Deliverable B

Rural businesses endure high commission rates from third party delivery services. As such, JAMZ intends on opening the door to a cost-efficient drone delivery system. However, to do so they require our help to create a module for a climate sensing system that will be attached to the drone.

They plan on launching their business in the listed areas:
- Segmented Area 1:
    - Metcalfe Ottawa, Ontario
    - Greely Ottawa, Ontario
    - Mississippi Mills, Ontario
- Segmented Area 2:
    - Eganville Ontario
    - Perth Ontario
    - Carleton Place Ontario
- Segmented Area 2:
    - Gananoque Ontario
    - Osgoode Ottawa
    - Smiths Fall Ontario

Their goal is to have five drones that simultaneously communicate with one operator. Ergo, the information communicated from the climate sensor module must be concise, accurate and continuous. As such a top priority of the design of the module must be the accuracy and reliability of its data. The drone and package temperatures must be relayed to both the operator and the user to ensure the package's integrity upon delivery. Another need that has high priority is ensuring the design takes into account the safety of the package and the safety of the clients, users and all others nearby. Furthermore, the physicality of the module must be precise not to impede the aerodynamics of the drone, thus the module must be as compact as possible and positioned aerodynamically. Also, the overall weight and balance of the drone must be steady enough for the food and its content to remain intact. In laconic terms, the module that will be attached to the drone must be as light as possible. Likewise, customers will have a limit on the quantity of food they can order to ensure they do not go over the weight limit.

The drone operator must be updated as to whether the package's condition is deliverable based on the climate. The outside element (temperature) will have effects on the package, and the system needs to detect these changes. The analysis of the weather patterns of the segmented areas where JAMZ plans to unveil will provide information on how the temperatures in this area can affect the package's climate. Targeted humidity is 50-55% relative humidity. In the beginning period of their launch, JAMZ will not operate during rain or snow. Therefore a specific season's weather pattern must be analyzed for the system.

Benchmarking remarks

Drone Delivery Canada has its package inside the drone, thus completely sealing it. This allows for better insolation of the food, which allows the package to lose less humidity, keeping its temperature more stable. It also allows the temperature module to record accurate data on the food's condition, without having outer elements interfering with the sensors. However, having this inner package means many people will be handling the drone, thus they will need to be formally trained.

Amazon Prime Air drops the package directly on the floor, thus does not use a cable like JAMZ and Flirtey. Consequently, there are lower risks of breaking the package and requires much less stability from the drone. In other words, when using a cable to descend the package, you are creating an enormous strain on the drone and if the drone was to sway a little, the distance of the package by relation to its weight would cause an enormous moment which could lead to the crashing of the drone.

Conclusion

JAMZ needs a system that transfers reliable accurate data between the operator and the drone concerning the safety and climate of the package. The system must be compact, light and inexpensive. It should also be prepared for situations with the help of collected data (i.e weathering patterns, etc.). The locations where JAMZ will be launched should be used to the advantage of predicting possible climate changes that will affect the package's climate.

Problem statement

Safely delivering food to clients in the rural area, while continuously exchanging accurate data with the operator about the package's and the drone's climate. Ultimately determining the good standing of the buyer's package and the condition of the drone.