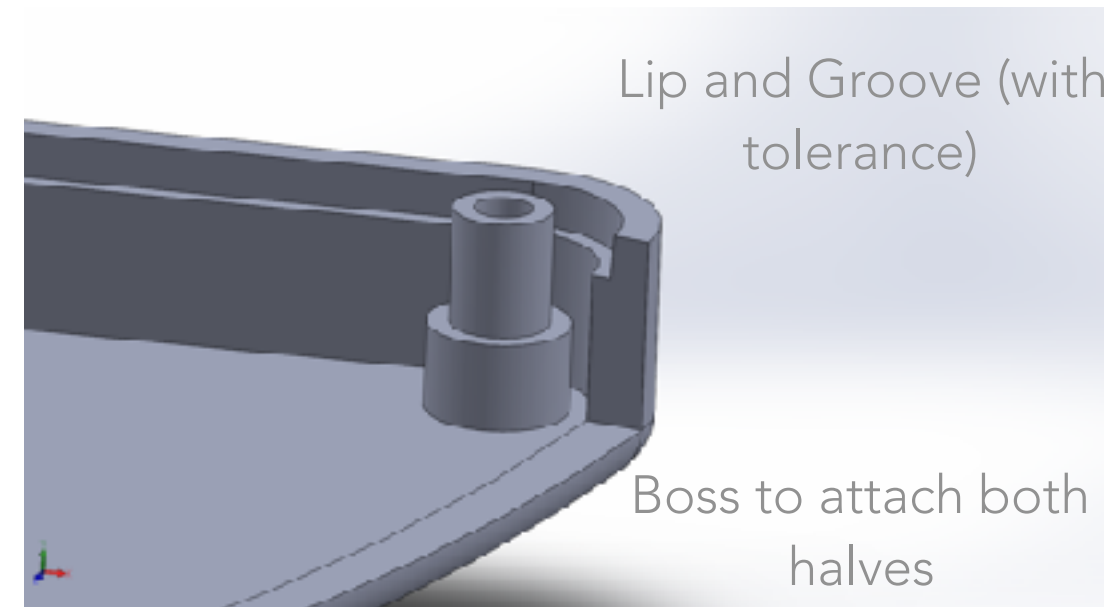
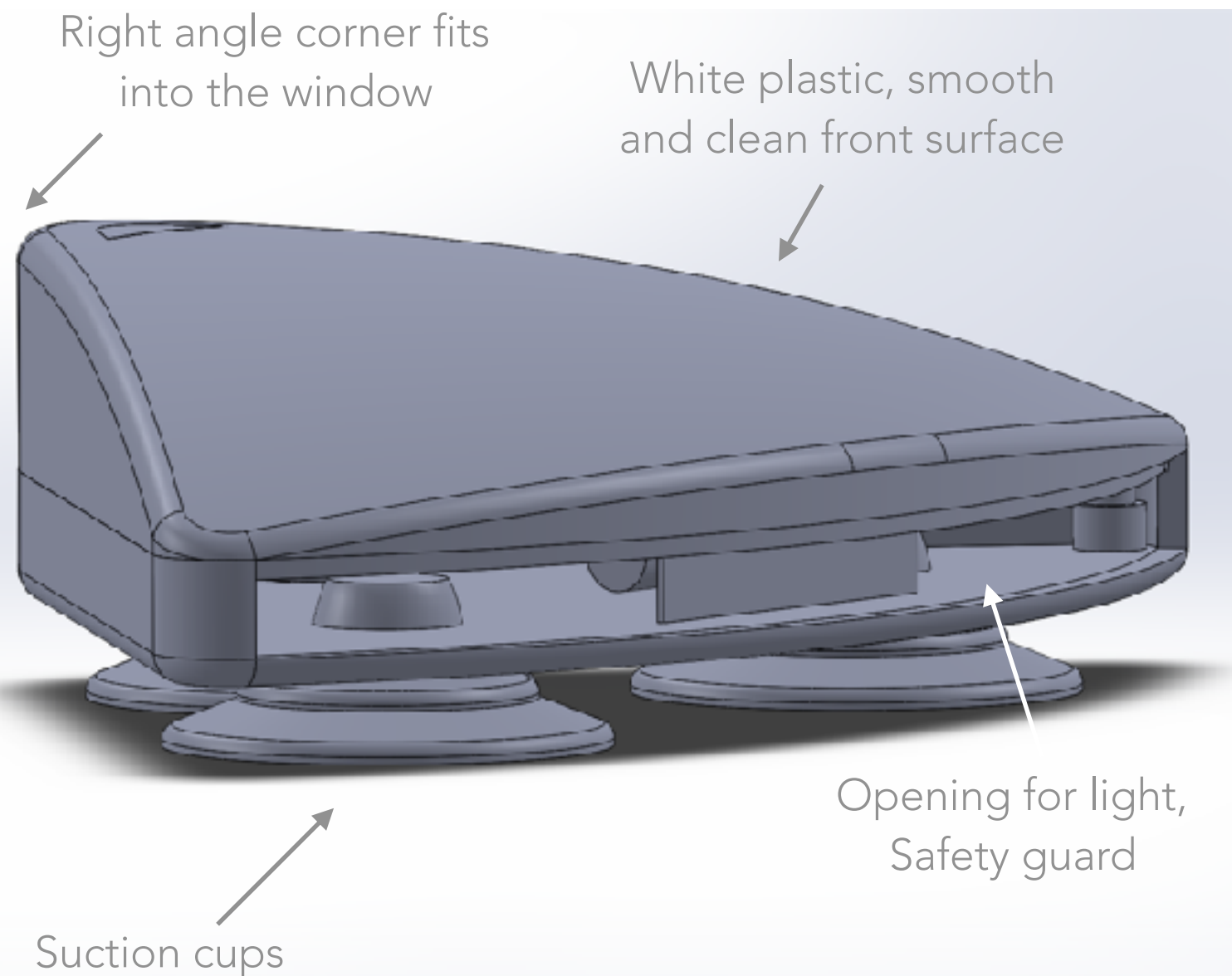


