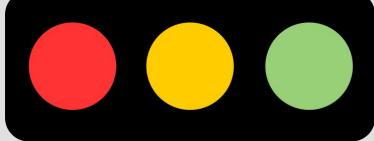




AURA

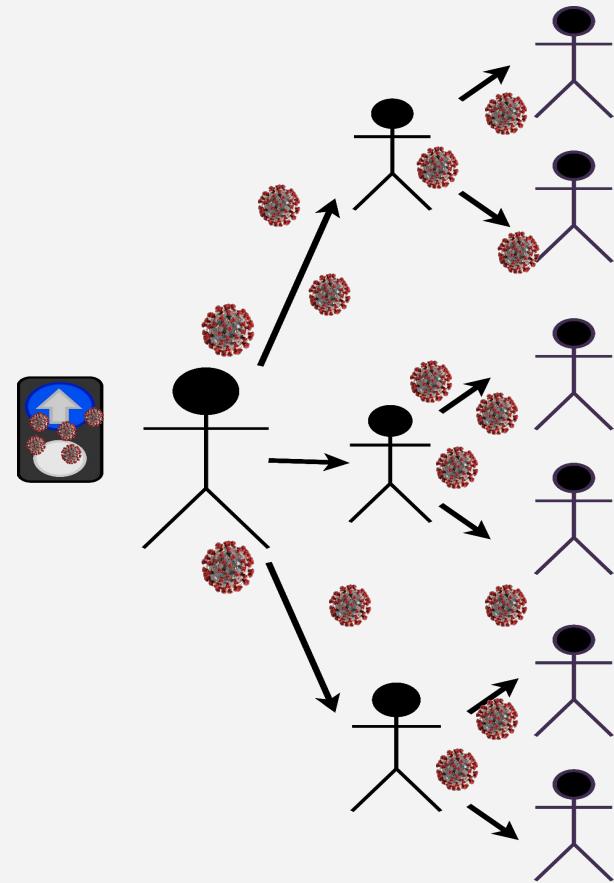


T.L. Aura

Traffic Light Cleanser

Risk of Transmission

- According to Healthline, COVID-19 can survive on Stainless Steel for 4-7 days
- Study in Massachusetts sampled crosswalk buttons: 10.4% of samples had live COVID-19
- Figure can be higher in areas with higher populations and lower access to hygiene facilities
- Single infection from surface transmission can lead to a large cluster of infections



Effectiveness of T.L. Aura

- UVC has shown to be effective in sterilising pathogens
- The radiation exposure time would be sufficient in combating combat COVID-19 and other pathogens such as norovirus without harming humans
- Immunocompromised individual would benefit greatly benefit from sterliesed surfaces.

