

Drone Disruption

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New technologies can bring many opportunities for organizations, but they also offer cyber criminals many ways to harm your business, deceive your customers, and spoil your reputation.

That is why it is important to know that investing in preventing and tackling this is mandatory for any company, especially for EPTDA members: the logistics sector is an important target for hackers because it manages a huge and diverse amount of data.

From weapon of war to freight

An unmanned aerial vehicle (UAV or drone) is an aircraft that can be operated and navigated autonomously by a computer or from the ground via a remote control. Hence, it does not have an on-board crew.

Primarily used as a strategic weapon of war in recent years*, drones captured the attention of several companies that envisioned the possibility of using them as logistics tools.

**Other uses included so far imaging, cleaning, and security.*

US leads the way in delivery drones

For several years, drones have been used successfully in the military and entertainment industries. Lately, this technology has been improved to such an extent that it has allowed it to expand into other areas as well. One of these is delivery of goods.

The US market had already some major breakthroughs. Recently, the world's largest retailer announced that it could start drone deliveries very soon. Through a service called Prime Air, Amazon will use delivery drones that can carry packages of over 2.2

kilograms, at distances up to 24 kilometers, in about 30 minutes. They take off vertically, like helicopters, but once lifted they can fly like Lockheed Martin F-35 Lightning II aircraft.

These drones are using sensors which can detect obstacles such as cables, chimneys and other objects, in real time, to avoid accidents. They also have a software embedded in their structure which uses technologies such as Machine Learning and Artificial Intelligence that will improve this service over time and make it more secure.

The first testing of this delivery service was done by Amazon in 2016. Now, the company announced that it will start deliveries with drones in a few months.

Amazon is not the only U.S. company to test such solutions. For example, UPS announced last year that it has tested a drone that launches from the ceiling of a parcel van, autonomously delivers a parcel to a home address and returns to the vehicle while the courier continues the route to make another delivery. The UPS-tested HorseFly drone is powered by a battery that recharges while it is docked. It has a flight time of 30 minutes and can carry a parcel weighing up to 4.5 kg.

Drone Logistics and Transportation Market

With the incorporation of new technologies, such as Artificial Intelligence, sense and avoid systems, and cloud computing in UAVs, the demand for drones is expected to increase in various sectors.

The incorporation of Artificial Intelligence is expected to enable UAVs to enhance their abilities by providing them a humanlike thinking capabilities. This new technology is expected to enable UAVs to carry out a number of activities such as takeoff, navigation, data capture, data transmission, and data analysis, without any human intervention.

Why should your company invest in UAVs? Because the drone logistics and transportation market is anticipated to register a compound annual growth rate (CAGR) of over 20% until 2024, [according to a recent report published by Research and Markets](#). The fastest growing sectors will be shipping, infrastructure, software, and warehousing.

Advantages and disadvantages of using drones

Road safety is a major societal issue. [Eurostat data](#) shows that in 2011, more than 30,000 people died on the roads of the European Union, i.e. the equivalent of a medium town.

Also, for every death on Europe's roads there are an estimated 4 permanently disabling injuries such as damage to the brain or spinal cord, 8 serious injuries and 50 minor injuries.

Traffic congestions and pollution are also problematic. Europe has no more than 20 cities in the [top 50 TomTom Traffic Index](#) and [air pollution is suffocating us](#). Logistics companies have their share of responsibility in this manners. So, could drones be a part of the solution for these problems?

Here are some of the advantages of using this technology:

- Savings in distribution costs.
- Faster deliveries.
- Possibility of reaching areas that are difficult to access.
- They reduce urban traffic and CO2 emissions.
- Helps to control inventories and movements within the warehouse itself.
- No shifts are needed: drones can operate 24 hours 365 days a year.

However, experts also speak clearly of the limitations on the use of drones today. Those limits would be related to the fact that it is a high cost technology – it requires a lot of research and development – there is underdeveloped legislation – it produces loopholes – the carrying capacity is limited – we cannot include large volumes and the range is limited – and the air traffic routes are not yet defined or fully adapted for drones.

Market Dynamics

In order to have an informed opinion about the current drone market, here are the key elements:

Drivers:

- Demand for faster delivery of goods
- Investments in the drone delivery market
- Rising demand for sophisticated industry-specific analytical solutions

Restraints:

- Bandwidth and battery life concerns

Opportunities:

- Opportunities for vendors at different levels of the value chain
- Drone delivery service in geographically challenging areas
- Use of drones for cargo delivery in military operations

Concerns:

- Delivery authentication and cybersecurity concerns
- Concerns regarding safety during travel and package drop
- Restrictions on the commercial use of drones
- Lack of skilled and trained personnel

Critical components of drone logistics and transportation

In order to have a successful fleet of drones, you have to take care of three important aspects:

1. drones
2. ground stations
3. cloud network

Drones refer to the platform that carries payloads which in case of drone logistics are the package that needs to be delivered. The package can be either food, medical supplies, parcels from online delivers or other. Drones today have the capability to transport up to a few kg of payload over a distance of several km (usually, a double-digit figure). A company adopting drone logistics solutions needs hundreds of drones.

Drones also require ground stations placed strategically in various locations so that they fully automate the drone logistics process. These ground stations help in payload pickup, battery exchange, or changing of the drones. Placement of ground stations is critical as they provide a landing location for drones carrying a package to a long distance.