SAFETY

- **Curved guard** to block the light source of light from eyes
- **FDA approved laser power**
 - 5mW (same as visible light lasers)
 - Maximum for consumer use (class IIIA)
- **Suction cup strength**
 - Area of 9.423cm^2 will provide 9.363N of force at 10% vacuum.
 - Minimum of 2.21N is needed for a 113g product with a coefficient of friction of 0.5 (glass)

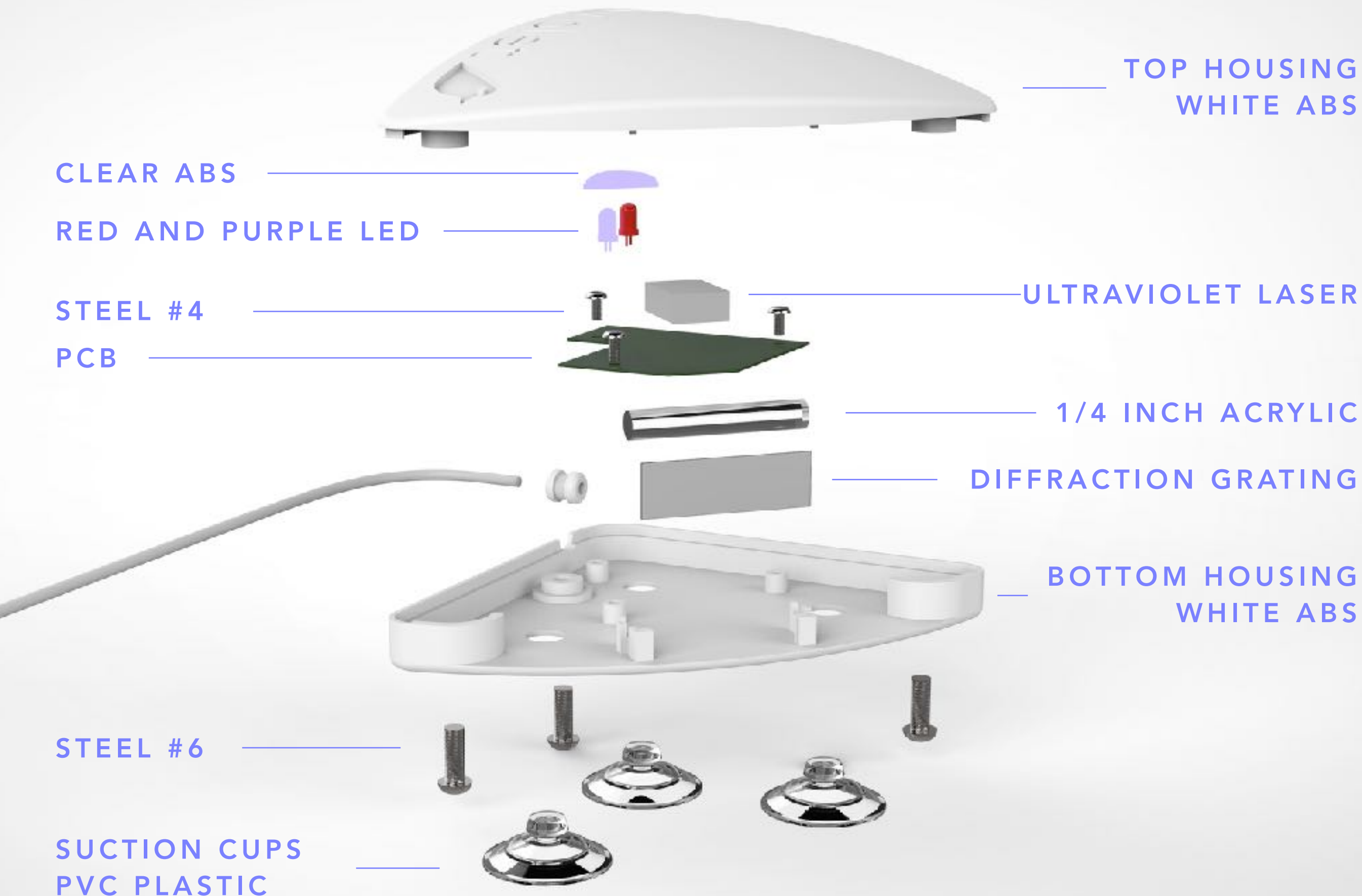


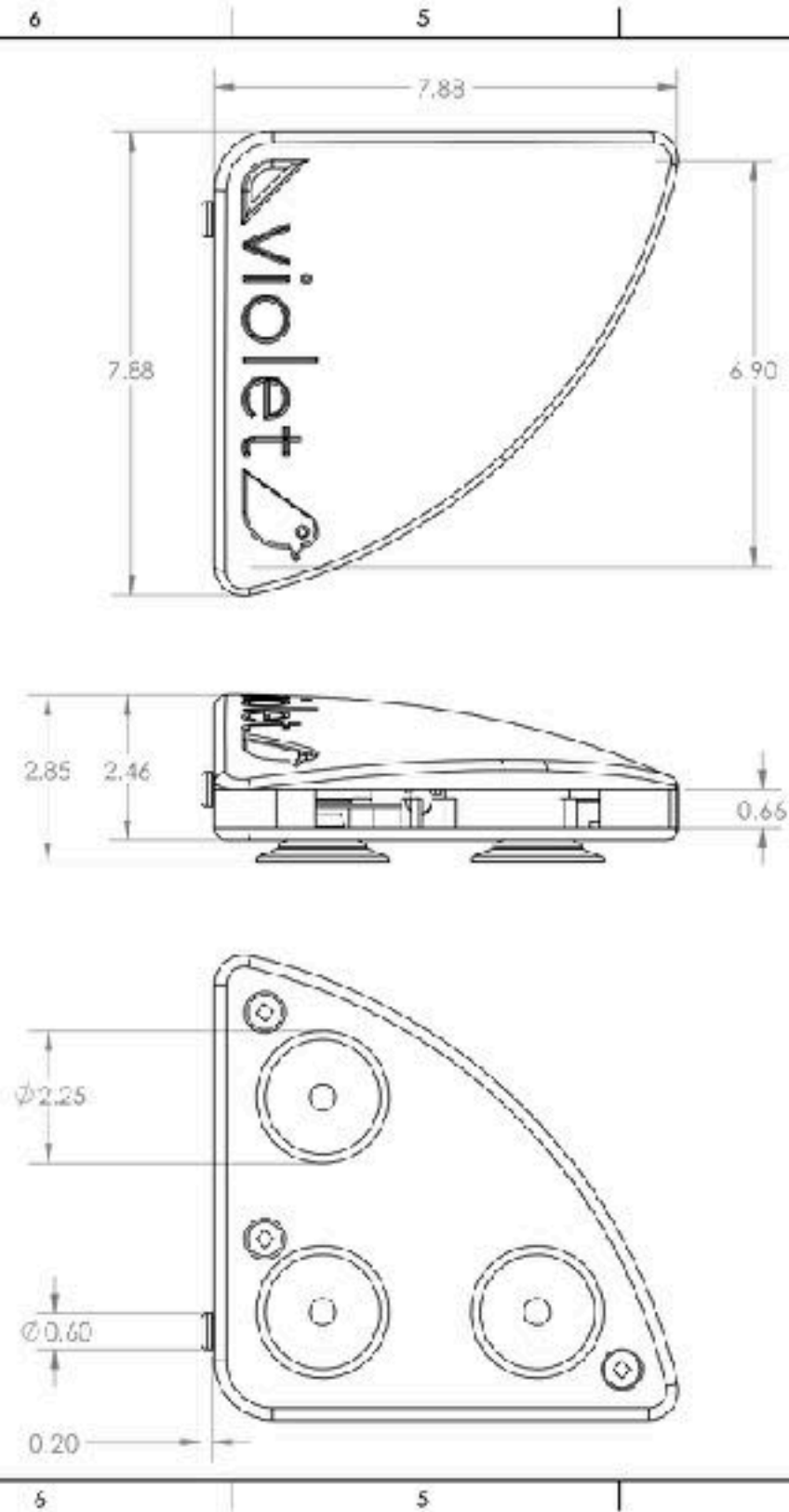
PRELIMINARY DESIGN





FINAL DESIGN





SD CARLETON SCHOOL OF INDUSTRIAL DESIGN OTTAWA, CANADA			
TITLE:	VIOLET BIRD SAFETY HOUSING	TOLERANCES:	
DRAWN:	AYELEI LUSIGARTEN	DECIMAL ± 0.25	
CLIENT:	MIKE SIROSIS, ROB WATERS	ANGLE $\pm 0.2^\circ$	
CHECKED:	AL	DATE:	06/11/18
UNITS:	cm	SCALE:	1:1
SHEET 1 OF 2		3.11x17	
		1	

