FlyVETUp!
Innovative Training Curricula for Drone Controllers

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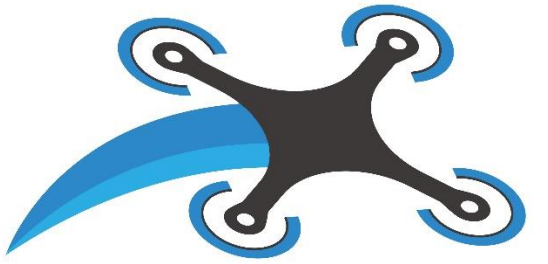
Erasmus+ Programme
of the European Union

IO2 –Training Needs Analysis & Design of Occupational Profile for UTM/UAV Controller with the use of DACUM – Synthesis Report



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Innovative Training Curricula for Drone Controllers

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1 Introduction

The purpose of this analysis is to define the training needs as the arise by the current situation of the sector and to provide the necessary learning objectives to be achieved for the courses to be developed in IO3.
In view, of this the following will be presented:

- The survey of training needs of an aeronautical school in Croatia are presented
- The results of the National Reports for the current situations,
- The methodology followed in view of structuring the occupational profile of the UTM/UAV Controller

2 The FlyVETUp! Project

The project's objective is the realization of an updated training material for using Unmanned Aircraft Vehicles (UAV) on parcel delivery available on different e-learning platforms. By taking part in this project, the employees of the postal operators (postmen and not only) will learn how to operate drones and be ready for authorization when the EU regulations will be in place and the National Aviation Authority will adapt and implement them at national level.

The project targets in many ways the following human resources/professional categories:

- Workers in post offices – in terms of their daily work
- long-term unemployed young people, people with disabilities and organizations providing public services – in terms of beneficiaries of UAVs making parcel deliveries based on the following characteristics: speed, quality of service, efficiency, innovative services, the emergency response when needed

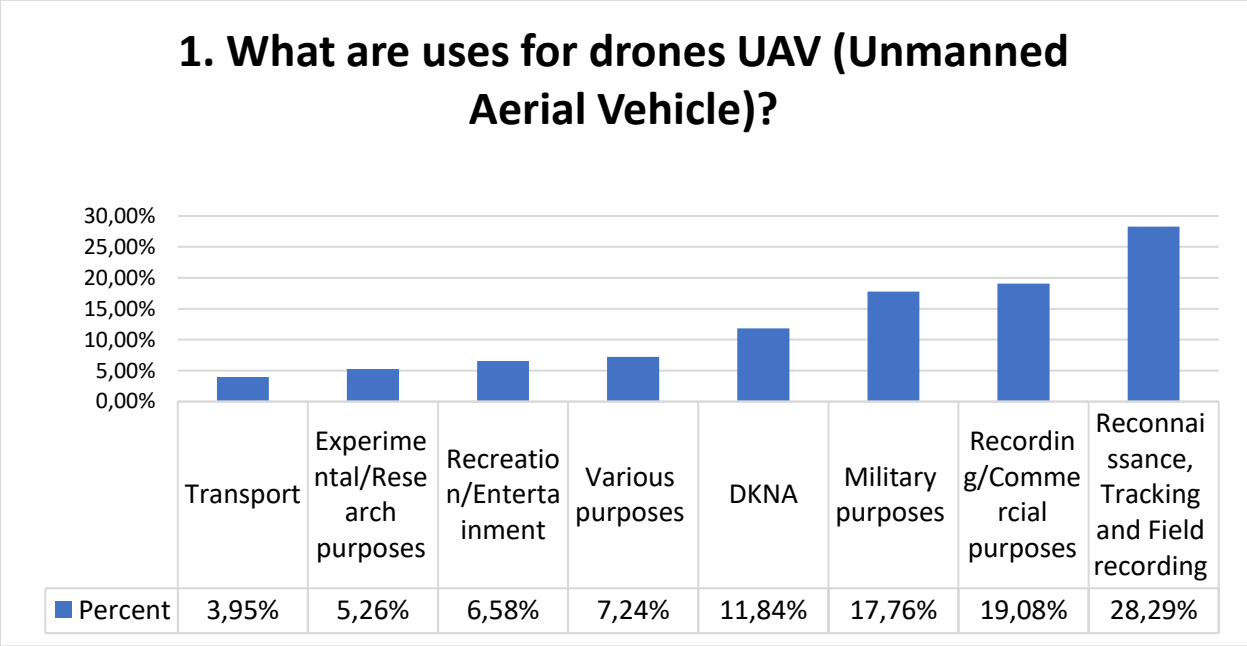
3 Followed Methodology

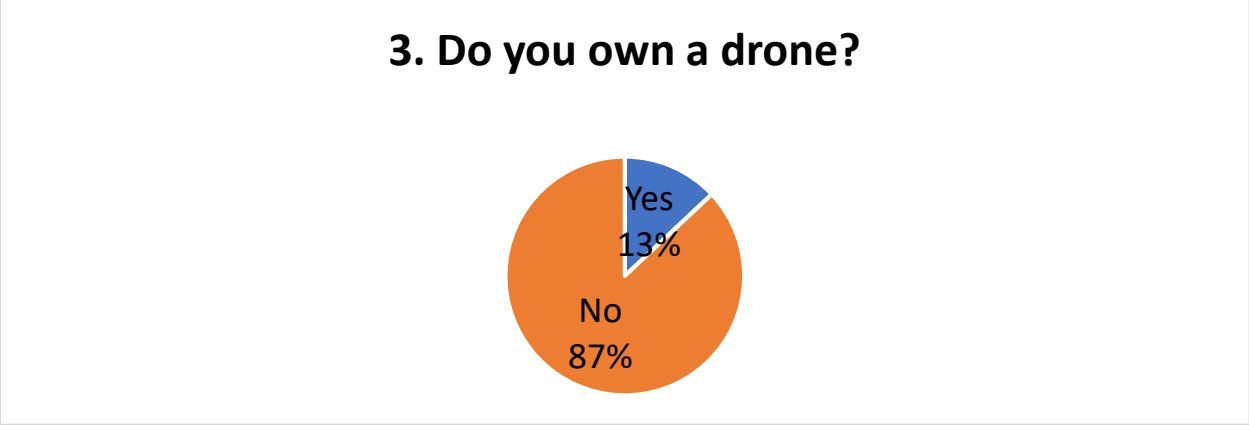
For developing the curriculum outline and training material following in Task 1.4., this step is considered as necessary. The scope of the above-mentioned procedure is to identify the needs and the challenges for UTM/UAV controllers for the postal sector and find the skills mismatches to design the training material. This step is important for the theoretical framework of the training plan and the development of the training program during IO3.

The TNA report belongs to the second project output and derives from a dual focus (a) exploring and analyzing the duties, tasks, general knowledge and skills of UAV/UTM controllers (b) those features needed in to develop the training material and design a successful training program.

