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DEVELOPMENT POTENTIAL OF UAV OPERATIONS IN CROATIA

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ABSTRACT

The industry of unmanned aerial vehicles (UAV) is a fast growing market with an increasing number of users, providing the technology of "door-to-door" transport. The paper elaborates the possibility of using unmanned aerial vehicles (drones) for the purpose of supplying the Adriatic islands and the coastal areas with medicines and medical equipment, transplants and urgent postal packages. Croatia has 47 inhabited islands, of which only 16 have medical pharmacies. The optimal characteristics of drones have been analyzed for the Adriatic islands as well as the criteria of locating and sizing the potential medical centers regarding the island population, the deployment of the island and tourist capacities. Drones are favorable means of linking the continental and island medical centers for the purpose of delivering medical equipment and medicines. In elaboration of the insufficient transport links of the islands and the mainland, as a possible functional solution a model of UAV has been proposed, which meets the environmental, economic and social requirements. The exploitation advantages and shortcomings of UAV have been analyzed in relation to the helicopter and sea-going vessels.

KEY WORDS

air transport, unmanned aerial vehicle, supply of remote areas, emergency medical service, Adriatic islands and coastal areas

1. INTRODUCTION

Over the recent years the use of drones has been greatly expanding, and they are becoming more available to humans for their basic use. Also, the operative advantage of using drones for various purposes has been recognized, where it can practically replace various other aircraft regarding economy, simplicity, and efficiency of usage. A high benefit of drones is the possibility of usage for door-to-door operations. In this respect a large potential of using drones lies in the implementation within the telemedicine, i.e. transport of medicines, equipment, blood and organs over large distances at minimal costs. The possibilities of using drones for medical purposes for the Adriatic islands of Croatia have been studied, and the positive impact of drones on the possibility of inhabiting the islands and fast and efficient transport of various types of goods has been presented. The relation of drone and helicopter performances are analyzed and noting a great potential in using of drones for the purpose of transporting goods and the possibility of improving the connections of the indented coast and the increase of tourist potentials.

2. UAVs RELATED REGULATIONS IN CROATIA

The flying of drones has been regulated in the Republic of Croatia by the Unmanned Aircraft Regulations. The Regulations are implemented for unmanned aircraft of operational mass of 150 kg

and less. The unmanned aircraft are classified according to the operative mass:

1. Class 5 – up to 5 kilograms;
2. Class 25 – from 5 kilograms to 25 kilograms;
3. Class 150 – from 25 kilograms up to and including 150 kilograms.

The classification of the flying area is done in relation to the build-up level, population density and the presence of people and this has been presented in Table 1.

Table 1 – Classification of the flying area

Class 1	Area where there are no high buildings or facilities and no people, except the manager and personnel required for flying;
Class 2	Area in which there are auxiliary industrial facilities or buildings not intended for people and where there are no people, except for the manager and personnel required for flying. Only occasional passing is allowed, without staying, of people through this area (cyclists, walkers, etc.)
Class 3	Area with buildings or facilities primarily intended as residences, offices or recreation (apartment buildings, residential houses, schools, offices, sports facilities, parks, etc.)
Class 4	Area of narrow urban zones (centers of cities, towns and settlements).

Drone flying is performed in compliance with the valid regulations for the use of the Croatian airspace and the provisions of the Regulations. The pilot must ensure that the drone flight is performed so as not to endanger human lives, health or property, check the functioning of the drone before the flight, consider the meteorological and other conditions that might endanger the flight performance, insure that all the equipment or cargo be adequately fixed. For flying a drone over a distance greater than 500 meters from the pilot an Agency permit has to be obtained [1].

3. CLASSIFICATION OF UAVs FOR IMPLEMENTATION IN CROATIA

Regarding the implementation in Croatia, the drones may be used for the following purposes:

a) EMS (Emergency Medical Service) operations;
b) firefighting;
c) SAR (Search and Rescue) operations;
d) state border surveillance;
e) surveillance of the Croatian Adriatic against pollution;
f) surveillance against floods;
g) collecting data about the terrain;
h) surveillance and assistance in agricultural industry;
i) transport of urgent postal items.