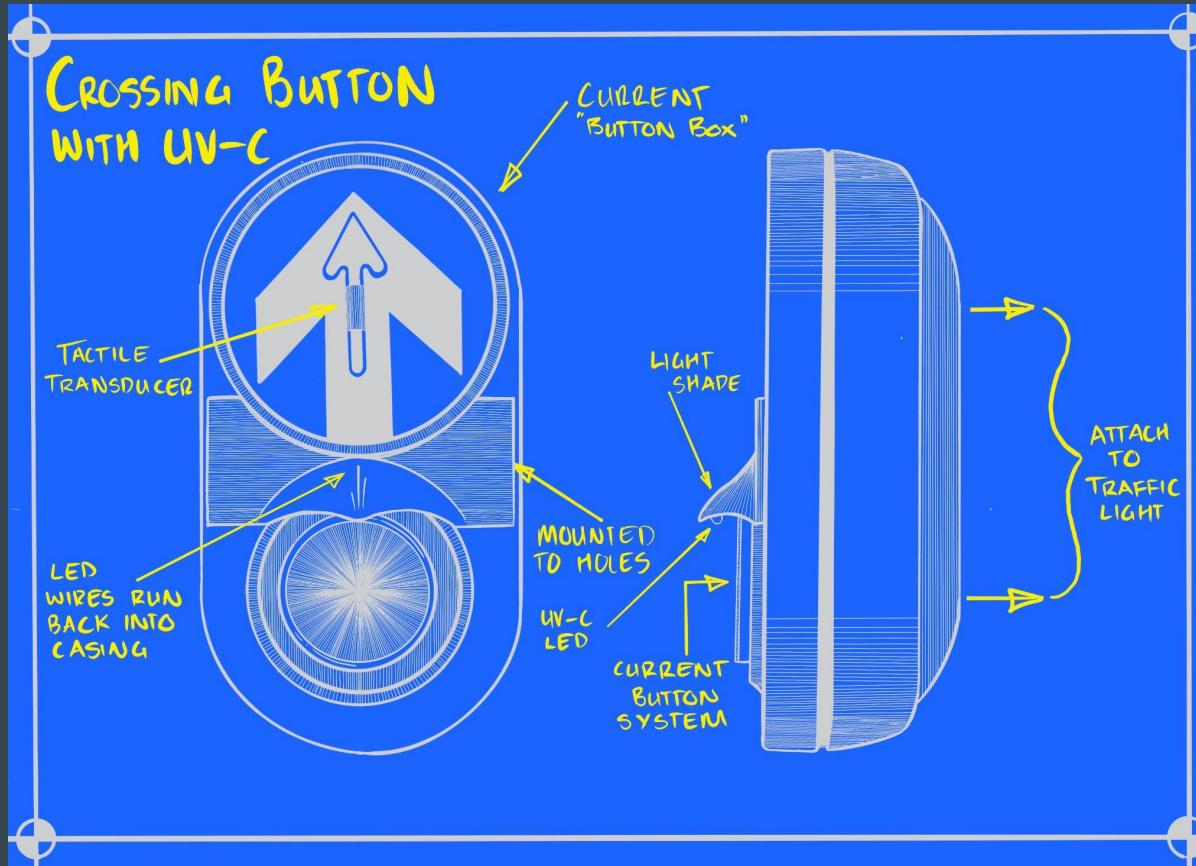


Competing Products/Services

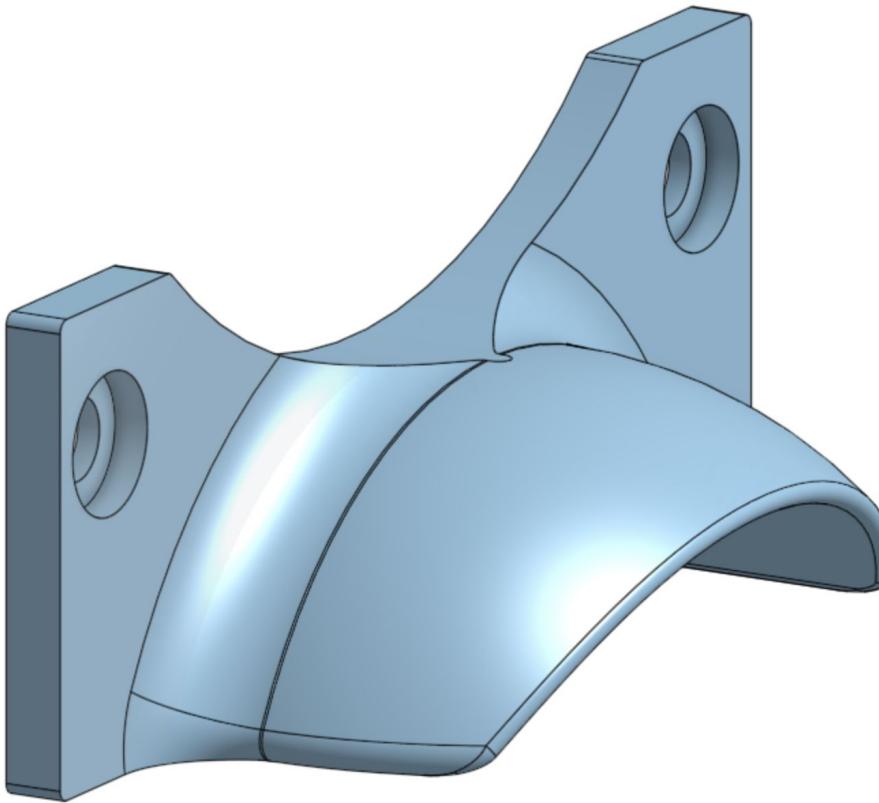
- Inhibit coatings
- Hand held UV-C bulbs
- Other UV-C products



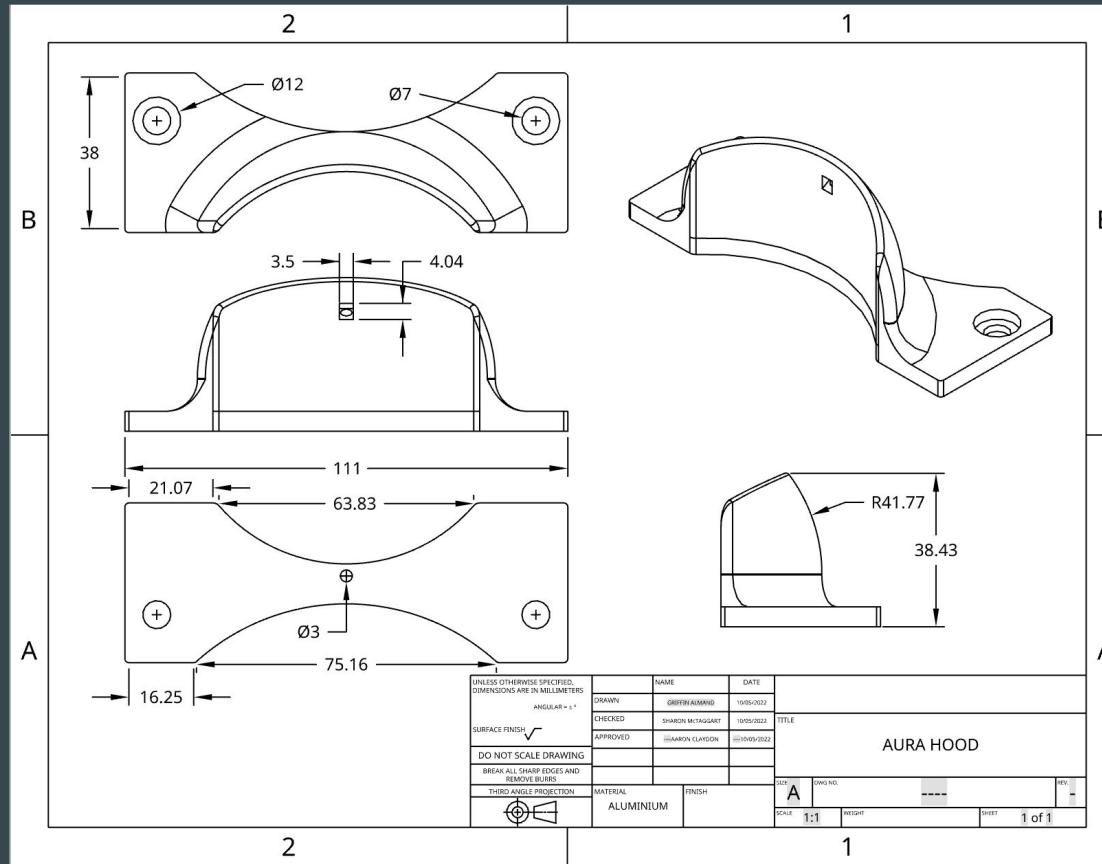
Design and Implementation



Design and Implementation



Design and Implementation



Design and Implementation

Manufacturing (of the Hood):