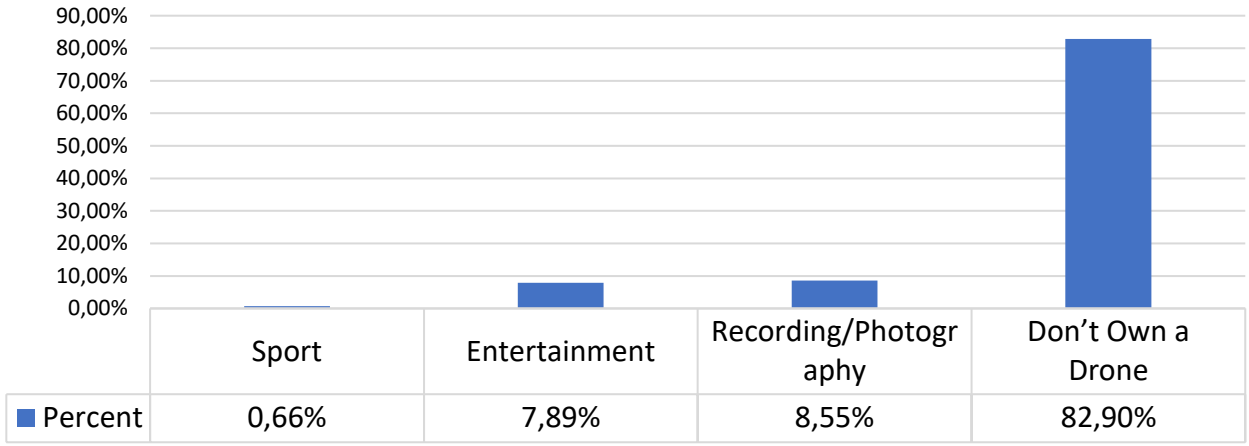
4 SURVEY ON TRAINING NEEDS OF VET AERONAUTICAL SCHOOL

A Training Needs Analysis survey was conducted amongst the students of the Rudolf Perešin Aeronautical Technical School. The questionnaire was filled out by 307 students of the VET school of the 1st to 4th grade. The purpose of the survey was to collect information on the current skills & knowledge of VET students of the exact specialization (aeronautical school) on UTM use & applications.



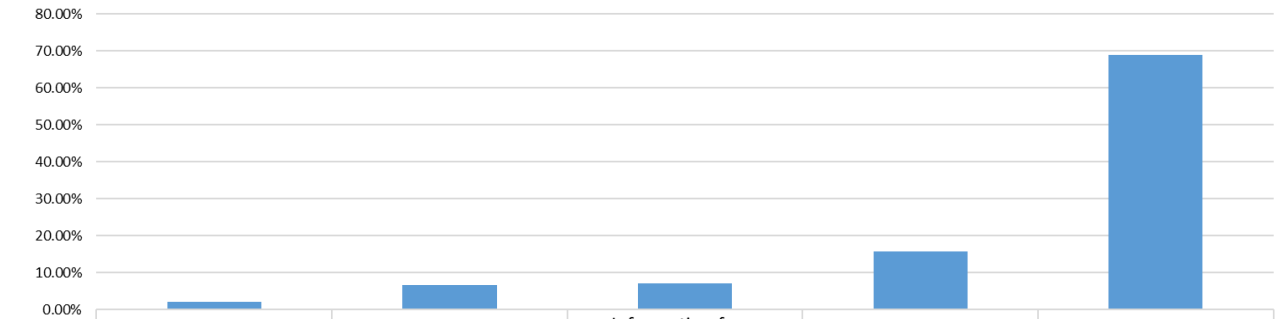


4. If you own it, for what purposes do you use it for?



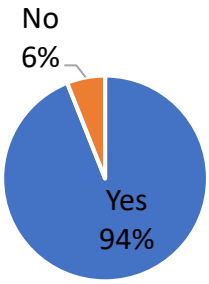
	Sport	Entertainment	Recording/Photography	Don't Own a Drone
Percent	0,66%	7,89%	8,55%	82,90%

5. Do you have technical knowledge of how a drone works and flies? Where did you acquire it?

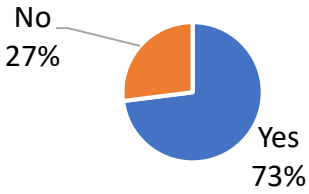


	Using a drone.	I researched on my own/ I took a course.	Information from parents, friends, acquaintances.	Using the Internet.	No knowledge.
Percent	1.95%	6.49%	7.14%	15.58%	68.84%

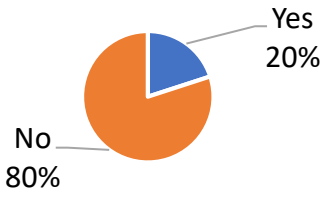
6. Do you think that the use of drones has a future?



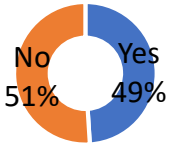
7. Would you like to be educated on the use and operation of drones for professional purposes (fire reconnaissance, military purposes, reconnaissance,…



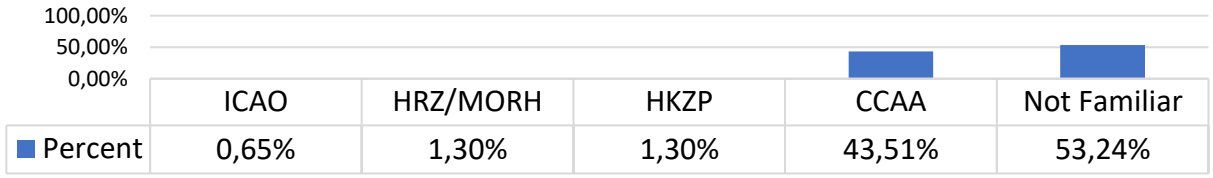
8. Are you familiar with the laws and rules of drone flight?



9. Do you know if a special permit is required to fly drones?

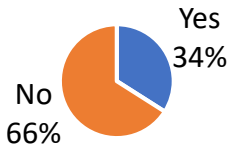


10. Which agency in Croatia deals with aviation regulations that include drones?

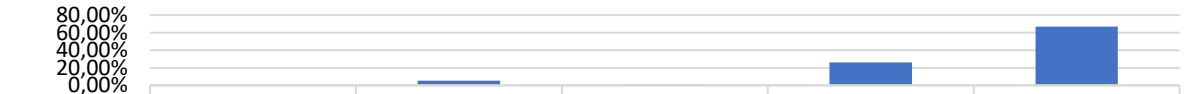


	ICAO	HRZ/MORH	HKZP	CCAA	Not Familiar
Percent	0,65%	1,30%	1,30%	43,51%	53,24%

11. Do you know if there is a minimum and a maximum legal age limit for drone management?

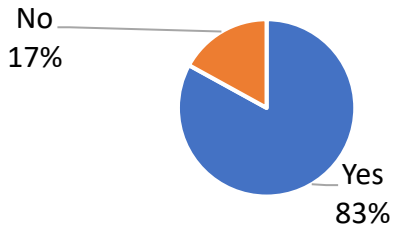


12. Do you know what kind of drive the drone most often uses to take off? List him.

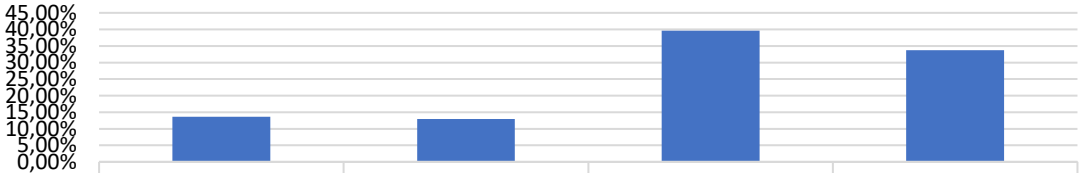


	Rocket propulsion	Propeller drive	Jet propulsion	Electric/Battery drive	Not familiar
Percent	0,65%	5,19%	1,30%	25,97%	66,89%

13. Would you be interested in having an extracurricular activity on drone management in our school?



14. In which subjects at school do you see the application of drones?



	Practical lesson	Science(physics etc.)	Vocational subjects (aerodynamics etc.)	Not sure
Percent	13,64%	12,99%	39,61%	33,76%

5 DRONES USES FOR POSTAL ACTIVITIES ACROSS EUROPE

So far, drones have been used/trialed for the provision of postal activities in the following countries:

- Switzerland
- Germany
- France
- UK
- Croatia

- Finland
- Ireland
- Latvia

The information seen below has been collected from various sources, including the operators' official websites, articles published in web and printed media etc.

