

A STUDY ON THE MODERNIZATION OF POSTAL DELIVERY¹

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Abstract

Modernization is achieved by encouraging product innovation to adapt to the user needs. The postal sector is in a good position to adapt to market transformation, and to new types of services resulting from the combination of electronic and traditional postal services. UPU provides a platform specifically dedicated to electronic postal services and ensure that innovation meet in three dimensions (physical, financial, digital/electronic). It is necessary to restriction on the kind of activities that postal operators can provide while ensuring fair competition. The paper is about a new way of delivery of consignments by using drones. Beside this, research is carried out on terms which would apply in their implementation. Tests are conducted to investigate the technical capacity as well as their commercial use.

Keywords – innovation; delivery; drone

INTRODUCTION

A possible big change in the postal delivery which is coming on in the future is parcel delivery by using a drone. The idea of a package delivery right to doorstep of clients has always been the goal of the postal companies. Delivery using drones need to look like this into the future: a drone execute package delivery, eliminates retention and the waste of time and cost of human labour, and return to the initial destination. Figure 1 shows an illustration of one of the drones (position of four propellers, box with the logo of postal services, basic construction) which will be discussed further below. [1]

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Recruiting enough people who is working in the delivery to cover all areas served by the company makes a very high cost. Although it should be invested around \$ 10,000 in each drone, by using them it is possible to organize fast and stable delivery, without crowds.



Fig. 1. Illustration of delivery by using a drone

Postal services are focused on the safety of the package and overall control of delivery to recipient. All clients expect to know what the status of their packages is during the transportation. Deliveries using drone will be controlled via a common service. Using cloud-based information, all recipients will be able to track delivery at any time.

The story of potential service delivery by drone excited consumers, but it remains a certain number of obstacles while service delivery drone becomes the norm: there are no restrictions in the mass, distance limitations and restrictions due to weather conditions. Release drone will be allowed each within its field of vision, but commercial users must obtain permission from the operator and allow for activity, they are obliged to apply for a permit for an activity if they decide to fly a drone in the open, but the permit is not required if the drone deserted in indoors or in areas that do not affect the general public.

CHARACTERISTICS OF DRONE DELIVERY

The drone has four propellers on his ends. The yellow box, which has the logo of the postal service, is located in the middle. In the centre there is a box, and the recipient can recognize and accept delivery using a mobile application to open the box. A drone has extremely lightweight construction and some even the possibility of transport loads up to 10 pounds on a single

charge. Figure 2 shows the idea of delivery by using drone and specific characteristics of drones (a product of the purchases, order go to the warehouse, drone picks up the order and deliver it to the destination). [2]



Fig. 2. The future of the delivery by drone

The drone is equipped with an improved safety features. There are specially designed function of verification to ensure that the subject is coming to its recipient. There is developed atailored solution - application equipped with safety features and functions for authentication to ensure that the mail and parcels arrives at the desired recipient. Through this application, users will be able to choose their desired delivery date and time to suit them. The prototype application that is developing can allow users to choose when they want to receive a package using drones. Most often, the drone has a capacity to carry loads of up to half a pound, flying at a height of 45 meters and cross the distance of 2.3 kilometres. And there are drones who deliver parcels up to two kilogramsto local municipalities. GPS will be used to ensure that the packages are delivered to the correct location. [3]

As part of the plan to be followed, for some types of drones, it is suggesting the flying in the air space of 200 meters - between 200 and 400 meters from the ground. What guarantees the greatest security is a request that as the level of complexity of airspace increases, the level of sophistication of the vehicle should increase. The technology brings a number of security functions that will be used to ensure timely delivery. Auxiliary engines will be available for optimal balancing of weight. [4]

Some types of drones can fly autonomously, following clearly defined, secure airways, which were set by Cloud software and developed by Mattern's (American manufacturer of drones). By the time of their actual commercial use in the near future, there are different requirements that need to be clarified. This includes the study of the regulatory framework that will be applied when unmanned aircraft will be sent over the mountain regions, which are interrupted by a number of remote and isolated villages where delivery by drone can be helpful. Extensive tests will be conducted to examine the technical limitations of drones, including limited battery life.

By the current testing, it is successfully and fully implemented automated transport package by flight consisting of the following stages:

- Taking Off
- Phase of flight
- Landing
- Back to the first station. [5]

Navigation: The drones which are using GPS (differential or otherwise) don't have problems that are listed in open areas or landing on the field. It is the precision of somewhere between 3 and 10 meters, which is fine for most applications, but not good for landing on the stairs at the entrance of the house, especially when there are obstacles (such as trees) everywhere. Moreover, how the drone knows where to go? You cannot just give him the address; it is necessary to take a precise GPS coordinates. Maps of fields usually aren't updated often enough to show the obstacles and if you leave it in the hands of consumers (through, say, a GPS application), you can get a lot of people who give the coordinates of their homes to drone with an error of 50 meters.

