**PROJECT DELIVERABLE B:**

**NEEDS IDENTIFICATION AND PROBLEM STATEMENT**

**Submitted by**

Team D14

Cristie Kwan (300186315)

Fatmah Bayrli (300159193)

Bill Wu (300170086)

Michael Hetu (300209299)

Mashal Joyaa (300082650)

**On**

January 31, 2021

University of Ottawa

**Introduction:**

 With the onset of the COVID-19 pandemic, the food delivery market experienced a massive surge. The lack of in-person dining options and the risk of getting sick drove many people to spend the extra money to receive their food at the doorstep. The food delivery industry suffers from “extortionate” fees, slow delivery times and lack of coverage in rural areas. This increase in the popularity of food delivery and the many issues plaguing the food delivery industry encouraged the team at JAMZ to come up with an innovative solution. The team at JAMZ is developing a new drone designed specifically for food delivery. This new drone plans to increase delivery speeds, reduce costs and increase the areas in which food delivery will be available.

 The JAMZ team is currently working on the drone prototype. For this prototype, JAMZ requires modules to cover some of the features of the drone. The modules will consist of an anti-theft system, a violent shake sensor and a climate sensor. Our team is enlisted to help with the creation of these modules.

**Client Meeting and Needs Identification:**

 During the initial client meeting, the JAMZ team expressed what they needed to improve their drones. After analysis, Team D14 decided to focus on the emergency beacon and an anti-theft system. The two add-on systems coincide with each other. Designing a mechanism that will satisfy one of the needs can be adjusted to suit the needs of each system. The table below consists of the need that we interpreted, how we would associate the need with our design and the overall ranking of each need.

The scale is 1-5 where 5 is the most important feature and 1 is the least important.

|  |  |  |
| --- | --- | --- |
| **Rank** | **Interpreted Client Need** | **Design Criteria**  |
| **5** | Reporting of any deviation between flight plan and actual path | The module must be able to detect when the drone is deviating from the path and enter a state of alert |
| **4** | Location of the stolen/ Missing drone | GPS signal attached onto the drone transmitting a direct signal to the operator |
| **5** | An alert system to notify others the drone has crashed/ is in the process of getting stolen  | A speaker, and lights to make it prominent the drone is not supposed to be in that position, whether it is crashed or getting stolen |
| **3** | Visual feedback for the operator  | A camera to allow the operator understand the circumstances/ state of the drone  |
| **4** | Accurate data of the situation | Allow access to provide data back and forth between the operator and the drone. |
| **2** | User does not want to spend too much money on the device | The device is inexpensive |

**Problem statement:**

 The JAMZ team needs a module that will protect the drone from undesired flight path deviations, and theft, by reporting constant feedback to the operator, alongside alerting bystanders, while being cost-effective and lightweight.

**Benchmarking :**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Sabre** | **Motorola** | **CNXIN** |
| **Type of Alarm/Siren** | Handheld chain siren | Bolt WiFi Smart Safe with Remote Open Security Monitoring and Siren | HOT! 120db Power Cut Failure Outage Automatic Alarm Warn Siren LED Indicator |
| **Cost** | $8.43 | $179.00 | $20.99 |
| **Weight/Size** | 79.4mm x 25.4 mm x 12.7mm | * 2.89 lbs
 | * 10 x 5.3 x 2.5 cm
 |
| **Assembly Required** | No | No | No |
| **Can be modified to suit user’s needs** | Yes | Yes | Yes |

 While comparing the three units we chose to benchmark, one of the largest disparities is the cost. The first option is significantly cheaper than the other two. This makes it a very financially appealing option for our project. The first unit works by the siren activating when the chain is a part of is broken. While the second unit works by virtual real-time monitoring, and the third unit works by activating when a power failure occurs. The first unit may give us the options necessary to develop our solution thoroughly. All three of these devices are viable designs that we will utilize for our solution.

**Conclusion:**

 The current drone prototype requires a device that will warn both those around the area and the operator to make them aware of any theft that would occur. The device must include a GPS tracking system, speakers and lights that flash as the drone is deterring from its intended location, as well as a camera to track the surroundings. In addition, the alarm device must be lightweight and reliable when it is activated. It will be able to help assist in alarming people that a theft is occurring with the drone. These issues must be organized and resolved for an effective alarm device.

**References:**

SABRE Sabre Personal Alarm - Black Key Chain with Loud Attention Grabbing Siren-PA-01. (n.d.). Retrieved January 31, 2021, from <https://www.homedepot.com/p/SABRE-Sabre-Personal-Alarm-Black-Key-Chain-with-Loud-Attention-Grabbing-Siren-PA-01/204317433>

MOTOROLA Bolt WiFi Smart Safe with Remote Open Security Monitoring and Siren. (n.d). Retrieved January 31, 2021, from https://www.homedepot.ca/product/motorola-bolt-wifi-smart-safe-with-remote-open-security-monitoring-and-siren-black/1001529749

CNXIN Hot! Power Cut Failure Outage Auotmatic Alarm Warn Siren LED Indicator. (n.d). Retrieved January 31, 2021, from https://www.newegg.ca/p/0ZK-08UH-0FY52?Description=siren&cm\_re=siren-\_-9SIAN8UC9B5464-\_-Product