3.1. UAV in EMS operations

EMS represents a drone flight in order to ensure urgent medical assistance at places where fast transport of medical supplies (equipment, medicines, blood, organs) is required. Among the medical supplies the drones would transport medical equipment and medicines, and possibly blood, but to transport blood they would have to be equipped with a tank ("fridge") with temperature norms and the safety of the drone itself having to be additionally increased. Thus, the drones would dispatch medical equipment and medicines to inhabited islands and the Adriatic coastal area of the Republic of Croatia replacing in this way the helicopters. Further analysis of the possibility of implementing drones in order to supply the Adriatic islands and the coastal area with medical equipment and medicines will be explained in more detail in Section 4.

3.2. UAV in firefighting

In relationship to the world average, most fires occur in Canada, i.e. there are about 7,500 forest fires every year, which is on the average about 2.5 million hectares of burnt surfaces annually, and Canada is the most advanced country regarding the usage of drones in firefighting activities, which makes it possible for them to reduce the costs which amount to about a billion dollars [2]. The drones with thermal screening or infrared thermography can scout a large area of fire in conditions of dense smoke and fire, and this system would be implemented in the Republic of Croatia. While implementing the firefighting system, apart from their primary task (transport of

medical equipment and medicines in EMS and SAR operations) the drones would also perform the task of participating in the firefighting activities in Croatia.

3.3 UAV in SAR operations

The drones can be used in search and rescue (SAR) activities, primarily in the absence of helicopters. Besides, in comparison to drone, helicopter has some shortages such as long response time to accident, high exploitation costs and high fuel consumption. A drone is capable of carrying also a defibrillator to a paramedic at hard to reach places. In SAR regulations it is necessary to use IAMSAR (International Aeronautical and Maritime Search and Rescue Manual). In SAR operative implementation it is very easy to find people with thermal screening, regardless of whether the SAR action is performed at night or in foggy conditions. In these conditions the drones are more efficient in relation to helicopters regarding their economy and safety [3]. In the absence of helicopters, a drone can start and support:

a) the Mountain Rescue Service (GSS - Gorska služba spašavanja) in climatic and configuration requirements of the demanding hills and mountain regions – in reconnaissance from high altitudes in search for the victims;
b) in the maritime search and preventive action – in search in which it is equipped for night search, in locating the victims, such as swimmers or injured persons who are far from the coast due to strong currents. The possibility of action would include ejection of safety belts that are automatically activated in the fall and allow a maximum of three people to hold themselves onto the belt. While waiting for a transport rescue vehicle to arrive, the drone would circle above them using the Shark Shield device. The Shark Shield device emits electrical impulses that irritate the sharks' senses (or any other dangerous sea animals). This method is as yet only being tested and implemented in Australia [4].

3.4 UAV for other applications in Croatia

In controlling the state border, a drone would be used in order to: prevent and detect crimes and offenses, prevent illegal migrations, prevent other threats to public safety and public order, as well as national security. In control of the Croatian Adriatic against pollution, in case of emergency in the Adriatic, i.e. oil pollution, a drone would be used for a more detailed survey, so that the oil-cleaning ships and Air Tractor AT-802 (which is ideally equipped for such events, except fires) could act fast and efficiently in order to protect the fishing and ecological zone. When collecting data about the ground, a drone would perform tasks related to geodesy, cartography, cadastre and other tasks for administrative and professional activities of the State Geodetic Administration. When monitoring of floods, a drone would be used for the interior of the Republic of Croatia, starting from Karlovac, Varaždin all the way to the extreme parts of Slavonia and Baranja. The central UAV operational center would be Zagreb that would control the majority of secondary applications such as control of state border, control of floods, affairs of the State Geodetic Administration, and it would be in the state of preparedness of the SAR system and for the purpose of other applications.