5.1 Swiss Post drone logistics

Together with the drone manufacturer Matternet and partners from the healthcare sector, Swiss Post is using drones to transport laboratory samples. At present, samples are transported by road. But thanks to the use of drones, transporting these samples should become more flexible, more eco-friendly and less dependent on the traffic situation. A car journey lasting 45 minutes becomes a flight of just a few minutes in the uncongested airspace, which means true added value for customers and their patients. This is because healthcare consignments in particular are often urgent and the speed at which they are delivered can be crucial.

The aim of the Swiss Post drone project is to transport blood samples between hospitals and laboratories at sites throughout Switzerland. The drones are developed, manufactured and operated on behalf of Swiss Post by Matternet Inc., Mountain View, California CA 94041, USA, an American company with a Swiss subsidiary located in Dübendorf (ZH).

EOC Hospital, Lugano

A first drone service in Switzerland: in 2017, Swiss Post introduced the first drone service for the transport of laboratory samples in Lugano, in collaboration with the Ticino hospital group, EOC. Since then, more than 2,000 flights have successfully been completed between the Ospedale Italiano and the Ospedale Civico. The Lugano drone is now deployed every day, transporting laboratory samples up to 45 minutes faster than road couriers.

University Hospital Zurich and Zurich University

Swiss Post has been transporting laboratory samples by drone on behalf of University Hospital Zurich (USZ) and the University of Zurich since December 2018. The route runs from a roof terrace on the north wing of USZ to the University of Zurich at Winterthurerstrasse 190. Wherever possible, the drones fly over a wooded area.
The drone takes about four minutes to cover the two-and-a-half-kilometer stretch. Compared to a courier on the road, the drone can travel the route twice as quickly, is more environmentally friendly and is unaffected by traffic volumes.

Insle Gruppe, Berne

For two weeks in June 2018, Swiss Post trialed the use of drones to transport laboratory samples on behalf of Insel Gruppe. The drones operated between Tiefenau Hospital and the central laboratory at Berne University Hospital.
Insel Gruppe and Swiss Post are currently evaluating the flights in Berne.

Zentrallabor, Zurich

From June 2018 to spring 2019, Swiss Post transported lab samples high above the basin of Lake Zurich on behalf of Zentrallabor Zürich (ZLZ). The drone linked the ZLZ emergency laboratory at Hirslanden Klinik Im Park with the central laboratory at Forchstrasse 454 in Zollikon. It covered the distance in about seven minutes, reaching its destination up to five times faster than a road courier.

Drone Specifications

A state-of-the-art delivery drone is used: the M2V9, manufactured by Matternet[1].

Manufacturer: Matternet, Inc.
Model: M2V9
Swiss FOCA approval: since March 2017

[1] https://www.post.ch/en/about-us/innovation/innovations-in-development/drones

Aircraft type: Quadrocopter
Drive: electric motors
Power supply: Lithium-ion battery
Communication: Mobile GSM
Maximum payload: 2 kg
Volume: 4 L
Dimensions: 23 x 15 x 12 cm
Masse: 23 x 15 x 12 cm
Maximum range: 20 km with 1 kg payload, 15 km with 2 kg
Flight altitude: about 110 m above ground
Maximum speed: 16 m/s (57.6 km/h)
Weather conditions: Between -10 and +40 °C
With visible humidity up to:+5 °C
Wind up to 6.4 m/s, gusts up to 9.6 m/s

5.2 Deutsche Post DHL Group

Parcelcopter

Deutsche Post DHL Group is taking part in a joint research project which, amongst other things, will look at using drones for parcel deliveries. The other partners in the project include DFS Deutsche Flugsicherung, Deutsche Telekom and RWTH Aachen University.

DHL is using a drone to fly parcels to the German island of Juist, in what it says is the first time an unmanned aircraft has been authorized to deliver goods in Europe. The company, owned by Germany's Deutsche Post, joins the likes of Amazon.com and Google in testing the potential for drones to deliver parcels and packages. IFor the Juist project, Deutsche Post has received permission from the German transport ministry and air traffic control authority for a restricted flight area that will be used only by its parcelcopter.

It was the first time that medications and other urgently needed goods were delivered over the open sea, and it was also the first time in Europe that a flight by an unmanned aircraft was operated outside the pilot's field of vision in a real-life mission.

The Parcelcopter 2.0 had a longer range and was equipped to handle the wind and marine weather conditions of the North Sea. During the test, it made regular, 12-km flights from the mainland to Juist that were completely automated, though constantly monitored by a team on the ground. Traveling at an altitude of 50m and at speeds of up to 18m/s, the 'copter mostly made express deliveries for a pharmacy during the week – and on weekends at times when alternatives such as ferries and flights were unavailable. The result: customers were able to fill prescriptions and receive urgent medication much faster than traditional delivery methods.

In the spring of 2016, the next generation demonstrated a giant leap in technology and capability. Now a tilt-wing aircraft (think miniature V-22 Osprey) and double the size of its predecessor, the

Parcelcopter 3.0 is a fully autonomous UAV able to carry a payload of up to 2kg and travel at speeds of around 70km/h. In a three-month trial, this state-of-the-art drone was successfully integrated into DHL's parcel delivery business.

The feat was also made possible by another innovation: the 'Parcelcopter Skyport' – a fully automated parcel loading and unloading system based on DHL's Packstation technology and developed specifically for this research project. Private customers in the Bavarian ski resort of Reit im Winkl and up on the Winklmoosalm mountain plateau were invited to test out the specially developed Packstations.

During the trial, they could simply insert their shipments into the Skyport to initiate automated shipment and delivery by Parcelcopter. All told, the drone made 130 trips from Reit im Winkl to Winklmoosalm, flying roughly 8km and up to 1,200m above sea level. The deliveries were made within eight minutes of take-off, a trip that takes 30 minutes by car in the winter.

At present, the Parcelcopter and the innovative Skyports are designed for delivering packages in hard to reach areas. Ultimately the aim is to provide a same-day drone delivery service in towns and cities. The Parcelcopter 3.0 has succeeded in realizing all the technical and process-based improvements required to carry out a field test in an urban area.

The DHL Parcelcopter[2] is intended primarily for situations that mesh poorly with established infrastructures or where standard delivery methods are overly lengthy. Locations not linked to the standard road network are one example. "Natural barriers" such as water or mountains are not an issue for the drone. The DHL Parcelcopter is thus seen as a tool for improving infrastructure in hard-to-reach areas, improving the lives of the inhabitants there[3].

Revolutionising the delivery of medicines to remote areas using drones - the pilot project Deliver Future was carried out

Over a six-month period, the delivery of medicines using a drone to an island in Lake Victoria was successfully tested. During the trials, the autonomous DHL Parcelcopter 4.0 completed the 60 km flight from the mainland to the island in 40 minutes on average. A total of 2,200 km were flown and roughly 2,000 flight minutes recorded during the pilot project[4].

[2] https://www.dhl.com/discover/business/business-ethics/parcelcopter-drone-technology
[3] https://postandparcel.info/76608/news/deutsche-post-dhl-taking-part-in-drone-tests/
[4] https://www.reuters.com/article/us-deutsche-post-drones-idUSKCN0HJ1ED20140924

According to the info provided by Deutsche Post, as of March 2021, the drone flight project has been called-off temporarily.

In addition to assessing the drones' suitability for delivering parcels in urban areas, the project will examine if Deutsche Telekom's mobile network can be used to connect unmanned aircraft systems (UAS) to the mobile internet.

DHL launched its first regular fully automated and intelligent urban drone delivery service

The launch ceremony was held on 16 May 2019 at the EHang Command and Control Center in Guangzhou, with the attendance of senior executives from both companies.

The new customized route, which has been exclusively created for a DHL customer, covers a distance of approximately eight kilometers between the customer premises and the DHL service center in Liaobu, Dongguan, Guangdong Province. Using the most advanced Unmanned Aerial Vehicle (UAV) in EHang's newly launched Falcon series, featuring the highest level of intelligence, automation, safety and reliability, the new intelligent drone delivery solution overcomes the complex road conditions and traffic congestion common to urban areas. It reduces one-way delivery time from 40 minutes to only eight minutes and can save costs of up to 80% per delivery, with reduced energy consumption and carbon footprint compared with road transportation.