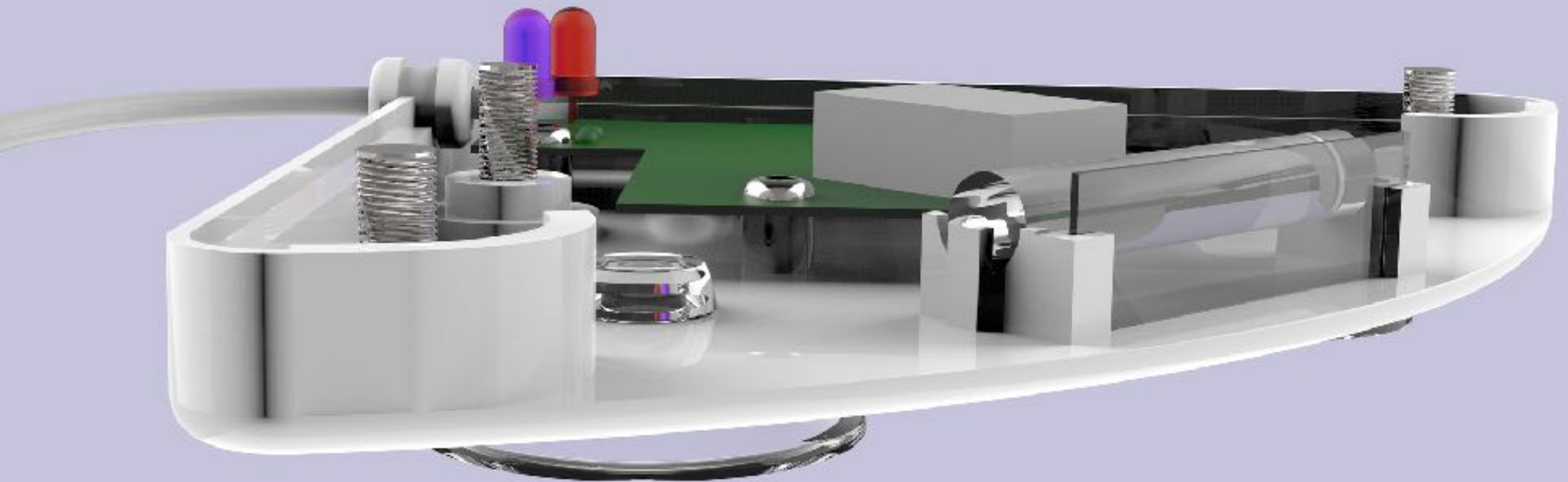
SUCTION CUPS
FASTENING SCREWS