4. POSSIBILITY OF UAV OPERATIONS FOR THE PURPOSE OF SUPPLYING MEDICAL EQUIPMENT AND MEDICINES

In the Republic of Croatia there are 1,171 pharmacies per 4,284,889 citizens [5], out of which 39 pharmacies cover 118,488 island population, which means that 3.33% of pharmacies on the islands account for 2.77% of the Croatian population, which is a greater coverage than the average coverage of pharmacies per total population of the Republic of Croatia. On the islands, there is one pharmacy covering 3,038.15 citizens, while on the mainland the coverage is 3,674.85 citizens per pharmacy. All the Adriatic islands suffer from the problem of

lack of road traffic connection, and the method of supplying the pharmacies themselves is difficult due to the sea-going vessel capacities and the number of navigation timetable frequency due to the distances between the islands and the mainland. Adding to the permanent residents the share of tourists who stay there during the summer, the number of temporary island population rises by 2,606,900 citizens (2015). Table 2 shows the number of residents and the number of tourists in relation to the number of pharmacies and the number of possible requirements for medicines. Other inhabited islands that do not have a pharmacy (31 islands) have a population of 6,467 citizens, with the recorded data about the number of tourists on two islands (Mljet and Lastovo) with an increase of temporary citizens by 26,100 [6]. Adding the tourists to the residential population results in an average of 66,843.59 tourists per one pharmacy, and on the islands without pharmacy there are officially 26,100 tourists without the possibility of access to medicines, considering that during the summer seasons 15 otherwise uninhabited islands are temporarily inhabited. During the summer season the pharmacies on the inhabited islands cover 66,843.59 tourists, i.e. the population rises from the residential population to temporary population in a ratio of 21:1. The problem lies in the arrangement of pharmacies on an island, where some settlements have no pharmacy on inhabited sites whereas certain places on the island have several pharmacies. The main problems of the islands with and without pharmacies lie in the supply of the island with medicines, due to the low level of line frequencies between the islands and the mainland, so that there is often a lack of supplies in peak times of the tourist season. All the mentioned problems can be solved by introducing the operative action of using drones for deliveries. A drone has the possibility of fast transfer from the centers on the mainland to island pharmacies and medical centers. Figure 1 shows the arrangement of 31 inhabited islands that have no aspect of medical care, such as a pharmacy. The highest density of islands without pharmacies can be observed in central Adriatic, and in southern Adriatic. A drone has the possibility of high speeds, short delivery time, reliability and the possibility of "door-to-door" operations.

Table 2 - Relationship of residential population and tourists per number of pharmacies [7], [8]

Inhabited islands	Number of pharmacies	Population (2011)	Average population/tourists per one pharmacy	Tourists (2015)
Krk	6	19,383	3,230.5 / 113,700	682,200
Korčula	3	15,522	5,174 / 43,266.67	129,800
Brač	7	13,956	1,993.7 / 29,028.57	203,200
Hvar	3	11,077	3,892.3 / 84,466.67	253,400
Rab	3	9,328	3,109.3 / 81,366.67	244,100
Pag	4	9,059	2,264.7 / 89,275	357,100
Lošinj	1	7,587	7,587 / 293,400	293,400
Ugljan	3	6,049	2,016.3 / 13,800	41,400
Čiovo	1	5,908	5,908 / -	-
Murter	1	4,895	4,895 / 147,400	147,400
Vis	2	3,445	1,722.5 / 20,800	41,600
Cres	1	3,079	3,079 / 114,800	114,800
Vir	1	3,000	3,000 / -	-
Pašman	1	2,845	2,845 / 23,600	23,600
Šolta	1	1,700	1,700 / 12,100	12,100
Dugi otok	1	1,655	1,655 / 36,700	36,700
Total	**39**	**118,488**	**3,053.5 / 66,843.59**	**2,606,900**