The EHang Falcon smart drone, with eight propellers on four arms, is designed with multiple redundant systems for full backup, and smart and secure flight control modules. Its high-performance features include vertical take-off and landing, high accuracy GPS and visual identification, smart flight path planning, fully-automated flight and real-time network connection and scheduling. As a fully-automated and intelligent solution, the drones, which can carry up to

5kg of cargo per flight, take off and land atop intelligent cabinets that were specifically developed for the fully autonomous loading and offloading of the shipment. The intelligent cabinets seamlessly connect with automated processes including sorting, scanning and storage of express mail, and will feature high-tech functions such as facial recognition and ID scanning[5].

5.3 DPD France launches a parcel delivery line using drones in Isère

DPD France is launching a regular commercial line to deliver parcels using drones in 2019. DPDgroup launched the first line of this kind in 2016, in Var. This second line will make deliveries from a mobile take-off pad in the delivery vehicle.
DPD France is authorised to make parcel deliveries by drone, on a regular commercial line in Isère, connecting Fontanil-Cornillon to the village of Mont-Saint-Martin in a return journey time of 8 minutes.

In December 2016, the French Civil Aviation Authority (DGAC) authorised DPDgroup, the international express delivery subsidiary of Le Groupe La Poste, to deliver parcels by drone on a regular commercial line in Var, between Saint Maximin-la-Sainte-Baume and Pourrières. This first line has shown the utility of drone technology for parcel delivery in isolated areas.
For this new commercial line, DPD France is innovating with the “Delivery Assistant” solution: a mobile pad that allows drones to take off and land safely, directly from the side door of the vehicle. This means the drone can be used during a normal delivery round by lorry.

[5] https://www.dpdhl.com/en/media-relations/press-releases/2019/dhl-launches-its-first-regular-fully-automated-and-intelligent-urban-drone-delivery-service.html

During their rounds, if the delivery driver has parcels for customers in Mont-Saint-Martin, they can park their vehicle in a dedicated space in Fontanil-Cornillon, in order to carry out the operations safely. Once the drone is in place, it requests authorization to take off from an operator qualified by the Aviation Safety Agency, who then monitors the journey to ensure it goes smoothly.

When the parcels arrive in Mont-Saint-Martin, the drone leaves them at a secure, fixed receiving terminal near to the town hall, where several parcels can be received and stored.

After the parcel has been delivered to the terminal, a delivery receipt is sent to the nearby town hall, by SMS/email.

A delivery receipt is sent by SMS/email to a town hall employee, who can take delivery of the parcel as they would via a mailbox, then deliver it personally to the end-customer.
Once the parcel has been delivered, the drone returns to the lorry and the delivery driver can continue their round. The drone navigates from the mobile take-off pad to the fixed terminal and back, without the delivery person needing to control it at any point.

Normally, the delivery driver needs to drive 20 km, on a round trip taking approximately 30 minutes to get to and from Mont-Saint-Martin. With this new drone delivery line, delivery vehicles do not need to take the mountain road, which reduces the distance that the parcel travels to around 3 km, taking 8 minutes for the drone to fly to its destination and back.

Drone delivery in the mountains offers many advantages. For delivery staff, it not only saves time, but also reduces risk, since they do not have to drive along difficult or dangerous mountain roads, particularly during winter. For customers, it guarantees that they will receive their parcels, even when precipitation makes the road impassable.
Finally, since the drones are powered using electricity, they emit no CO2, which is an additional benefit in this protected natural environment.

5.4 Royal Mail and Skyports partner on drone delivery

Royal Mail has partnered with DronePrep, Skyports and what3words to become the first nationwide UK parcel carrier to deliver a parcel for recipients via an unmanned aerial vehicle.

The first delivery took place to a remote lighthouse on the Isle of Mull.
Next year the consortium will undertake a consultation with islanders on the use of drones to deliver to rural communities on the Isle of Mull – the second-largest island of the Inner Hebrides. This will help to identify opportunities to support postmen and postwomen in delivering to very remote areas and addresses in the UK.

This is the first step in a groundbreaking consultation programme and trial in the New Year, which will focus on engaging with the community to explore the viability of using drones to deliver to rural communities on the Isle of Mull, where Skyports is already using its drones to help NHS Scotland with the response to COVID-19. This will help to identify opportunities to support postmen and postwomen in delivering to very remote areas and addresses in the UK.

As with all Royal Mail deliveries across the UK, the postcode will route the parcel towards its destination. The local postie will then use drone delivery to reach the most remote locations in their patch faster. For the drone delivery, residents consulted on the Isle of Mull will be invited to use the DronePrep platform to assess the viability of their property for drone delivery and pinpoint a suitable landing location within their ownership using the what3words integration.

To enable this for the trial, Royal Mail is asking recipients to provide the what3words address, a 3 metre by 3 metre square, that corresponds to the precise landing point for delivery of Royal Mail parcels via the drone from the Royal Mail van[6].

5.5 Croatian Post successfully completes first drone delivery

[6] https://skyports.net/2020/12/royal-mail-and-skyports-partner-on-drone-delivery/

Working together with drone services provider AIR-RMLD, Croatian Post has successfully completed its first drone delivery as part of a pilot project in January 2020.
A drone flew autonomously from the Zadar port of Gaženica to Preko on the island of Ugljan at a speed of 35km/h, for about 12 minutes.

The drone has since successfully delivered parcels from Gaženica to Preko over a dozen times, also flying during heavy winds. The drone can carry loads of up to 200g, while flying completely autonomously on a pre-programmed route.

The pilot project will initially demonstrate the possibilities of using a drone in the delivery of letters and parcels between post offices and indicate the needs of Croatian Post for this type of technology[7].

Today, Croatian Post is testing smart solutions faster and more often than ever before - from augmented reality goggles, pallet-carrier robots to electric vehicles and drones. Our teams are engaged in artificial intelligence, robots, augmented reality, advanced data analytics and the Internet of Things (IoT)[8].

Overall, it was the first time in Croatia that a flight by an unmanned aircraft was operated outside the pilot's field of vision in a real-life mission equipped to handle the wind and marine weather conditions of the Adriatic Sea[9].

5.6 Finnish postal service tests drone to deliver online purchases

The Finnish postal service Posti Group had run some tests with drones for parcel delivery. The postal company let drones fly while transporting parcels between mainland Helsinki and Suomenlinna, an island fortress about five kilometers from the Finnish capital.

[7] https://www.parcelandpostaltechnologyinternational.com/news/automation/croatian-post-successfully-completes-first-drone-delivery.html
[8] https://www.ipc.be/news-portal/operations-logistics/2020/01/24/13/18/croatian-post-successfully-made-its-first-drone-delivery
[9] https://www.youtube.com/watch?v=MlCrMeQmb18&feature=emb_logo

Posti Group is testing ways to make online shopping quicker and better for both sender and recipient. The test with drones is just one of those ways. The Finnish postal service told Reuters it's the first company in Europe to experiment with drones for mail delivery in an urban area, with a flight path that is partially obstructed. Posti started the four-day test, dispatching parcels weighing up to three kilograms.

The first drone that was part of the experiment arrived some distance from the landing zone. The drone pilot chose to modify the flight trajectory because of the wind. According to Jukka Rosenberg, senior vice president of parcel and logistics services, it could take them two or three years before they have everything in place. Partly because of the regulations that are required[10].

5.7 An Post Ireland

In July 2018, An Post started trials of off-shore drone delivery flights.
The first delivery was made on 5 July 2018, when a joint operation between An Post and SkyTango (https://skytango.com/) saw a parcel-carrying drone cross 5km of sea between Roonagh Pier in County Mayo and Clare Island in 11 minutes, an An Post spokesman told *Unmanned Airspace*[11].

