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DRONS IN LOGISTICS: DIGITAL TECHNOLOGIES AGAINST THE COVID-19 PANDEMIC

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Abstract: *The article analyzes the main trends in the use of drones before the appearance of the coronavirus pandemic and during its occurrence. Particular emphasis is placed on the formation of drone logistics in Ukraine and the world by type of activity in recent periods. The prospects of using drones in logistics processes to counter the pandemic are outlined. There are a number of examples of the application of drone logistics for medicine. The experience of using medical drones in the conditions of COVID-19 is considered.*

Key words: drone; unmanned devices; logistics; dronology; pandemic; medicine.

The use of drones in logistics processes today has become a separate industry - dronology. Drones have now become indispensable assistants for rescuers, logisticians, photographers, cinematographers, farmers, and police. Drones protect public order in cities, quadrocopters distribute the Internet along highways, railways and restore communication after natural disasters, courier networks of drones deliver food, aquadrons determine the depth of the reservoir, the location of fish and lure it to shore. And the list of drone use does not end there. The newest industry is rapidly gaining momentum.

According to Gartner, by 2022 the turnover of the world drone market will exceed 11.2 billion dollars. In 2017, it was estimated at 7.8 billion dollars, a year earlier - at 7.3 billion dollars [1]. Such data are given in reports analysts at J'son & Partners Consulting.

In Ukraine, the market volume is growing by 50% annually and is not going to slow down. Over several years in Ukraine, more than 10 companies have joined the development of military and civilian drones: Antonov, Athlon Avia, Politeco-Aero, DeViro, Meridian, UA Technology, Ukrspecsystems, Carboline, DroneUA, Spaitech, Kray Technologies, Aitek, etc. Thus, Ukrainian manufacturers of civilian drones occupy about 7% of the domestic market. Some companies try to work for export. For example, Kray Technologies produces drones for the agricultural sector, develops the markets of the United States and Canada. The company estimates that companies in these countries invest about 1.8 billion dollars a year in the purchase of agro drones. Logistics companies do not support the use of drones in practice. So, for example, «Nova Poshta» already several times stated about desire use drones [2].

The successful experience of using drones to deliver goods has demonstrated another area for the potential use of drones - emergency medicine in a pandemic. Covid-19 is changing the world. Yes, in China there was and remains a large-scale «digitalization» of quarantine. Photos of the faces of infected people are brought to a special database, monitored by surveillance cameras and drones, and those who came in contact with them are found by geolocating smartphones. Residents of Chinese cities are now scanned with individual QR-codes when entering public places - so the authorities collect the routes of movement of specific citizens. The harsh measures of communist China cannot be afforded by the governments of most European countries, where total surveillance is seen as an attack on fundamental human rights.

At the same time, unmanned devices are effective in minimizing human interaction, which is extremely important when human-to-human contact causes the virus to spread. In a COVID-19 pandemic, the use of drone principles is possible in the following areas:

1) preventive measures;
2) remote examination and identification of patients;
3) disinfection of disease areas,
4) delivery services (food, PCR tests, medicines, etc.);
5) body temperature measurement.

With the help of drones, law enforcement officers can more effectively scan the area and transmit messages, such as wearing a mask or staying indoors if the area is infected. Doctors examine patients remotely, rather than counseling by phone for symptoms of the disease. All this at the same time keeps some people from close contact with potentially infected people.

Seeing the risk of a pandemic, local authorities often encourage citizens to restrict their movements and stay in their homes. This puts a strain on the packaging and delivery services of products, which in themselves are a potential carrier of infection. Most drones can be easily modified using the reset mechanism to deliver packages weighing up to 6 kg without risk to both parties. This is especially important in areas where the virus has been confirmed, such as hospitals that are actively treating the virus.

In order to disinfect public places and prevent the further spread of COVID-19, local health authorities have tested ways to deploy spray quadrocopters in agriculture to more effectively disinfect these areas. Previously used in agriculture, these drones are filled with disinfectants instead of pesticides and are used to spray the entire public area. Although the effectiveness of this new disinfection process has yet to be measured rigorously, the speed and area of the process are unmatched. Spraying quadrocopters can cover 100,000 m^2 per hour with a 16-liter tank.

Because China has taken steps to limit the spread of COVID-19, most residential complexes and other buildings have followed a simple process of checking the temperature before admitting visitors to the building. To limit this point of risk, some teams use drones equipped with infrared cameras to check the temperature. Although these quadrocopters are commonly used for operations or public safety inspections, when properly calibrated, these helicopters can instead help measure body temperature [3].

The feasibility of using drones outside the pandemic in other areas of medicine is also no less important. Startup Flirtey is developing drones to deliver defibrillators for heart failure victims. However, the idea of delivering defibrillators by drones is not new. In 2014, a graduate student at Delft University in the Netherlands developed a prototype Ambulance Drone. The drone delivered defibrillators to patients who had had a heart attack, and an integrated webcam allowed operators to remotely transmit operational instructions to those around them and provide first aid.

The effectiveness of defibrillator drones has been confirmed by a study by the Karolinska Institute in Sweden. It turned out that drones deliver defibrillators 4 times faster than traditional ambulance services. Thus, in the case of a heart attack, every minute is decisive [4].

American Wake Forest Baptist clinics began delivering drugs using unmanned aerial vehicles. The first route was very short - only a few hundred yards, which separated the two establishments of this network in Winston-Salem. Previously, this work was performed by ordinary couriers, who most often walked. Now they have been replaced by drones. These are quadrocopters, each of which can lift up to 2 kg of weight and deliver cargo to a distance of up to 20 km. The use of these devices in the United States has already been licensed [5].

Today, one of Berlin’s laboratories will use drones to transport blood samples, drugs or tests for coronavirus. In the German capital, they want to launch 5 such routes [6].

It is worth noting that today the market for medical drones is 40 million dollars. The annual market growth of 24% in the period from 2019 to 2025 opens a very attractive sector for investment in innovative unmanned delivery solutions. Already today, drones save hundreds of lives: they transport drugs, donor organs, blood substitutes, defibrillators, etc. Winged helpers are able to fly quickly and without hindrance to the most inaccessible and remote places, so that someone’s heart continues to beat [5]. The multimillion-dollar investments of global companies today are aimed at developing unmanned delivery of patients by drones to medical facilities, and this gives hope for greater opportunities in rescue operations.

The future use of drones in logistics in countering the pandemic is extremely important, perhaps it is their active implementation in combination with the development vaccines will stop the spread of COVID-19 and save the world’s population.

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