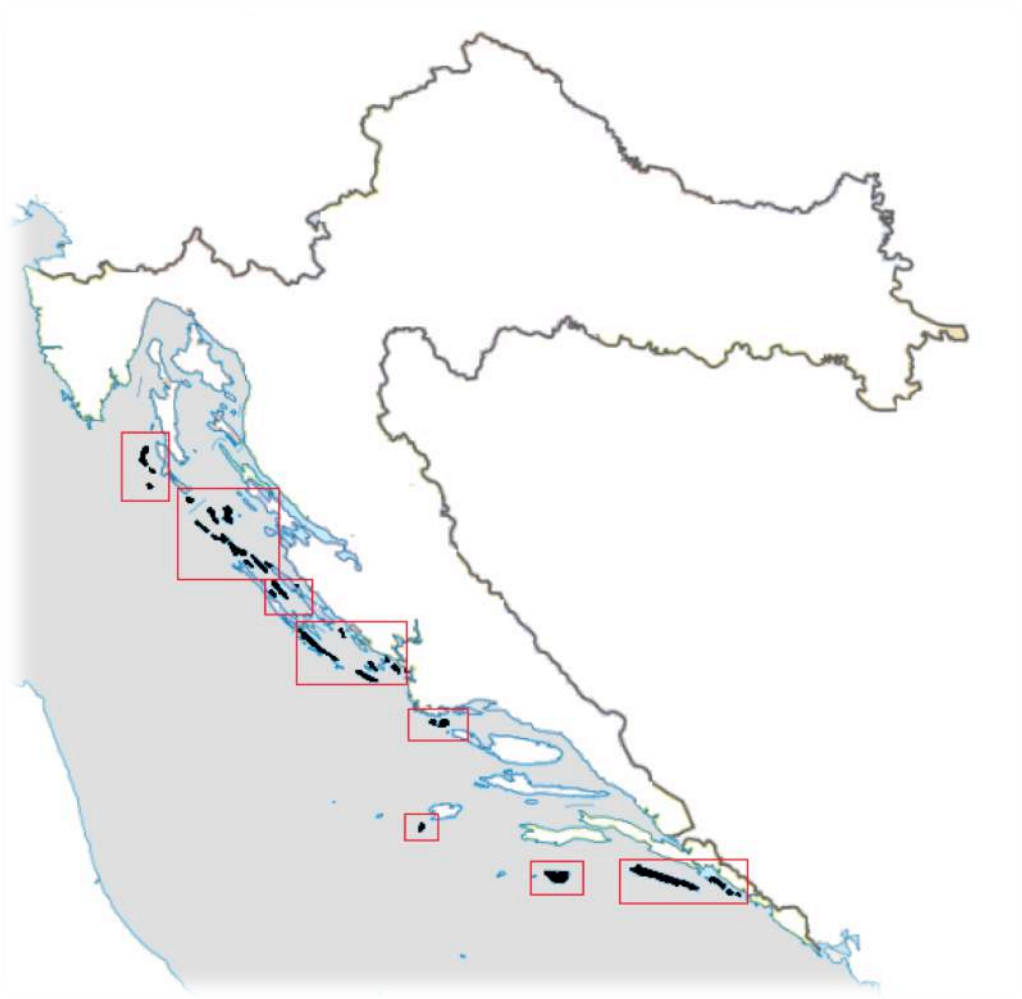

Figure 1 - Arrangement of inhabited islands (31) in the Adriatic Sea without pharmacies

5. PROPOSAL OF A SOLUTION FOR CONNECTING ISLANDS BY UAVs FOR THE PURPOSE OF SUPPLYING MEDICAL EQUIPMENT AND MEDICINES

The headquarters of the drones for the delivery of medical equipment and medicines are located in the cities with major medical institutions (clinical hospital centers or general hospitals) and they represent the operational centers:

1. operational center General Hospital Dubrovnik;
2. main operational center KBC (Clinical Hospital Center) Split;
3. operational center General Hospital Zadar;
4. operational center KBC Rijeka.

Apart from transport by drones there is also their administration and maintenance, and the main operational center KBC Split, apart from its scope of activity, represents also the entire logistics of drone transport in connecting the islands with the Croatian coastal area. In the Adriatic there are 16 inhabited islands with pharmacies where about 120,000 citizens are living, and 31 inhabited islands without pharmacies with about 6,500 citizens. Although Table 3 shows also the possibility of delivering medical equipment and medicines to islands with pharmacies, the highest priority is given to the supply of islands that have no pharmacies.