This was An Post's first autonomous over-water drone flight and was a test flight for

[10] https://ecommercenews.eu/finnish-postal-service-tests-drone-to-deliver-online-purchases

[11] https://www.irishtimes.com/news/social-affairs/an-post-delivers-parcel-by-drone-to-island-off-mayo-1.3556747

other postal delivery operations throughout the country[12].

5.8 DPD Latvija

First-ever drone delivery in Latvia completed in January 12th 2021.

LMT, SPH Engineering, and DPD Latvija have successfully completed the first-ever parcel delivery by drone in Latvia. The flight, which was conducted entirely on a mobile network in December 2020, used a remote ID device prototype made by LMT, as well as UgCS drone mission and route planning software by SPH Engineering.

The drone's delivery flight took gifts to the residents in various social care centers in Latvia. The seniors received tablets from LMT packed with useful apps to help communicate with relatives, follow the news and learn new skills online.

5.9 Hellenic Post- S.A. (ELTA)

Hellenic Post has participated in the project EuroDRONE: A European UTM Testbed for U-Space project, which included pilot testing of drone deliveries in Greece for the first time throughout the period 2018-2019.

[12] https://www.unmannedairspace.info/uncategorized/irelands-post-autonomous-drone-mail-delivery-flights-start/

EuroDRONE is an innovative research and development project focused on demonstrating that operation of Unmanned Aerial Vehicles (UAV) for commercial, institutional and scientific applications, in an urban environment, can be technically viable and most importantly safe. Led by the University of Patras and including partners such as Dronsystems (UK), Cranfield University (UK), Hellenic Post (Greece), the Hellenic Civil Aviation Authority (Greece), Romanian Post (Romania) and Aslogic (Spain) and supported by UAV industry experts such as Marco Robustini, EuroDRONE is one of the five Unmanned Traffic Management (UTM) 'U-Space' demonstrators, funded by the European Union through its Single European Sky ATM Research Programme (SESAR) which aims to bring UTM functionalities for Europeans by 2023. The coordinator of the project is the Applied Mechanics Lab, University of Patras with Professor V. Kostopoulos and Professor Vaios Lappas. The EuroDRONE project is funded by SESAR Joint Undertaking (Agency of the European Commission) via contract SJU/LC/0342-CTR[13].

In July 2019, at the Messolonghi area in Greece., EuroDRONE successfully conducted first automated UAV flights within non-segregated airspace in the Mediterranean region. The experimental testing was conducted in the University of Patras and Messolonghi Airport regions between July 24th and 28th, for the first time in the Mediterranean region showcasing full-scope UTM functionalities, such as safe highly automated flight of a fleet of UAVs/drones, operating safely within both ATZs and in urban areas.

The campaign demonstrated a series of successful automated flights, sharing the same airspace with active general aviation and commercial aviation traffic and included automated selection of flight paths, tests of air-to-ground & air-to-air communication links, automated navigation and control of multiple UAVs as well as tracking of cooperative aircraft and simulated deconfliction. Special attention was placed to simulating scenarios where potential multiple failures in hardware and software would take place.

[13] http://www.demo.eurodrone.io/

The 2nd demo was carried in October 2019 at the Messolonghi airport. A successful delivery with UAV carrying a special parcel device constructed by the University of Patras was executed. The UAV conducted a fully automated BVLOS flight from the boarders of the city of Messolonghi to the Messolonghi airport[14].

6 DRIVERS OF CHANGE: NEW TRENDS & CHALLENGES TO TRANSFORM THE POSTAL SECTOR

The partners input on new trends & challenges that can act as drivers of change can be seen below:

6.1 Greece

As a general trend, technology has helped the parcel delivery chain to become receiver - centralised. Consumers, who act as receivers, are not only better informed about the status of their delivery via tracking, they now also have the option to change the delivery process by redirecting a parcel to a different delivery point, or postpone delivery if they are not at home. The increasing popularity of these delivery methods means carriers have to turn to a more individual approach instead of a standardised supply chain for delivery of each and every parcel. Consequently, this requires carriers to modernize their processes and to substantially invest in their IT infrastructures as a means of raising their operations' efficiency.

The position of postal operators is under increasing pressure. Global e-retailers might be turning the carrier's core offering, last-mile delivery, into a commodity which lacks added value and is subject to intense competition. By contrast, technology is impacting positively in different parts of the postal sector, mostly in sorting and delivery operations, helping to improve the overall consumer experience. Different kinds of technologies are enabling postal and parcel carriers to make their operations more efficient and create value added services in delivery. This is

[14] http://www.aml.eurodrone.upatras.gr/news.php

particularly valid in the parcels business where rising volumes are increasing the need for greater sorting capacity and faster handling processes as well as quality differentiation.

Robots have already found their way into parcel sorting operations. Self-service parcel lockers offer 24/7 access times and make deliveries more efficient for carriers by avoiding failed delivery attempts. In contrast, shared (crowdsourced) delivery is a fast - growing phenomenon. Crowdsourced delivery relies on having a large number of couriers available at any time and is so far mostly used for urgent or same - day deliveries within cities.

Technological inventions are a necessary but not enough condition alone for market changes, but are an important enabler for innovation in the postal sector:

- Automation in letter and parcel sorting
- Extended track and trace for parcels and value - added mail services
- Predictable delivery and redirected delivery
- Same - day delivery
- Variety of PUDO (pick - up and drop - off) solutions
- Shipping platforms (re-sellers) for private consumers
- Sharing economy (crowdsourced deliveries)
- Sustainability
- Consolidated rural/remote area parcel deliveries
- E-substitution
- Automated (self - driving) vehicles
- Robots in postal logistics
- Delivery by drones
- 3D printing

The impact of technology on consumers of postal services has clearly been positive to date and will remain so in the years ahead. Generally, lower costs expressed through lower prices are good news for consumers, and particularly lower income consumers. There are also new opportunities for vulnerable consumers from the growth of e-commerce because doorstep delivery of all kinds of goods has become standard at no extra charge.

Innovations in the postal sector lead to empowered consumers and to more choices for many consumer groups. Technology is the key enabler for such new services. Consumers in general benefit from new technology which enables them to access an increasing range of new services, particularly in relation to online retail fulfillment[15].

[15] https://www.wik.org/fileadmin/Studien/2016/WIK-Consult_CitA_Impact_of_technology_full-report.pdf

With the world embracing digital technology at an everfaster rate, customers (both senders and receivers) are increasingly expecting to interact directly with the Post through digital channels. In addition, 73% of Posts indicate that they have increased their investment in digital postal services. Therefore, the digital postal services landscape will continue to evolve in a number of directions.
Posts are therefore at a turning point: they need to adapt in order to remain relevant, competing with digital native companies in different areas of their product portfolio. To be able to compete effectively, Posts need to speed up the digitalization of their products.

The world is on the cusp of a new digital era. Digitalization is dramatically reducing the costs of collecting, storing and processing data, thus transforming economic activities around the world. Digital technologies open the way for micro, small and medium-sized enterprises, especially those in developing countries, to participate in global trade through e-commerce. This new digital era will require changes to existing legal and regulatory frameworks, and has tremendous implications for the transformation of Posts.

In order to offer sustainable digital postal services, Posts will need to rely on their competitive advantages and transform key aspects of their business. In this report, four key factors have been identified and are highlighted below, which make the Post especially well positioned, but which need to be developed[16]:

- Complementing post offices with new digital services to expand competitive edge in terms of network size and density
- Access to financing for digital projects
- Partnerships
- Alignment with government's digital strategies

It is essential that postal organizations find ways to combat the threat posed by disruptive entrants to their market, such as large retailers which have developed their own delivery networks (such as Amazon), companies that offer digital services (especially in the e-government field), etc.