- A pattern is made of the Hood
- This pattern is used to make a negative mould
- Molten metal is then poured into the mould
- After it has been cast the hood is fettled and made ready for painting.

This process will be outsourced to a commercial foundry.



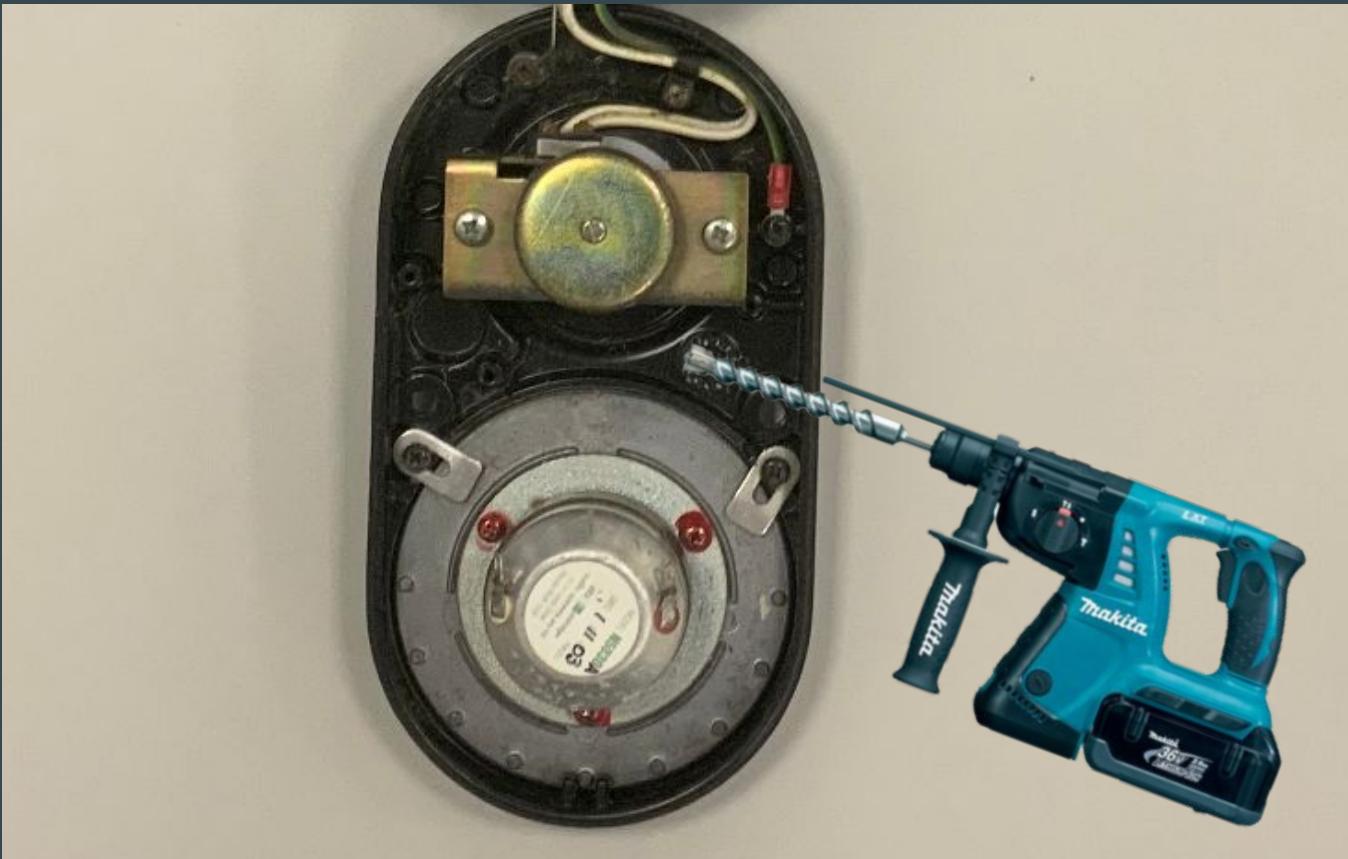
Design and Implementation



Design and Implementation



Design and Implementation