Table 3 - Comparison of inhabited islands with and without pharmacies by Operational Centers

	Number of inhabited islands with pharmacies	Number of inhabited islands without pharmacies	Population with pharmacies	Population without pharmacies
OPERATIONAL CENTER General Hospital Dubrovnik	-	5	-	2,711
MAIN OPERATIONAL CENTER Clinical Hospital Center Split	6	6	51,608	1,109
OPERATIONAL CENTER General Hospital Zadar	6	17	27,503	2,554
OPERATIONAL CENTER Clinical Hospital Center Rijeka	4	3	39,377	93
Total	16	31	118,488	6,467

The proposal of a solution for connecting the islands with their operational centers results from the use of drones with their specifications:

1. cargo minimal 3 kg;
2. speed 120 km/h;
3. battery endurance 70 min;
4. range 140 km.

OCs and the Main OC form the headquarters of drone activity radii, divided into three sectors: North Adriatic (blue), Central Adriatic (orange) and South Adriatic (green), presented in Figure 2. These specifications are necessary for calculating the travel time for single air lines of transporting the supply from the operational center to the receiver on the island ("door-to-door" transport), i.e. on the Adriatic as presented in the following tables

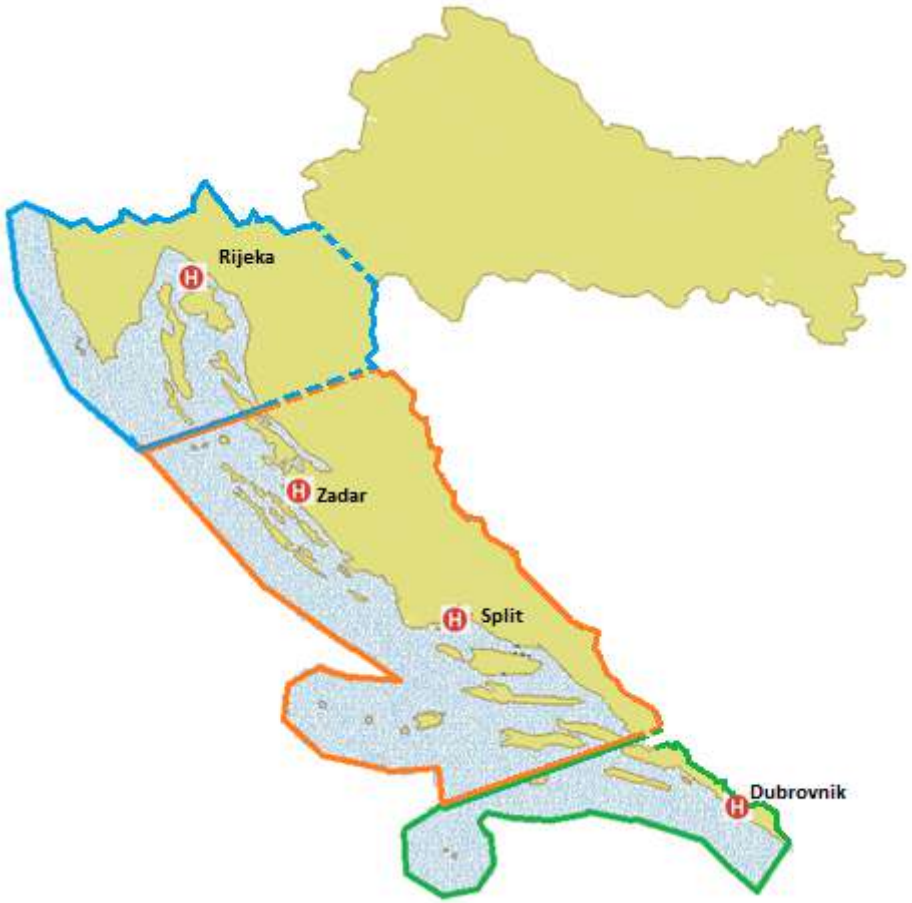

Figure 2 - Sectorization of operational centers

Table 4 - Operational Center – General Hospital Dubrovnik with its operational activities