The current and future trends and concerns in order to become a successful drone operator in the postal sector are:

Drones have the potential to revolutionize last mile delivery as they would make delivery by human staff unnecessary, making last mile more cost efficient. If a flying unmanned vehicle is used for deliveries, it has the advantage of avoiding street traffic and can reach locations without

[16] https://upu.int/UPU/media/upu/publications/Digital-economy-and-postal-digital-activities_EN.pdf

sufficient infrastructure. Flying drones also have the disadvantage of being much less energy efficient than ground -based vehicles and typically only have a very small cargo capacity and limited range.

A precondition for drone delivery will be exact geo-mapping services even in rural and remote areas to exactly specify the location of delivery. Delivering a parcel only a few meters apart could result in dropping it in the neighbor's garden. Meanwhile, the public acceptance of air - based drone deliveries will also determine whether the technology can be used for consumer deliveries.

Delivery by aerial drones will remain niche in the next ten years. Fields of application will include deliveries of an urgent nature such as pharmaceuticals and spare parts in rather remote areas which are not easily accessible by delivery vehicles. These could be very rural areas, islands and mountain areas.

Regulation for operating drones is a crucial precondition for further adoption. Operation of automated delivery drones that do not require control by a pilot would facilitate drone delivery and lower costs for operators. Security concerns will have to be smoothed. Effective tools ensuring safe drone operations even in unforeseen situations must be developed.

Postal operators need to consider the following issues:

<u>Impact of drones on operators' costs and supply chains:</u>

- In the case of drone delivery, supply chains will be mainly impacted on the last mile to the consumer. Long haul transport of parcels will not be changed due to energy and cost aspects.
- Drone delivery operators will have to define starting locations for drones. These could either be flexible, depending on the destination or a standardized 'drone base' attached to a hub or delivery office.
- Drone operations for B2C delivery will be complex as well as costly and require significant investments. Drone operations for C2X deliveries might be the next step but is not expected during the next 10 years.
- Drone deliveries will be offered for situations in which demand is very urgent, or the delivery area is not easily accessible.
- Drone delivery could lead to completely new ways of covering the last mile, such as locations transmitted by smartphone as opposed to fixed addresses.
- Energy costs of drones will also play a role. Although drones could potentially take a bee-line route and reduce the distance covered to the point of delivery, each drone can carry only one parcel and fly back 'empty'.
- As costs of drone deliveries will be quite high, and future regulation is not yet foreseeable, retail demand for drone deliveries will be limited.

Drone delivery benefits for customers:

- Consumers can benefit from very fast delivery, especially in emergency cases.
- Drone delivery might be possible to any location, independent of house or shop addresses. Consumers could therefore receive parcels when not at home, and when the need for delivery is not foreseen.
- Drones could facilitate delivery under difficult weather circumstances, especially in rural and remote areas and islands during adverse weather conditions[17].

Drone delivery concerns for customers:

- The aviation security of delivery will have to be ensured.
- Parcels delivered by drones might be dropped-off in places accessible to other persons than the receiver. Solutions to secure the parcel against theft, as well as security measures against intercepting drones will have to be found.
- If drones deliver to an address, it will be important to locate the exact point of delivery to avoid placing the parcel on house roofs, garages and into the garden pond. Exact geomapping services will be needed.
- Delivery to the recipient needs to be confirmed. Standardised confirmation by signature currently used by parcel carriers will not be applicable.

The decline of the mail business – the long-standing and reliable cash cow of many incumbents – due to electronic communication is structural and irreversible. While mail revenue share remains around 40 percent globally, the global volume ratio of letters to parcels has declined from 13:1 in 2005 to 4:1 in 2015 and is expected to reach 1:1 parity by 2025. In contrast, the e-commerce megatrend will fuel an EUR 8 trillion retail opportunity by 2025, creating opportunities that no postal player should give up without a fight. Capturing a piece of the resulting parcel volume growth will therefore be crucial for incumbents wishing to protect the unique benefits of their joint mail-parcel operations.

Postal incumbents need to step up their game by further optimizing their current operations, boosting operational excellence in sorting, transport, pickup, and delivery and – often neglected – business support functions.

Incumbents should follow a structured approach when innovating products and production systems. With both quality enhancements and cost reductions in mind, they should first create a consumer-centric product strategy before developing a digital and data strategy that sets critical foundations in place, addresses innovation in the core along customer experience and value

[17] https://www.wik.org/fileadmin/Studien/2016/WIK-Consult_CitA_Impact_of_technology_full-report.pdf

chain design, and considers attaining new frontiers in the production system or product portfolio (e.g., drones and robotics, artificial intelligence)[18].

6.2 Cyprus

Postal Sector realizes that changes should occur in all operations concerning the services offered. Drones create new opportunities in postal sector especially in the delivery services such as delivery of parcels, small packets, and any other delivery of postal items. There is a serious concern that delivery of medicines should be a great success, a thought that many countries think to implement.
Drones can also be used in crises situations. (wars, crisis, bad climate situations etc)
Referring to the current Covid Pandemic Crisis, drones helped in situations of lockdowns, quarantine and isolation.

6.3 Croatia

Logistics is embracing the innovative technology as a very real delivery service option. The drone technology has been tried and tested and it's now ready to transform parcel delivery as we know it. Delivering parcels by air to remote or hard-to-reach areas is adding a 'third dimension' to multimodal delivery networks. For the logistics companies, the first and last mile constitute the most expensive and least efficient part of a delivery, requiring significant manpower, vehicle numbers and time, therefore, drones can overcome certain challenges facing conventional transportation:

Drivers/pro drone facts are:

- Challenging geographical area, e.g. dense urban with lack of space or hard to reach aria
- Time constrains, e.g. danger due to the medical emergency
- Lack of infrastructure, e.g. bad quality roads
- Unsafe environments, e.g. natural disasters
- Autonomy, e.g. reduction of human involvement to save costs

[18] https://www.mckinsey.com/~/media/McKinsey/Industries/Travel%20Logistics%20and%20Infrastructure/Our%20Insights/The%20endgame%20for%20postal%20networks%20How%20to%20win%20in%20the%20age%20of%20e%20commerce/The_Endgame_for_Postal_Networks_How_to_Win_in_the_Age_of_E-Commerce.pdf

- Energy usage, e.g. environmentally friendly modes of transportation

Hurdles are:

- Regulatory framework, e.g. lack of rules and standards regarding drone operators
- Overreaching traffic system infrastructure, e.g. availability of landing pads and charging pods
- Standardized flight profiles
- Acceptance of customers, e.g. low consumer willingness to pay for delivery
- Restrictions to maintain the quality of goods, e.g. temperature requirements

Despite these challenges, it's clear that cargo drones have a distinct value proposition. To overcome the hurdles to large-scale implementation, the development of a collaborative ecosystem will be key. This should include national authorities, infrastructure providers and leading players to ensure standards and scaling across the industry. The recent developments in European postal operators (Swiss post, Royal mail, DHL, Croatian post…) indicate that these parties are ready to work towards such a solution. If so, it's likely it won't be long before the delivery drone ecosystem is flying high to make full use of the potential offered by drones in transport solutions, to ensure that society can benefit.

Postal operators are piling into the cargo drone market. The parcel delivery sector's high public relevance and advanced regulatory progress mean it is likely to define how drone air space potential will be used in the future. Players in this sector will create a specific value proposition for certain customer segments, while complementing existing delivery modes. This will enable them to overcome physical barriers, such as traffic, poor roads or bodies of water, that pose significant obstacles to current delivery methods.

High capacity and long-range deliveries via cargo drones are becoming increasingly feasible. Instead of bundling goods in trucks or trains according to a fixed schedule, cargo drones can transport fewer items more often with more flexibility. Transporting this way should become more flexible, eco-friendlier and less dependent on the traffic or weather situation.