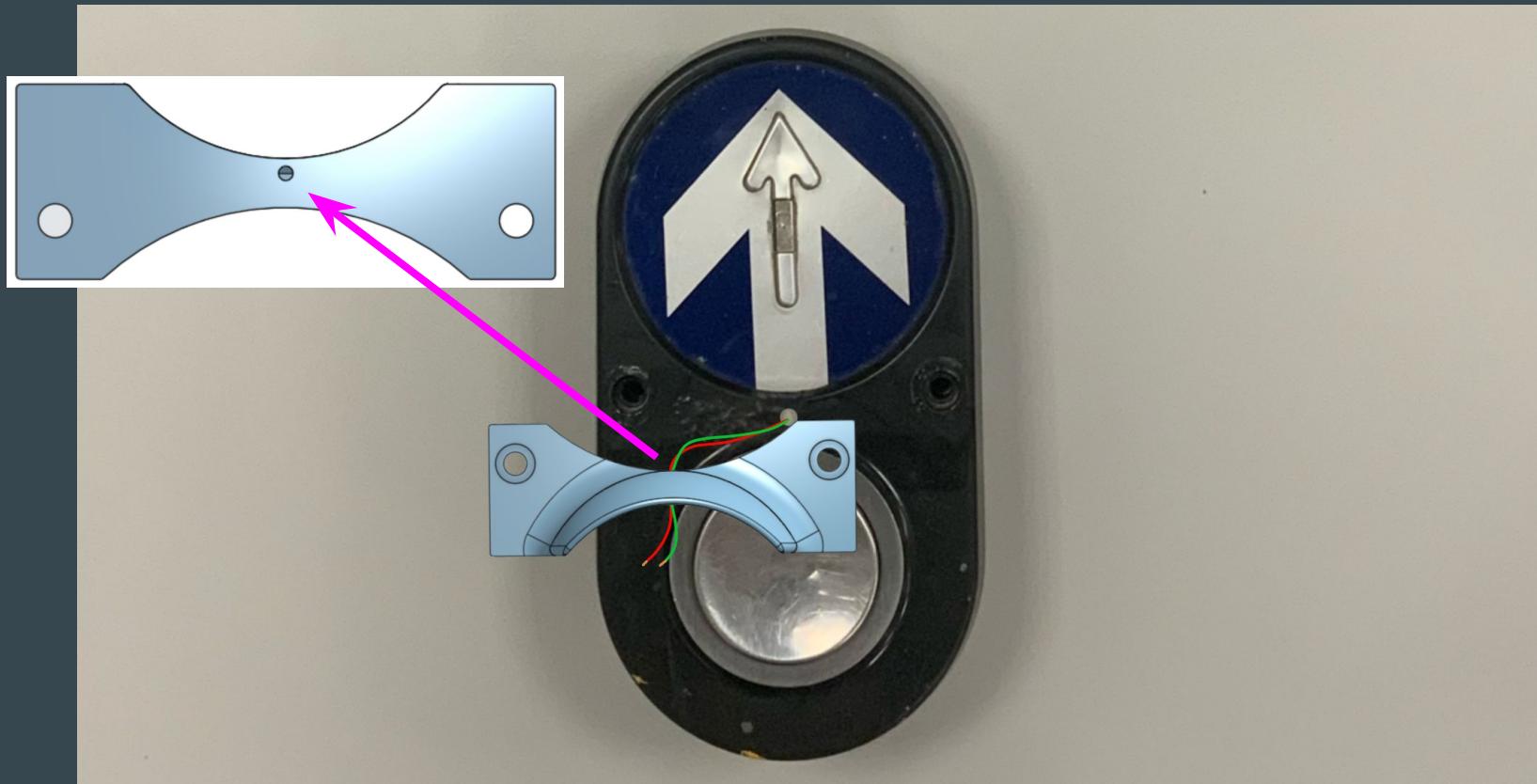
Design and Implementation



Design and Implementation



Design and Implementation



Design and Implementation



Design and Implementation



Design and Implementation

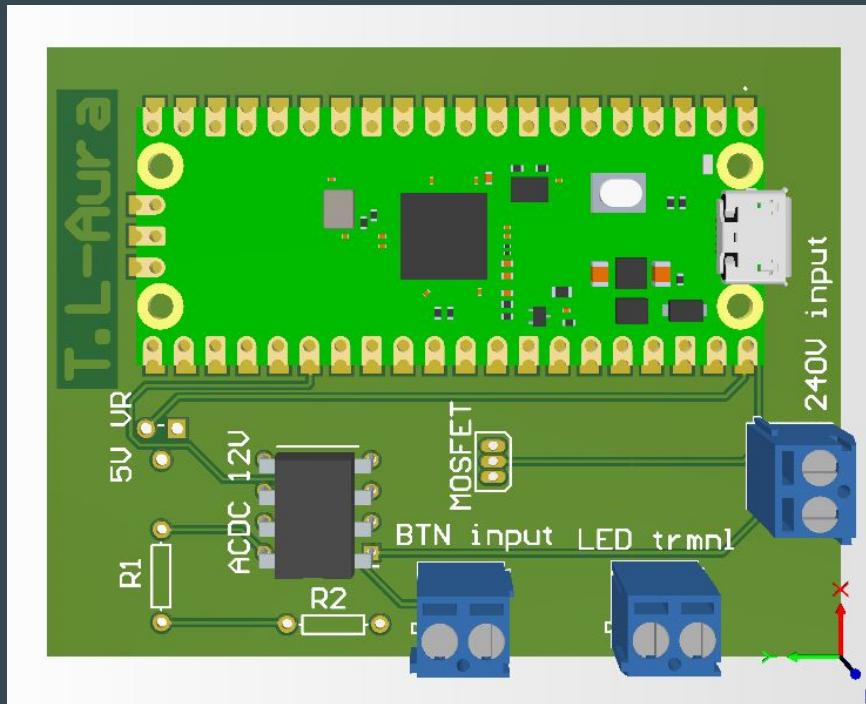


Design and Implementation



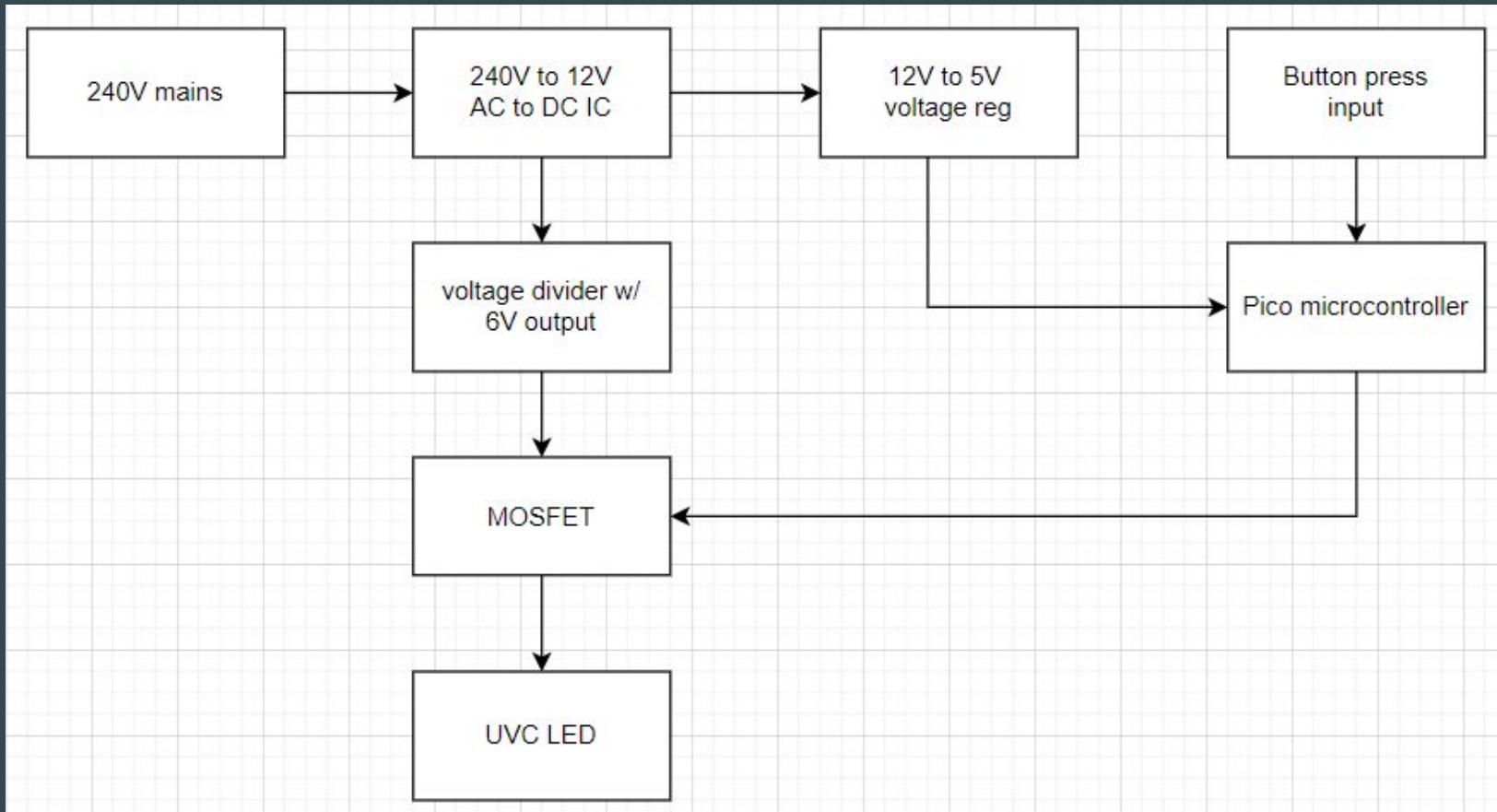
Design and Implementation

50 mm



65 mm