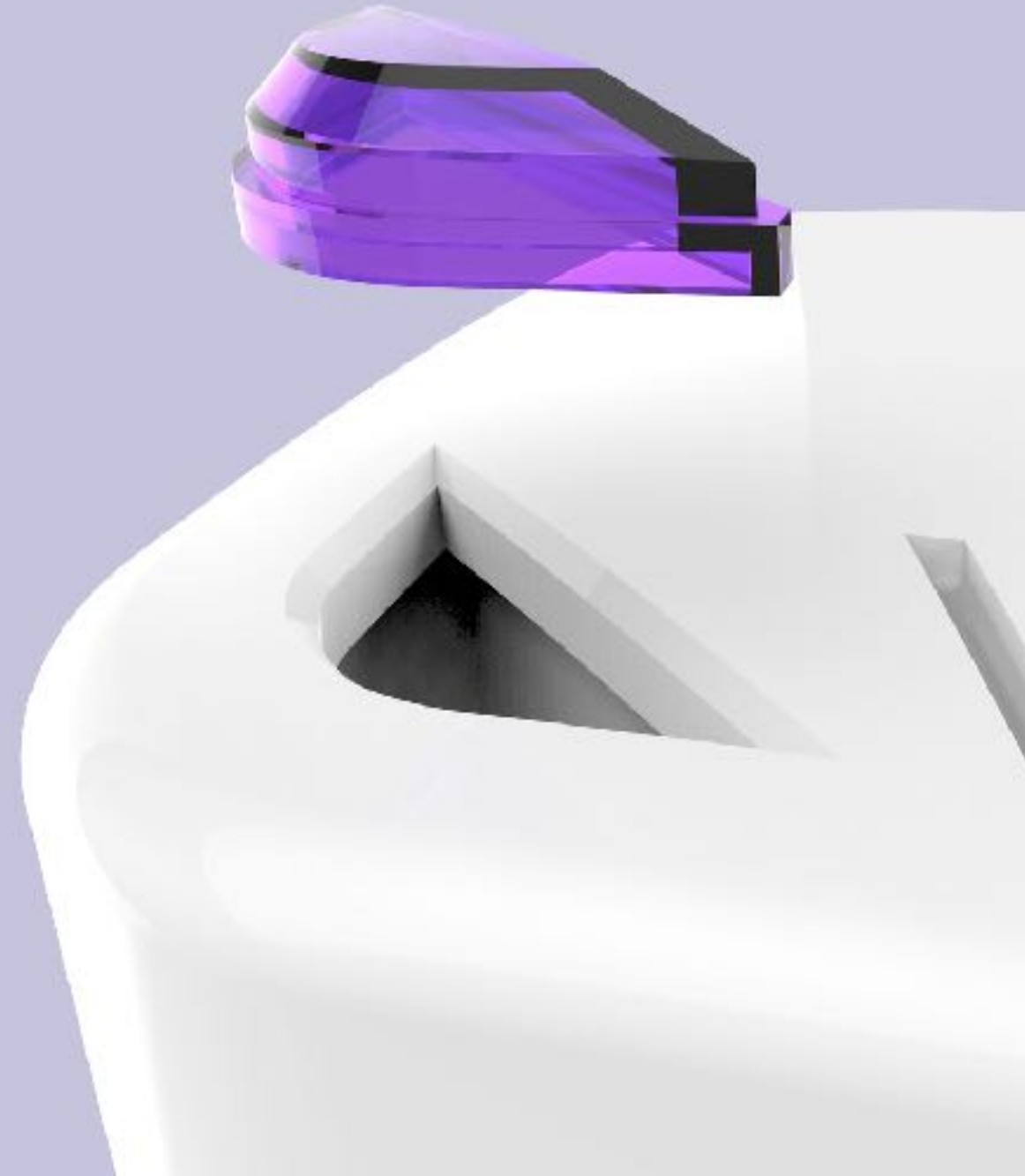