OPERATIONAL CENTER – General Hospital Dubrovnik			
Inhabited island with pharmacy	**Population**	**Air distance (km)**	**Travel time**
/	/	/	/
Inhabited island without pharmacy	**Population**	**Air distance (km)**	**Travel time**
Koločep	163	7	4 min
Lopud	249	12	6 min
Šipan	419	19	10 min
Mljet	1088	48	24 min
Lastovo	792	99	50 min

Table 5 - Main Operational Center - CHC Split with its operational activities

MAIN OPERATIONAL CENTER – Clinical Hospital Center Split			
Inhabited island with pharmacy	**Population**	**Air distance (km)**	**Travel time**
Čiovo	5,908	14	7 min
Šolta	1,700	19	10 min
Brač	13,956	28	15 min
Hvar	11,077	42	21 min

Vis	3,445	55	28 min
Korčula	15,522	73	37 min
Inhabited island without pharmacy	**Population**	**Air distance (km)**	**Travel time**
Drvenik Veli	150	26	14 min
Drvenik Mali	87	31	16 min
Krapanj	170	48	24 min
Zlarin	284	54	27 min
Prvić	403	60	30 min
Biševo	15	69	35 min

Table 6 - Operational Center – General Hospital Zadar with its operational activities

OPERATIONAL CENTER – General Hospital Zadar			
Inhabited island with pharmacy	**Population**	**Air distance (km)**	**Travel time**
Ugljan	6,049	7	4 min
Dugi otok	1,655	20	10 min
Pašman	2,845	21	11 min
Vir	3,000	26	14 min
Pag	9,059	41	21 min
Murter	4,895	45	23 min
Inhabited island without pharmacy	**Population**	**Air distance (km)**	**Travel time**
Ošljak	29	4	2 min
Iž	615	13	7 min
Rava	117	17	9 min
Rivanj	31	17	9 min
Sestrunj	48	20	10 min
Zverinac	43	27	14 min
Kornati	19	34	17 min
Vrgada	249	36	18 min
Molat	197	37	19 min
Ist	182	43	22 min
Olib	140	47	24 min
Silba	292	55	28 min
Premuda	64	58	29 min
Kaprije	189	60	30 min
Žirje	103	62	31 min
Ilovik	85	67	34 min
Susak	151	87	44 min

Table 7 - Operational Center – Clinical Hospital Center Rijeka with its operational activities

OPERATIONAL CENTER – Clinical Hospital Center Rijeka			
Inhabited island with pharmacy	**Population**	**Air distance (km)**	**Travel time**
Krk	19,383	36	18 min
Cres	3,079	42	21 min
Rab	9,328	70	35 min
Lošinj	7,587	73	37 min
Inhabited island without pharmacy	**Population**	**Air distance (km)**	**Travel time**
Unije	88	80	40 min
Vele Srakane	3	85	43 min
Male Srakane	2	86	44 min

According to Table 4, OC – General Hospital Dubrovnik with its radii i.e. sectors serves five inhabited islands without pharmacies, out of which four islands (Koločep, Lopud, Šipan and Mljet) are relatively close to the coast, but the island of Lastovo is about 100 km away (50 min of travel) and it requires another drone. Thus, the OC – General Hospital Dubrovnik should have a total of two drones. The use of two drones holds also for OC – KBC Rijeka with its three inhabited islands without pharmacies (Table 7). OC – KBC Split has six inhabited islands without pharmacies (Table 5) with air lines from 26-69 km, i.e. all are located in the 2nd scope of activity up to a range of 80 km or 40 min of drone endurance. Regarding the sector of activity, for OC – KBC Split there should be three drones. OC – General Hospital Zadar (Table 6) has 17 inhabited islands without pharmacies, the most of other operational centers thus requiring a higher number of drones than other operational centers. In case of this operational center of 17 islands the division into sectors (radii) of activity comes to the fore:

1) sector of activities up to 20 km flight range or 10 min of drone endurance – for 5 islands in the respective sector would require two drones;
2) sector of activities up to 80 km flight range or 40 min of drone endurance – for 11 islands in the respective area would require five drones;
3) sector of activities up to 140 km flight range or 70 min of drone endurance – for one island in the

   respective sector would require one drone.