The third-most important component for a successful drone logistics is the use of cloud-based networks to ensure the safety and security of drones as well as the package. A cloud-based network will collect the data from the drones and analyze them to make sure that the drones do not crash into each other and also into buildings and other properties. The data analysis will also help the optimal route for efficient package delivery.

Usage of drones in the logistics sector

A DHL report on the manner divides logistics industry use cases into four categories: Urban First and Last-Mile, Rural Delivery, Surveillance of Infrastructure, and Intralogistics.

This is how the report puts it:

Urban First and Last Mile

”An airborne first and last-mile network could look as follows: Shipments that arrive from outside the city limits are sorted at existing facilities (hubs, warehouses, crossdocking sites), and shipments meeting certain criteria are separated automatically. In addition to size, weight, and time criticalness, these criteria could also include dynamic metrics (e.g., current road conditions, air pollution, and network load). Each UAV automatically

picks up assigned shipment(s) from a conveyor belt and takes off. On its way back to the hub, the UAV could carry out point-to-point deliveries that lie on its route.

Its routing decisions would always be dynamic, meaning an intelligent network would redistribute all resources in real-time, depending on the load and urgency of certain shipments. When an assignment for emergency transport comes in (e.g., time-critical delivery of blood from a blood bank), this is prioritized. End customers are equipped with an app that allows them to see nearby UAVs and order a dynamic pick-up – this system would use GPS data from the customer’s smartphone to meet him or her wherever they are, even if they move to a different location after placing the order. There would be the same flexibility for deliveries – as soon as the customer sends a notification, a UAV leaves the hub and makes delivery direct to the customer location or in case of returns, picks it up right from the first mile of the customer.”

Rural Delivery

”For the logistics industry, rural delivery by UAV is attractive not only in emergency applications because low-volume remote locations represent a costly part of standard networks. Furthermore, they typically require a non-standard infrastructure tailored to regional specifics (e.g., mountainous settings or island delivery). For remote island locations, a conceivable use case is the delivery of parcels to near-shore islands, either replacing an existing (and complex) process involving cars, boats, and postal workers, or providing new, additional services. These could be off-peak delivery services originating from the mainland or specific express services.”

Surveillance of Infrastructure

”As in other industries, organizations in the logistics industry must monitor their infrastructure. UAVs can help with security and safety surveillance in large-scale facilities such as warehouse sites, yards, docks and even pipelines. They can also help to guide various operations (e.g., the movement of trucks and forklifts on site).

Intralogistics UAVs could play a vital role in intralogistics. Drones are easy to deploy and can follow pre-defined flight paths, so there is no requirement for specially trained personnel to launch and fly them. As long as system operations are limited to private premises only, the organization has to deal with minimal regulatory boundaries and privacy concerns (issues that can be so detrimental that they render other use cases

unfeasible). The most significant limitation for intralogistics is probably the payload issue. Smaller, affordable UAVs are still disappointingly expensive, and large unmanned helicopters almost rival their manned counterparts in terms of cost, maintenance, and infrastructure requirements, eliminating their major advantages. Another imaginable intralogistics application is the use of UAVs inside the warehouse environment for more flexible and accessible high-bay storage.”

Questions

[A PwC report about drones](#) suggest that every leader of a company should answer some questions if he wants to emerge as a winner from the forthcoming drone revolution:

- How vulnerable is your business model to drone-driven disruption – and how soon will that disruption arrive?
- What game-changing openings are there within your market, and how can you take advantage of them?
- Do you have the talent, data and technology you’ll need to do this?
- How can you build transparency and trust into your drone platforms and applications?

European Union’s view on drones market

[European Commission adopted in May](#) some rules that ensure increasing drone traffic across Europe in a secure manner. The rules will apply to all operators of drones – both professionals and those flying drones for leisure.

The pan-EU framework creates three categories of operation for drones — open’ (for low-risk craft of up to 25kg), ‘specific’ (where drones will require authorization to be flown) or ‘certified’ (the highest risk category, such as operating delivery or passenger drones, or flying over large bodies of people) — each with their own set of regulations.

The rules also include privacy provisions, such as a requirement that owners of drones with sensors that could capture personal data should be registered to operate the craft (with an exception for toy drones).

Also, as of 2020 drone operators will have to be registered with national authorities. In principle, the rules apply to all drones regardless of weight. Operators of drones weighing less than 25 kg will be able to fly those without prior permission under a certain number of conditions. Among others such conditions are that the drone must not fly higher than 120 meter and that the operator always keeps the drone in his/her visual line of sight and flies it far away from people.

Member States will be able to define so-called "no-fly zones" where – through satellite geo-location - drones will not be allowed to enter. "No-fly zones" may include airports and airfields or city centres.

Next steps

The European Commission and EASA will soon publish guidelines and so-called "standard scenarios" for drone operations that will help drone operators to comply with the adopted rules. The European Commission is also developing an institutional, regulatory and architectural framework for the provision of U-space services, which aim to enable complex drone operations with a high degree of automation. Finally, a systematic review of all existing EU aviation rules is progressing to identify the necessary changes to improve applicability to drone operations.

Critical Sources and further reading:

- [Reaserchandmarkets.com](https://www.researchandmarkets.com): Drone Logistics and Transportation Market - Growth, Trends, and Forecast (2019 - 2024)
- [Marsh Report](#): Drones – a view into the future for the logistics sector
- [DHL Report about drones](#)
- [Logistics Management](#)
- [European Union Aviation Safety Agency](#): EU wide rules on drones published