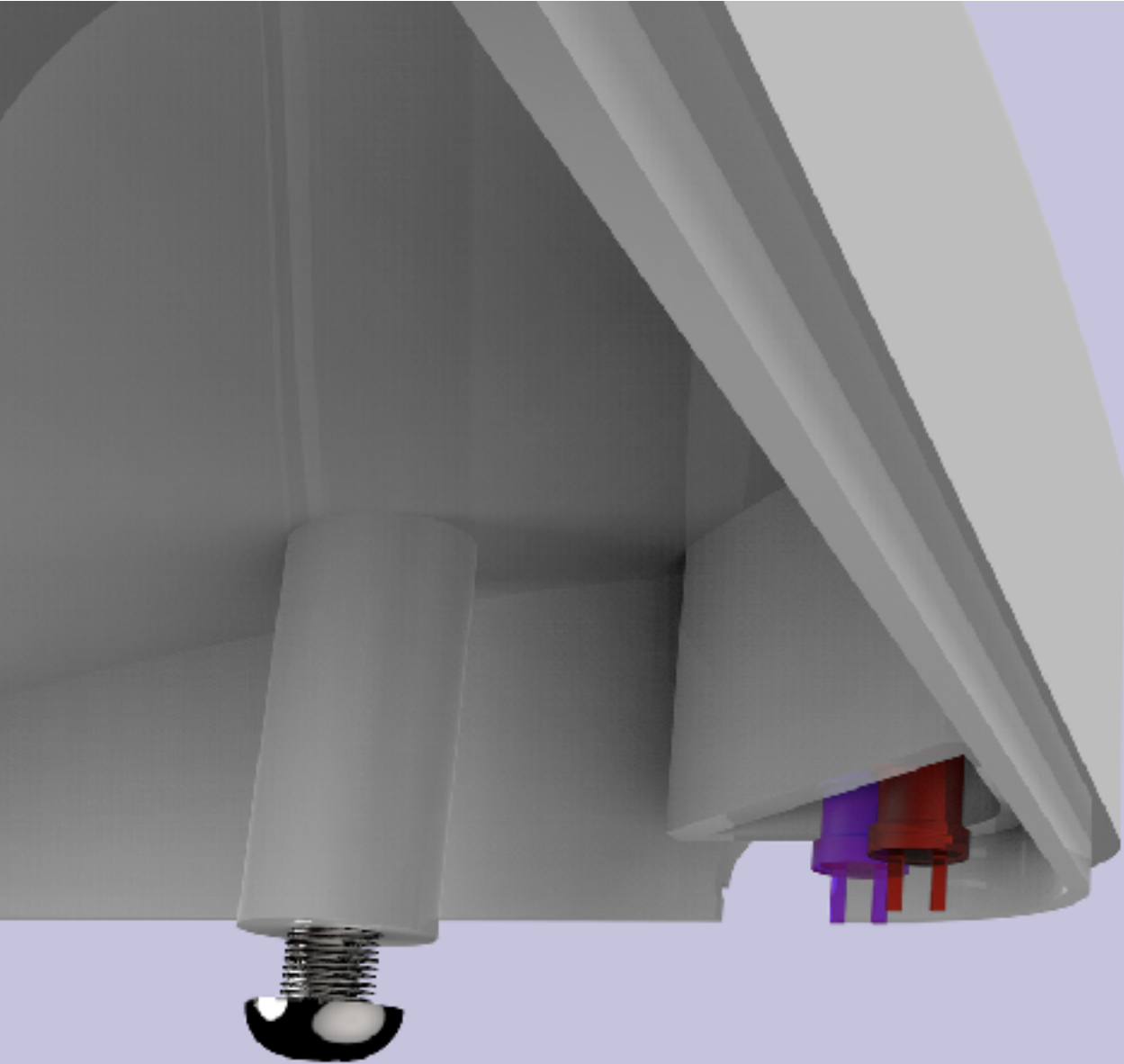
LIP AND GROOVE FASTENING STRAIN RELIEF