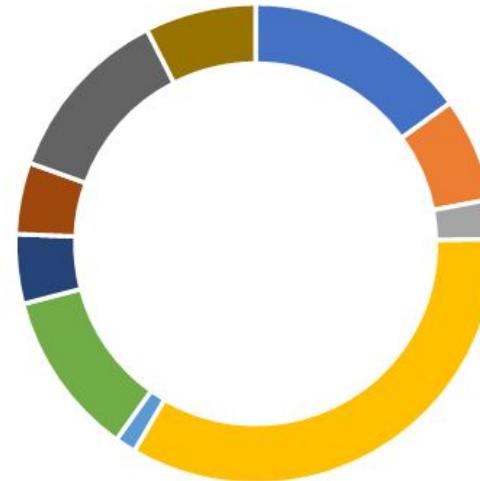
Design and Implementation



Hardware Cost Breakdown

Electronics		
	Pi Pico	\$6.23
	AC-DC Converter	\$2.90
	Voltage Regulator	\$1.11
	LED	\$14.00
	Resistors	\$0.58
	Screw Terminals	\$4.62
	MOSFET	\$1.94
	PCB	\$2.00
Hardware		
	Metal Hood	\$5.00
	Bolts	\$3.10
Additional		
	Wire	\$0.50
	Solder	\$0.50
	Sealant	\$0.71
TOTAL		\$43.19