Thus, for the medical supply of 17 inhabited islands without pharmacies, OC – General Hospital Zadar, would require 8 drones. Based on the analyses from the table, regarding the sectors of activities of single operational center, for 31 inhabited islands without pharmacies in the Adriatic 15 drones would be required, which represents a huge project of the Republic of Croatia. This would be necessary, particularly if on these islands, apart from the residential population, during the tourist season there is a large number of tourists. This would provide savings on huge operative costs of helicopters since it would mean a "door-to-door" transport directly to the receiver. In case of emergency on the Adriatic and the Croatian coastal area during the tourist season, e.g. fire, a small part of drones intended for medical supply of the Adriatic islands and coast could be transferred to the application of firefighting, depending on the location. The same holds also for SAR and control of the Adriatic against pollution.

6. SPECIFICATION OF DRONES FOR THE TRANSPORT OF MEDICAL EQUIPMENT AND MEDICINES

In selecting a drone, several factors need to be taken into consideration. One of the main factors is the speed of the drone that should be as high as possible, and in no way lower than 30 m/s (108 km/h). A drone would be primarily used for the transport of medicines to island towns and cities, which requires a flight above the open sea, where there is often wind, so that the drone would have to have the capability of flying in the conditions of wind of 12 m/s (43.2 km/h) or more. The weight of the drone itself should be as low as possible, and after being fitted with the equipment of HD camera and sensors, maximum cargo that the drone can transport should be 3 kg or more. The drone has to be equipped with GPS and HD camera, with a range of sight of 120°, and the real-time image transfer. The flying altitude should be minimum 300 meters, and the battery endurance minimally 70 minutes, with maximally short time of full charging. The drone has to be equipped also with a second auxiliary battery. The batteries can be charged via AC outlet or the drone can be equipped by solar panels, thus charging the battery. The drone that is to be used is controlled by one pilot who will perform the piloting via the base ground station. The control will be done by a remote control (via satellite), but it is desirable that the drone be equipped with an autopilot system. The drone has to be equipped with 4 rotors. Since the major part of the flight will be performed above the sea areas, there is danger of the drone falling into the sea; therefore, the drone has to be equipped with balloons filled with air, which will prevent the drone from sinking, and at the same time allow also landing on the water surface. It is necessary to set also the

base platforms on the water area, towards which the drone will automatically direct the flight and land safely, if the control or connection with it is lost. The flight from point A to point B can be performed also by means of the so-called check points that must be equipped with surveillance devices, whereas in this case the drone has to be equipped by sensors that will automatically follow the signal of the tracking device. In this transport mode one has to take into consideration the range of the signal.