As we have seen, individual drone-based parcel delivery services are already being rolled out: France's postal service has begun using drones to make parcel deliveries to a remote Alpine village. The delivery by drone, which flies at around 30km/h, takes eight minutes for a round trip, compared with 30 minutes for a vehicle. La Poste's subsidiary, DPD, says flying packages by remote control is more reliable, quicker and safer than driving a van up narrow mountain roads in winter when they are often icy or blocked by snow.

Cargo drones are a proven technology – they can now drop online shopping deliveries in back yards, deliver vital medicines to otherwise inaccessible locations and zip around warehouses delivering parts at the precise moment they're needed.

The problem is, they will need to be part of an over-arching system. This will involve developing a framework for the system, that is, determining the conditions in which it will exist, as well as implementing the system itself.

A second key condition is determining how the infrastructure of the over-arching system, such as drone landing pads and charging stations, will be organized. For example, as batteries become lighter and longer lasting, drones will become more efficient. Eventually they will be able to dispense with batteries altogether and charge as they fly using solar panels, removing the need for expensive charging infrastructure. Investments therefore need to be carefully targeted.

However, as parcel delivery sent per year are increasing rapidly, the nationwide use of drones would not be expedient. This means that drones can complement traditional parcel delivery where required in the future, but they will not replace it.

The development of technology has created the conditions for the development of suitable unmanned aerial vehicles for the needs of the postal service, which countries such as Croatia, with numerous islands and hard-to-reach areas, opens numerous opportunities for using drones for their own needs and users. Using drones to deliver smaller emergency service packages would be more accessible and faster.

Currently in Croatia there is no systematic training for drone operators that would include the specifics of the postal business. The trainings are mostly related to the mere management and knowledge of laws and regulations. By designing training that would include the specifics of the postal business, certified drone operators for postal services would be obtained, and a new profession would be developed that would also contribute to the development of the postal service of the future.

7 DEPARTMENTS TO USE DRONE SERVICES

Postal partners of the consortium expressed their views on potential postal activities that they could consider performing with the use of drones.

7.1 GREECE

Delivery by aerial drones will remain niche in the coming years. Fields of application will include deliveries of an urgent nature such as pharmaceuticals and urgent items in rather remote areas

which are not easily accessible by delivery vehicles. These could be very rural areas, islands and mountain areas.

The major benefit for customers is that drones will support delivery to any location, independent of house or shop addresses. Consumers could therefore receive parcels when not at home, and when the need for delivery is not foreseen. Moreover, drones could facilitate delivery under difficult weather circumstances, especially in rural and remote areas and islands during adverse weather conditions.

Considering the boost of e-commerce and the increase of online sales in the years to come, postal operators are expected to use drones to support the provision of services such as:

- Same-day delivery: Online shoppers receiving goods the same day as ordering the product. Same-day will become a widely used delivery option.
- Variety of (pick-up and drop-off) PUDO solutions: Online shoppers during regular working times can choose between several alternatives to home delivery to make it more convenient to receive their parcel[19].

In rural areas, it is extremely costly to offer delivery within a specified time window or on the same day with any kind of driving vehicle due to the large distances that need to be covered to be in the right place at the right time – even for two-hour time windows. For smaller parcels, drones could offer a solution. Drones may be the only solution to offer same-day and time-window services in rural areas, and we are certain consumers in these areas would appreciate the offering.

7.2 CYPRUS

- Parcel Services,
- Health services (medicines, vaccines, etc.),
- First Aid services ,
- Urgent postal items that need to be delivered out of working hours.

7.3 CROATIA

Croatian Post could use drones in the sectors dealing with the delivery of packages and urgent shipments, as well as in post offices. There should be personnel trained with certificates located regionally among postmen or logistic sector to cover the whole aria. For example, 1 expert per region for start.

19 https://www.mckinsey.com/~/media/mckinsey/industries/travel%20transport%20and%20logistics/our%20insights/how%20customer%20demands%20are%20reshaping%20last%20mile%20delivery/parcel_delivery_the_future_of_last_mile.ashx

8 MAPPING OF CURRENT UAV/UTM CONTROLLER COURSES

8.1 GREECE

The **European Aviation Safety Agency (EASA)** is the centerpiece of the European Union's strategy for aviation safety. Its mission is to promote the highest common standards of safety and environmental protection in civil aviation. The Agency develops common safety and environmental rules at the European level.
It monitors the implementation of standards through inspections in the Member States and provides the necessary technical expertise, training and research. The Agency works hand in hand with the national authorities which continue to carry out many operational tasks, such as certification of individual aircraft or licensing of pilots.

The main tasks of the Agency currently include:

- Rulemaking: drafting aviation safety legislation and providing technical advice to the European Commission and to the Member States;
- Inspections, training and standardisation programmes to ensure uniform implementation of European aviation safety legislation in all Member States;
- Safety and environmental type-certification of aircraft, engines and parts;
- Approval of aircraft design organisations world-wide as and of production and maintenance organisations outside the EU;
- Authorization of third-country (non-EU) operators;
- Coordination of the European Community programme SAFA (Safety Assessment of Foreign Aircraft) regarding the safety of foreign aircraft using Community airports;
- Data collection, analysis and research to improve aviation safety.

According to the “Easy Access Rules for Unmanned Aircraft Systems (Regulations (EU) 2019 / 947 and (EU) 2019 / 945)”, the main training categories are in accordance with the 3 following UAS operations categories:
1. Open Category
2. Specific Category
3. Certified category

<u>According to EASA, commercial services or not can be operated under the 'open' category, if the provider meets all the requirements defined for the 'open' category</u>.

Training conducted in one EASA member state will be recognized in all others.

Training requirements in the 'open' category

A person needs to have training that is proportionate to the category of drone they are going to operate.
Training is not required only if you are using very light drones. However, all other remote pilots must undergo the required training. This means that, in the **'open' category, all remote pilots** flying in subcategories A1, A2 and A3 are **required** to:

- be familiar with the manufacturer's manual;
- complete an online training course provided by the National Aviation Authority (please consult their website); and
- successfully complete an online theoretical knowledge examination (provided at the end of the online training) before they can fly the drone.

The test consists of 40 multiple choice questions testing your knowledge as a pilot.
Once completed the national National Aviation Authority will issue a **certificate of completion of the online training.** It enables you to fly in the in **A1 and A3 subcategories**.
(*Regulatory reference: Annex part A (DRONE.OPEN.020) of EU regulation 2019/947).*

However, if you intend to operate **in A2 subcategory**, you must **in addition** to the above:
1. Complete practical training of yourself in order to familiarise yourself with the drone and ensure you reach a good level of control. This must be conducted in an area where you do not pose a risk to other people; and
2. Undergo an additional theoretical knowledge examination that will be provided in a facility identified by the National Aviation Authority;

The test consists of 30 multiple choice questions testing the pilot's knowledge on mitigation of ground risks, meteorology and the drone's flight performance.
On completion, the National Aviation Authority issues a **'certificate of remote pilot competency'**.
With this certificate, you can fly in the **A2 subcategory**.
(*Regulatory reference: UAS.OPEN.030 Annex Part A of EU regulation 2019/947.)*

For the 'open' category or standard scenarios, the National Aviation Authority is responsible for issuing the certificates. A certificate for Remote Pilot competency **is valid for 5 years**. If the revalidation is conducted before the certificate expires, the remote pilot may attend a seminar provided by the National Aviation Authority or by an entity recognised by it, otherwise competencies need to be re-demonstrated.

Training requirements in the 'specific' category
For operations falling under the 'specific' category, the training depends on the operation that is scheduled to be conducted. So, unless the operation falls into a standard scenario, after the risk assessment, the operator will need to propose a possible training course to the National Aviation Authority. The authority will, in each case, evaluate the adequacy of the training, and if they confirm it in the operational authorisation, the training will become the required training.

If an operation falls into a standard scenario, the remote pilot must:

- hold a certificate of remote pilot theoretical knowledge for operation under standard scenarios;
- hold an accreditation of completion of the STS-01 practical skill training.