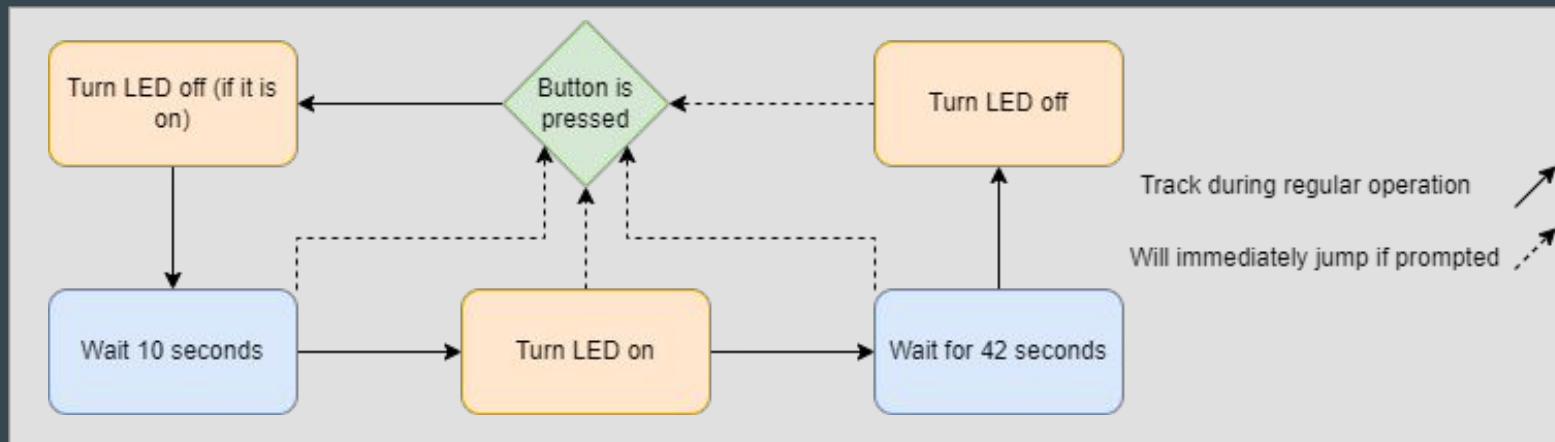
Component Costs



- Pi Pico
- LED
- MOSFET
- Bolts
- AC-DC Converter
- Resistors
- PCB
- Voltage Regulator
- Screw Terminals
- Metal Hood

Software

- The software implementation follows a simple architecture.
- The PCB idles while awaiting an button press.
- When pressed the PCB goes through the process outlined below.
- This is interruptible, if button is pressed before the process is finished the process restarts.



Marketing Approach

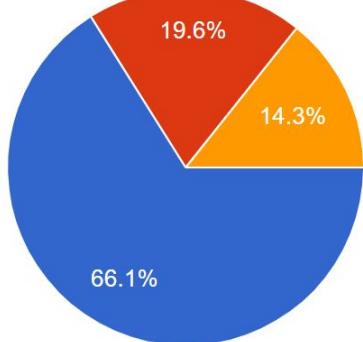
Customers: Local Councils

Users: General Public

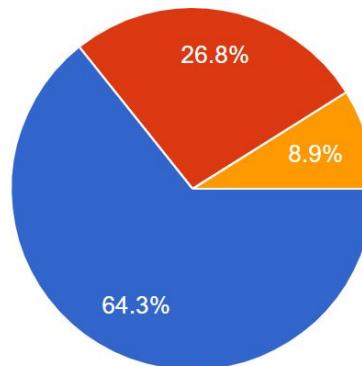
Survey:

- Yes
- No
- Maybe

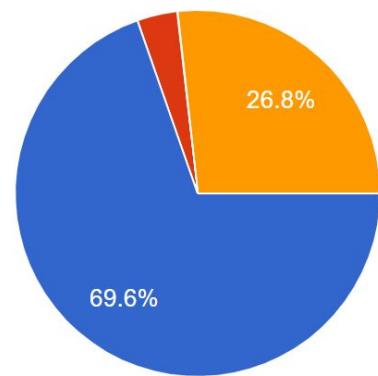
**Concerns over cleanliness
of the buttons**