7. COMPARASION OF TRANSPORT AND TECHNOLOGICAL FEATURES OF DRONES AND HELICOPTERS

The main competitor to drone in the transport of medicines by air is certainly a helicopter. In the comparison one should take into consideration numerous parameters, such as response time "from call to take-off", price of procurement, maintenance and hour of flight, dimensions and a lot of others. The price of helicopter purchase differs in tens of millions of dollars compared to the purchase of a drone. The price of one hour of helicopter flight is about 1,000 euro, whereas the price of one hour of drone flight is dictated only by the price of the pilot working hour, since it is powered by a battery. Currently, in the Republic of Croatia for the needs of emergency medical assistance by air, helicopter of HRZ (Croatian Air Force) is used, and it results in a complicated and time-consuming process of dispatching a helicopter (from call to take-off a minimum of 15 min). The drone would be connected to the operational center, and it would be ready for take-off within only a few minutes. Noise and vibrations generated by a helicopter are much higher in relation to the drone that produces no sound. The impact on the environment goes also in favor of the drone since it does not generate any burn products from the engine, as the case with helicopters. Maximum take-off mass is lower in case of drones, but since the purpose is the transport of medicines, no high take-off mass is required as in the case of helicopters. The flying speed is higher for helicopters (about 250 km/h), whereas the flying speed in case of drones is about 120 km/h. Great advantage of helicopters is that they can fly in much stronger winds than the drone. Also, the flying altitude that can be reached by a helicopter compared to a drone is higher, but it should be taken into consideration that the transport of medicines by drone would be performed at the altitude of up to 300 m, at which helicopters create great noise. The flying range and endurance are certainly on the side of the helicopter. The helicopter flying range of 950 km and endurance of several hours are still the biggest advantage of helicopters in relation to the drone whose flying range is 140 km, and the endurance 70 minutes (with one battery). It should be also noted that the drones are a new but fast growing branch of air traffic, and that innovations of new technologies are moving the frontiers. Comparing the dimensions, with huge fuselage dimensions of several tens of meters, a helicopter also has a large diameter of the main rotor, without the isolation of the tail rotor, representing a threat to people for the time spent on the ground in the idle regime. On the other hand, a drone is of small fuselage dimensions that amount to 1 – 1.5 m, and four smaller rotors of a diameter of several tens of centimeters. Due to its large dimensions and weight of 6 – 7 tons, a helicopter requires a big and hard landing platform, with secured approach and take-off surfaces, whereas the drone has a mass of up to 10 kg and it can land on smaller areas. The advantages and drawbacks of helicopters and drones are presented in Table 8.

Table 8 – Comparison of transport and technological features of helicopters and drones

	HELICOPTER	DRONE
Purchase Price	> 15,000,000 €	10,000 € – 60,000 €
Price per hour of flight	+ 1,000 €	Depending on the price of pilot working hour
Maintenance Cost	Very high	Very low
Response Time (min)	15 – 20	2 – 3
Noise and Vibration	Very high	None
Flight Speed (km/h)	250	120
Wind Sensitivity	Medium	High
Range / Endurance	500 – 950 km / few hours	70 – 140 km / 70 minutes*
Dimensions (meter)	> 15	1 – 1.5
Main Rotor Surface (meter)	> 20	4 rotors, few cm diameter
Weight (kg)	6,000 – 7,000	10 – 15
Environment Impact	High	No impact

*Range and endurance with one battery

The comparison should include the consideration of the possibility of accidents. In case of fall of a helicopter, the consequences can be disastrous with huge material, ecological and financial consequences, and human victims (personnel and people on the ground). In case a drone falls there is no danger of ecological pollution, and in case of fire outbreak the fire would not be of huge dimensions and would be extinguished fast and simply, even without firefighter interventions. In case of fall it only endangers the people on the ground, who can be hit by the drone or one of its parts. During the flight, the drone is also endangered by the birds, and the contact with them will most certainly result in the loss of control and fall. The introduction of drones in the operative does not require investments into building of infrastructure and purchase of the handling equipment, but rather only investing funds for the purpose of establishing operational centers. This would also mean opening of new workplaces.

8. CONCLUSION

The regulations related to drones in the Republic of Croatia are incomplete and not fully defined, particularly for the use in the public sector. The potentials of using drones in Croatia are significant, and they have a sign of positive impact on activating tourist, industrial, economic and development potentials of the Republic of Croatia. The study has shown that helicopters and other sea-going vessels are inferior in relation to drone operations, although the use of drones started only several years ago, and the technologies of use have not been clearly defined. In the use of supplying the islands with and without pharmacies, i.e. door-to-door service, drone is an excellent solution from the aspect of safety, exploitation, maintenance, ecology and comfort. A drone with optimal specifications for the Adriatic islands arranged centers within hospital centers will allow the replacement of the helicopter interventions for the purpose of transporting medical devices, blood and medicines. This will result in faster response, and the delivery will be more flexible regarding the possibility of "door-to-door" delivery. It will allow re-inhabitation of islands, creation of new workplaces, improvement of services regarding tourism, allow development of new technologies related to air transport and connect islands with the mainland.

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