Avoiding obstacles: If the drone should fly in the area of high population density, it should possess the equipment for avoiding obstacles. It should avoid a lot of buildings, power lines, telephone poles, birds, trees and stuff on his road and the drone should safely get around them all alone. This is of course possible, but doing so dynamically at the right time while the drone is traveling, which requires a large computing power and some relatively sophisticated sensors, such as (at least) camera that is high enough resolution to distinguish the black lines from the black pavement. And when the drone

reaches its destination, it will have the task to locate a safe place to land and drop packets, which brings us to security issues.

Security and liabilities: To raise the 5 pounds load for 20 minutes with the release, the drone needs a big engine with large propellers. Even small engines with small propellers can hurt; however, big engines with large propellers can probably cause significant harm. The amount of interaction between drones and people are reduced to a minimum, but these things are related to self-supply package on the country while in full operation. Adults have the feeling that they should stay away but what about the children? What about pets? This doesn't enter even into what happens when one of these gadgets actually fell for some reason, what will be certainly from time to time, if for no other reason, at least because the weather is unpredictable.

Legality: It is unlikely that air space will be suddenly open for all drones. What is more likely is that the new rules would allow unmanned aircraft in the airspace in the public, which is generally 500 - 1000 feet away from any obstacles (including ground). Operational aircraft (or any other) which is flying too low over private property constitute a violation of the rights of owners of property. This means that it will not be probably legal for unmanned drones to flying over private property below 500 feet, which makes it difficult to carry out many deliveries.

Price: One of the important questions is whether it will be worth to try to implement this system for anything other than as a factor of innovation [3]. From an economic perspective, we can easily see how delivery-using drone could be an elegant technological solution. Economy of delivery is driven by two main factors, the volume of way and size of the delivery times. The volume of way is the number of landings that can be made on the way of delivery, often referred on industrial language as "milk run". The size of the delivery is number of deliveries per stop on the so-called "milk run". If the drone makes a large number of deliveries in a short period of time or distance, cost per shipment will be low. Also, if the drone deliver a large number of postings on the same location, price per package will be low. The current prototype drone that companies represented carry only one package, and after drone execute the delivery, he has to fly all the way back to the initial destination to recharge their batteries and pick up the next package.

If the goods would be close enough to consumers that drones can deliver them within 30 minutes, we may be witnessing the delivery by drone that can cost more than a delivery by truck, because as many consumers cite - The aim is that fast delivery. Compare the delivery by drone with delivery by trucks. The number of stops of trucks on delivery is in average around 120. So many people would tell that a classic delivery is much better. There was not much analysis of the overall costs of delivery using drone. For now,

there are suggestions that the drones should have the potential to be both faster and cheaper way of delivery. Currently economically feasible time of delivery of shipments is 1 hour. Are people willing to pay a large fee for this service, it will be seen in the near future. [6]

SOME POSSIBILITIES OF USING THE DRONES

When it comes to the use of drones, it is very popular to consider its use to access some isolated areas (mountains, islands, rural areas, etc.). Many states will certainly provide the funds for this technology to be used in emergency situations. For example, this may include the delivery of supplies in the areas that was cut off from the world during the storm. Figure 3 shows the way of an emergency delivery of specific supplies by using the drone.

In many cities in underdeveloped countries are scarce paved roads what makes it difficult to transport goods. For example, the drones can supply blood samples to clinics and hospitals in which are analysing AIDS. Blood samples are perfect cargo for drones: small, light, valuable and time-sensitive. In these cases which are time-sensitive, the cost is much less important factor. Delivery by drone can save lives by using it to deliver a medication to a patient in a rural area. Or it can be very useful when some essential spare part should be transferred to oil rig, etc. Even in less extreme cases, drones are sometimes more attractive. The drones only need to beat the cost of private courier. [7]



Fig. 3. Emergency service using drones

Another real option for drone implementation is the emergency transport of consignments with the highest priority, as well as laboratory tests. The

focus of the tests is the use of drones in special situations or for transport of special items:

1. If a settlement which is cut off from the rest of the world because of bad weather, the drones could transport urgently needed things there.
2. People who live in isolated areas that need regular supply of medication may also receive their shipments via drones.
3. The drones can be used to transmit courier shipments of high priority, such as laboratory samples. [8]

One of the basic preconditions for using drones is a mutual cooperation - vehicles must be able to communicate with each other and to avoid each other as airspace becomes thicker at low altitudes. The following should be included:

- Sophisticated GPS that tracks the location of other drones in real time;
- A reliable Internet connection;
- Online flight planning for the possibility of mutual communication;
- Communications;
- Sensor with which avoid other drones and other obstacles.

Equally good case for the use of drone technology is adaptation for use in dense urban areas. This technology is more energy efficient because it reduces carbon dioxide emissions, because its work is completely based on batteries. [9]

CONCLUSION

In the case a customer needs something faster than the courier to deliver some postal item, drone technology is the right choice. A drone lands, pick up a package, and it came back again to the first station for a small fee. It is considered also to use the drones for other commercial uses such as delivery of food. Software of drone is programmable so that it can be used to capture family moments too. They are used by the military too for reconnaissance and elimination of threats to the rather secret way.

It seems that the drones are one of the new technological areas that will really intrigue the human imagination. It is very likely that drones will be very frequently used in the future for a variety of applications that we could never imagine. It is expected that the technology continues to progress and many companies will certainly use the drones for different purposes. [10]

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