**Less likely to touch buttons
since COVID-19**

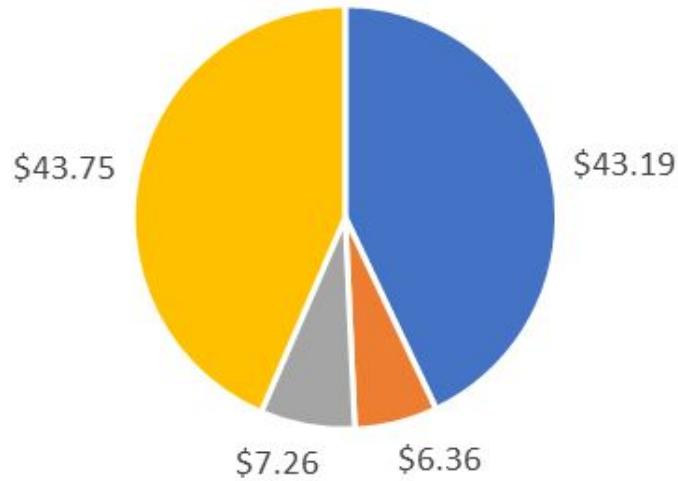


**More comfortable using
buttons if cleaned**



Determining the Price of a Unit

Production Costs per Unit:
\$100.56



Cost of Hospitalisation: \$290 - \$276k

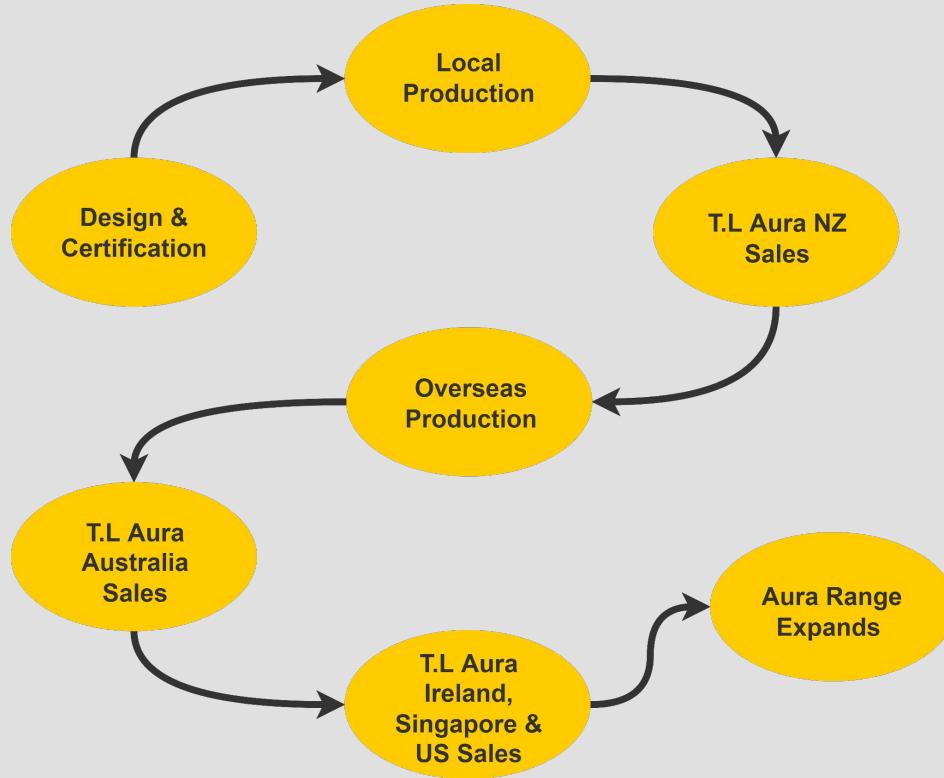
Cost to Businesses: Millions of Dollars

Public Opinions: Social Cost

Sales Price: \$270

- Components
- Manufacturing
- Testing
- Installation

Business Plan



T.L Aura New Zealand Sales



1

Development and Certification

2

Wellington Sales: 836 Units

3

Christchurch Sales: 1498 Units

4

Auckland Sales: 6510 Units

T.L Aura Australian Sales



Upwards of
66,000 Units
Solds

Conclusion

- Explored the need for the product
- Demonstrated the feasibility of the product through hardware and software design
- Shown user side demand for the product
- T.L. Aura has the potential to be a profitable investment



NZ Sales

		Quarter One	Quarter Two	Quarter Three	Quarter Four	Total
Income						
	New Installations	\$0.00	\$214,920.00	\$385,290.00	\$1,674,000.00	\$2,274,210.00
	Replacement Units	\$0.00	\$10,800.00	\$19,170.00	\$83,700.00	\$113,670.00
Total Income		\$0.00	\$225,720.00	\$404,460.00	\$1,757,700.00	\$2,387,880.00
Cost of Sales						
	Component Costs	\$431.90	\$36,841.07	\$66,037.51	\$286,911.17	\$389,789.75
	Manufacturing Costs	\$37.83	\$5,421.67	\$9,718.32	\$42,222.91	\$57,362.90
	Testing and QA	\$75.66	\$6,196.19	\$11,106.66	\$48,254.75	\$65,557.60
	Installation Costs	\$0.00	\$36,575.00	\$65,537.50	\$284,812.50	\$386,925.00
Total Cost of Sales		\$545.40	\$85,033.93	\$152,399.99	\$662,201.33	\$899,635.25
Operating Expenses						
	Marketing Costs	\$12,500.00	\$1,000.00	\$1,000.00	\$1,000.00	\$3,000.00
	Branding and Promotional Material	\$1,800.00	\$900.00	\$900.00	\$900.00	\$2,700.00
	Manufacturing Staff Training	\$120.00	\$120.00	\$120.00	\$120.00	\$360.00
	Installation Staff Training	\$0.00	\$120.00	\$300.00	\$300.00	\$720.00
Total Operating Expenses		\$14,420.00	\$2,140.00	\$2,320.00	\$2,320.00	\$6,780.00
Initial Costs						
	Product Design Consultation	\$25,000.00	\$0.00	\$0.00	\$0.00	\$0.00
	Software Development	\$1,200.00	\$0.00	\$0.00	\$0.00	\$0.00
	Compliance Certification	\$4,000.00	\$0.00	\$0.00	\$0.00	\$0.00
Total Initial Costs		\$30,200.00	\$0.00	\$0.00	\$0.00	\$0.00
TOTAL PROFIT		-\$45,165.40	\$138,546.07	\$249,740.01	\$1,093,178.67	\$1,436,299.35

AUS Sales

Income		
	New Installations	\$16,632,000.00
	Replacement Units	\$831,600.00
Total Income		\$17,463,600.00
Cost of Sales		
	Organisational Fees	\$1,499.00
	Component Costs	\$2,850,540.00
	Production Costs	\$330,000.00
	International Freight	\$17,787.00
	Port Charges	\$220.00
	Marine Insurance and Handling	\$15,902.70
	Duty	\$0.00
	GST	\$321,422.97
	Misc. Customs Charges	\$110.00
	Misc. Packing and Handlings Costs	\$1,540.00
	Transportation to Location	\$22,110.00
	Installation Costs	\$2,829,750.00
Total Cost of Sales		\$6,390,881.67
Operating Expenses		
	Direct Marketing Costs	\$100,000.00
	Branding and Promotional Material	\$10,000.00
	Installation Staff Training	\$12,000.00
	Product Storage	\$2,970.00
Total Operating Expenses		\$124,970.00
TOTAL PROFIT		\$10,947,748.33

Software FAQs

Q: Is this a polling or interrupt based approach?

