**GNG 1103 Deliverable C**

**Deliverable C: Design Criteria and Target Specifications**

Submitted by

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# Introduction:

The design process of this product will have many obstacles. There is a list of needs that must be met in order for the product to be useful. These needs will be ranked by priority, making sure that there are no cutbacks on important aspects of the product. The device must measure if a person is having an opioid overdose, likely by measuring the blood oxygen percentage or respiratory rate. Once the device detects an overdose it must alert emergency services of the person's location. Some of the mechanical needs can interfere with the aesthetic needs. It will be difficult to make the device both light and discrete yet also fully functional. One of the larger issues that we will have is the GPS aspect. The device must not only inform emergency services that there was an overdose but also the location of the person. There will either need to be a 24/7 GPS system installed or, if possible, a GPS system that only turns on when an overdose is detected. The features of the device will depend on priority rank and what we are able to include.

# Needs Table:

|  |  |  |
| --- | --- | --- |
| Priority rank | Need | Design Criteria |
| 1 | Overdose Detection | Oxygen (%)  Respiratory rate (breaths/min) |
| 2 | Location detection | Location detection(metres from target) |
| 3 | Size/Weight, Lightweight | Weight (lbs)  Size(mxmxm) |
| 4 | Cost | Cost($) |
| 5 | Form factor | Aesthetic(approved by client)  Wearability |
| 6 | Durability | Durability(lbs withstood, scale) |

# Comprehensive Design Specifications:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#** | **Design Specifications** | **Relation** | **Value** | **Units** | **Verification Method** |
| 1 | Battery Life | > | 24 | Hours | Physical testing |
| 2 | Size | < | 10 | cm^3 | Measuring |
| 3 | Durability | > | 43 | IP | Physical testing |
| 4 | Cost | <= | 100 | $ | Buying |
| 5 | Response time | < | 3 | min | test |
| 6 | Weight | < | 250 | grams | Weight measuring |
|  |  |  |  |  |  |

# Benchmarking:

Pulse Oximeter(Used by hospitals and safe injection site. Monitors same stuff but, since it is already used at a medical facility, doesn’t contact anyone).

Scale: 1-3(x, light, dark check)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature** | ToronTek-E400 Pulse Oximeter | Oxalert EPO (Enhanced Pulse Oximeter) | Hopeband | Vancouver startup project - opioid overdose |
|  |  |  |  |  |
| Cost | ↑ | --- | ↓ | ↓ |
| Location Detection/ GPS | ✘ | ✘ | ✔ | ✘ |
| Overdose Detection | ✔ | ✔ | ✔ | ✔ |
| Wearability | 🗸 | ✔ | ✔ | ✓ |
| Lightweight | ✔ | ✔ | ✔ | ✔ |
| Form Factor/ size | ✔ | ✔ | ✔ | ✔ |
| Durability | ✘ | ✓ | ✓ | ✘ |
| Total | 13 | 20 | 27 | 23 |
| Link | <https://www.walmart.ca/en/ip/torontek-e400-fingertip-oximeter-recording-and-alarm-feature/6000197856901?cmpid=sem_google_en_pla_none_868545289_76686332525_None&gclsrc=aw.ds&&gclid=Cj0KCQiAyKrxBRDHARIsAKCzn8xeU3cI8UdxNqRz8Q-B21HJeOrX2WCtz0GvgpCCw1CGy10LFvj6VqEaAsZaEALw_wcB&gclsrc=aw.ds> | <https://www.med-botics.com/> | <https://www.heinz.cmu.edu/media/2019/March/new-model-found-effective-in-predicting-risk-of-opioid-overdose> | <https://www.thestar.com/vancouver/2018/06/03/bc-startup-developing-wearable-tech-that-could-save-drug-users-from-overdosing.html> |

# Conclusion:

The results displayed above contribute to the overall design of the device and outline the criteria with which each idea/solution will be compared and contrasted in order to ensure the best solution is chosen in the end. Non-metric qualities, such as the aesthetics of the device, will be trickier to measure, but, utilising the other criteria that are metrics and input from the client, they can still be evaluated to a reasonable capacity. Priority ensures that the device is chosen based upon the most important needs/traits but does not ignore those lower on the list. The device chosen will therefore, thanks to the listing and rankings above, inevitably have the best traits in most regards and in the most important areas.

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