INTERNAL COMPONENTS



LIGHT CHANNEL



LIGHT AND NAME

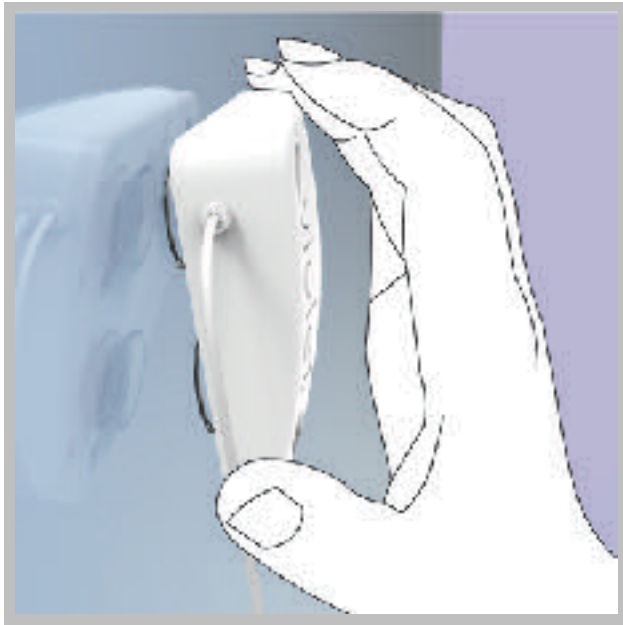


CORD MANAGEMENT

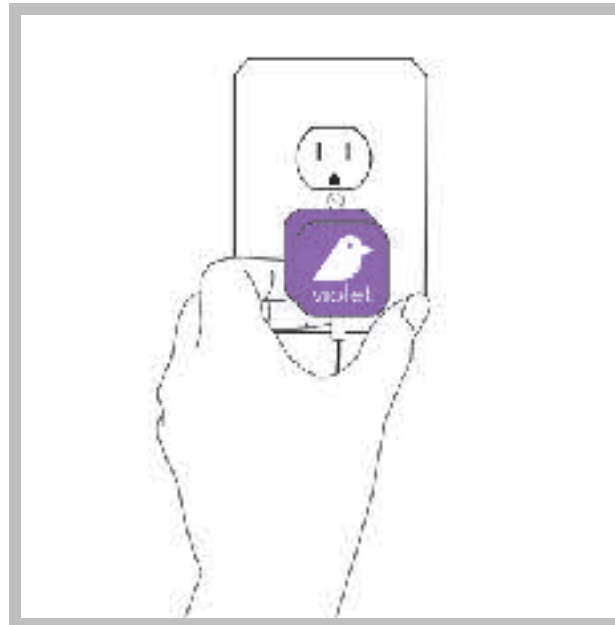


USE CYCLE

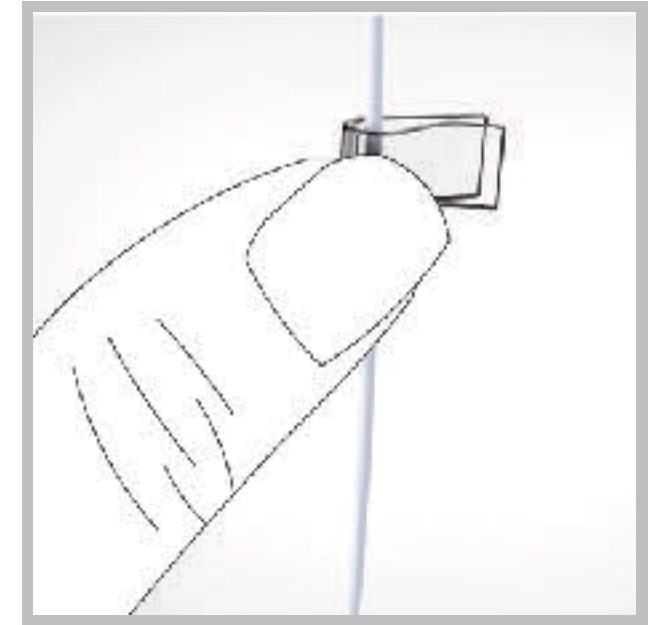
SUCTION CUP
IN TOP CORNER
OF WINDOW



PLUG INTO WALL



CORD
ORGANIZATION



USER FEEDBACK

RED = NOT WORKING



SAVE BIRDS!











THANK YOU