A: Interrupt.

Q: What language is the software coded in?

A: MicroPython.

Q: Where is the program stored in the PCB?

A: The non-volatile flash memory.

Q: Why are you not programming for the button linking to the traffic lights?

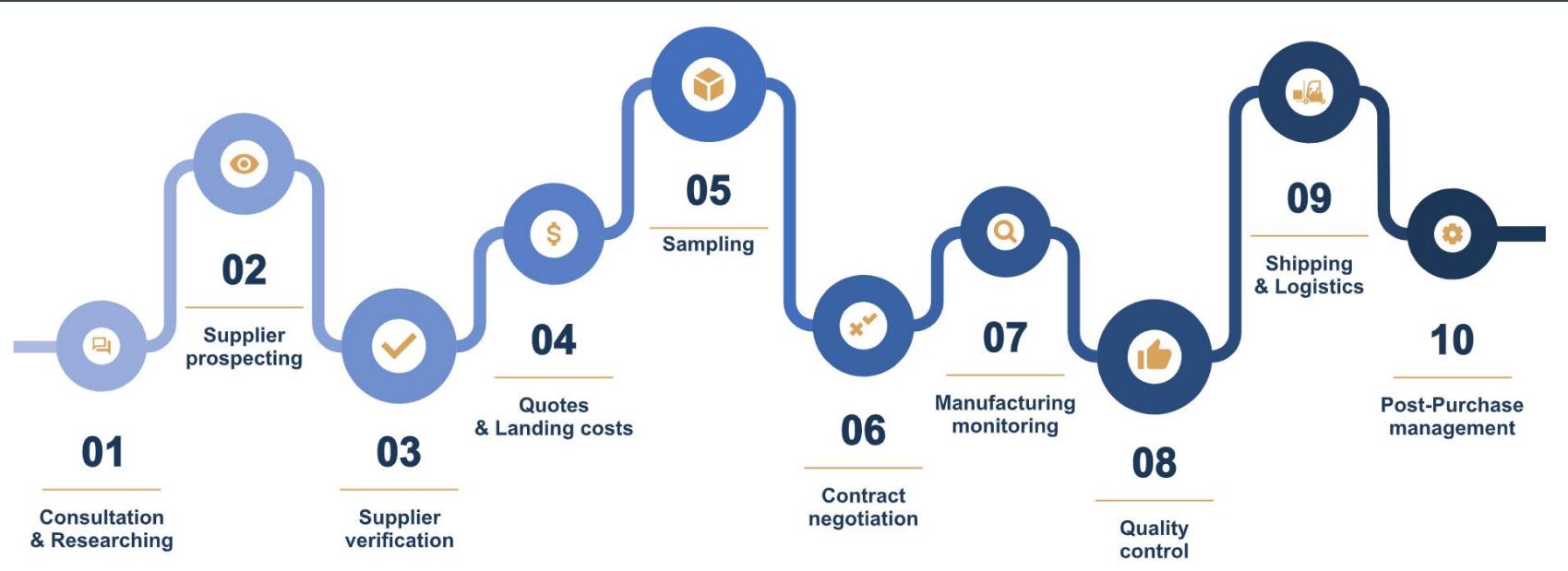
A: The button is all analogue circuitry, we do not need to replace this.

Australian Sales Pricing

	Volume	Weight
Unit	0.001 m ³	0.4 kg
Shipment	64.68 m ³	29195.4 kg

Freight	\$275/m ³
Insurance	0.5% of Product Price
Duty	0% due to ChAFTA
GST	10% product cost, freight and insurance
Transport	\$6700/34m ³
Storage	\$900/month/69.6m ³

Organising Production in China



Design Safety

Key Facts:

- **5 mJ/cm²** dose can kill 99.7% of COVID-19
- American Conference of Governmental Industrial Hygienists (ACGIH) guidelines state that UVC has no known adverse effects at a daily exposure rate of **6 mJ/cm²**

T.L - Aura's Design:

- Features a **3mW** UV-C LED which radiates the **25cm²** surface for **42 seconds** - providing a dose of **5.04 mJ/cm²**
- Cleaning cycle begins 10 seconds after button release
- Cleaning cycle stops immediately and resets if button is pressed
- Estimated time between entering the cleaning zone and pressing the button: **4 seconds**
- Expected dose per interaction: **0 mJ/cm²**
- Predicted maximum dose of **0.48 mJ/cm²** per interaction

The Cost of COVID-19

Hospitals

- ~1% COVID-19 Hospitalisation
- <1 Hour Visit: \$290
- Average Stay: \$20,000
- One Month Stay: \$276,000

Businesses

- Strain on the Economy
- Millions of dollars of losses over lockdowns
- Infections causing staff shortages

Public Opinion

- Social Cost
- Existence of a Solution
- Council's Responsibility to Public Health and Safety