To do so, the remote pilot must complete and successfully pass an online training course.
Both the certificate and accreditation can be issued by a competent authority or an entity chosen to do so.
(*Regulatory reference: UAS.SPEC.050 (d) and UAS.SPEC.060 (b) of EU Regulation 2019/947*)

For standard scenarios, the National Aviation Authority is responsible for issuing the certificates. A certificate for Remote Pilot competency **is valid for 5 years**. If the revalidation is conducted before the certificate expires, the remote pilot may attend a seminar provided by the National Aviation Authority or by an entity recognized by it, otherwise competencies need to be re-demonstrated.
For operations in the 'specific' category that are not covered by standard scenarios, the training will be defined in the operational authorisation provided by the National Aviation Authority.
(Regulatory reference: Article 12 of EU Regulation 2019/947 and UAS.STS-01.020)

Training requirements in the 'certified' category

The 'certified' category caters for the operations with the highest level of risk. Future drone flights with passengers on board such as the air taxi, for example, will fall into this category. The approach used to ensure the safety of these flights will be very similar to the one used for manned aviation.

For this reason, these aircraft will always need to be certified (i.e. have a type certificate and a certificate of airworthiness), the UAS operator will need an air operator approval issued by the competent authority and the remote pilot is required to hold a pilot licence. Longer term, we expect that the level of automation of drones will gradually increase up to having fully autonomous drones without the need of the intervention of a remote pilot.

In order to allow operations in the certified category almost all the aviation regulations will need to be amended. So this will be a major task.

EASA decided to conduct this activity in multiple phases and to address first the following three types of operation:

Operations type #1: International flight of certified cargo drones conducted in instrumental flight rule (IFR) in airspace classes A-C and taking-off and landing at aerodromes under EASA's scope. For example, an unmanned A320 transporting a cargo from Paris to New York.

Operations type #2: Drone operations in urban or rural environments using pre-defined routes in airspaces where U-space services are provided. This includes operations of unmanned drones carrying passengers or cargo. For example, air-taxi or package delivery services that come directly to your balcony or the roof of your building or your front yard.

Operations type #3: Operations as in type #2 but conducted with an aircraft with a pilot on board. Actually, this is expected to cover the first type of air taxi operations, where the pilot will be on board. In a second phase the aircraft will become remotely piloted (operations type 2).

The first proposal for amendment will be published on the EASA website in 2021[20].

8.1.1 Drone Operations in Greece

As member of the European Union, Greece must apply by the drone regulations set by the European Union Aviation Safety Agency (EASA). Additionally, Greece also has regulations that are country-specific.

The respective Agency in Greece is the Hellenic Civil Aviation Authority (HCAA/YPA). HCAA is a Civil Service under the Ministry for Infrastructure, Transport and Networks, directed by its Governor and Deputy Governors[21].

Its mission is the *organization, development* and *control* of the country`s air transport infrastructure, as well as the study a laying of proposals to the Minister of Infrastructure, Transport and Networks concerning the overall policy formulation in air transport[22].

This is the Regulation –General framework for flights of Unmanned Aircraft Systems - UAS (Published in Government Gazette B/3152/30.9.2016 - Original text published in Greek Language)[23].

The training programmes are in accordance with the following categories:

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20 https://www.easa.europa.eu/sites/default/files/dfu/Easy%20Access%20Rules%20for%20Unmanned%20Aircraft%20Systems%20%28Regulations%20%28EU%29%202019-947%20and%20%28EU%29%202019-945%29.pdf

21 http://www.ypa.gr/en/licensing-training/degrees licences/InformationbulletinsTechnicalOrders/

23 https://dagr.hcaa.gr/docs/HCAA%20UAS%20Regulation.pdf

E-Learning

Hellenic Civil Aviation authority (HCAA), the Greek National Aviation authority, has approved e-learning to be provided for all three categories A1/A2/A3 with training videos (Web Based Training) to include in the examinations.

Written exams / Skill test

After a successful completion of the course, a Certificate of Theoretical/ Practical Training Completion will be provided, which meets the Hellenic Civil Aviation Authority's Standards (HCAA/ΥΠΑ).

Certificate issued by the authorized training instructors where it is confirmed that the remote pilot is duly trained and has the basic knowledge of Air Traffic rules and / or piloting civil aircraft according to the requirements of each UAS category.

By decision of HCAA Governor, the syllabus, the curriculum and the required examinations for the issuance of training certificates, are to be specified.

The details on the issues of skills, training and examinations procedures, licenses and the registry of UAS operators' trainers will be defined by a Decision of the HCAA Governor, which will follow the publication of this Regulation.

8.2 Croatia

In Croatia, the courses and exams for drone operators are organized by the Croatian Civil Aviation Agency and has an online manual on its website as educational material for taking the theoretical part of the exam.

There are no specific thematic or sectoral areas, but it is general. The Open category of UAS operations is divided into three subcategories: A1, A2, and A3, based on operating constraints, remote pilot requirements, and technical requirements for UASs.

Croatian Civil Aviation Agency provides training courses for drones' operator.

- Online manuals are provided on line on http://www.ccaa.hr/osposobljavanje-za-udaljene-pilote-za-potkategorije-a1a3-otvorene-kategorije-28241
- Exams are taken on-line on the platform: https://ispiti.ccaa.hr/

Learning Outcomes for UAV controllers are:

- To know the basics of air safety, which includes considerate behavior, important precautions for drone operations and basic requirements for dangerous goods.

- To consider environmental factors, unmanned aircraft conditions and limitations, remote pilot limitations, and human limitations
- To know and recognize airspace restrictions
- To know aviation regulations
- To know the EASA system of aviation regulations
- To be aware and know human limitations
- To be able to establish work procedures before, during and after the flight
- To have a general knowledge of drones
- To know the concept of personal data protection
- To understand the risks that drone operations pose to privacy and data protection
- To know the general principles of flight, management and control
- To be able to recognize the impact of environmental phenomena on the performance of the drone (temperature, altitude, wind, drone mass)
- To know the emergency procedures that the remote pilot will apply in UAV operations

Conditions for obtaining a permit:

Taking exams for remote pilots who plan to perform operations in the "open category"

(EU) 2019/947 (Commission Implementing Regulation (EU) 2019/947) of 24 May 2019 on rules and procedures for the operation of unmanned aerial vehicles, provisions that remote pilots will be required to pass the theoretical knowledge test (s) before performing operations on unmanned aerial vehicles.

The online exam for A1 / A3 open category subcategories must be passed by remote pilots before performing drone operations in any open category subcategory (A1 or A2 or A3). Remote pilots operating unmanned aerial vehicles with a maximum take-off mass, including payload, less than 250 g and a maximum speed of less than 19 m / s or class C0 must be familiar with the UAS manufacturer's instructions.

Before performing operations in A2 open subcategory of C2 unmanned aerial vehicles or unmanned aerial vehicles not complying with the requirements of Commission Delegated Regulation (EU) 2019/945 (unmanned aerial vehicle does not have a C2 class designation)

maximum take-off mass of less than 2 kg, remote pilots must pass and the exam for subcategory A2 of the Open category in the Croatian Civil Aviation Agency.

Croatian Civil Aviation Agency is implementing Regulation (EU) 2019/947 of 24 May 2019 on rules and procedures for the operation of unmanned aircraft, which came into force on 31 December 2020.

In accordance with the provisions of the Regulation, all UAV operators must register:

- when performing operations within the "open category" on drones of a take-off mass of at least 250 g or on unmanned aerial vehicles capable of transmitting kinetic energy greater than 80 J in the event of a human impact, or on unmanned aerial vehicles equipped with sensors capable of collecting personal data on unmanned aircraft considered toys in accordance with Directive 2009/48 / EC.

- when drones, regardless of their mass, perform operations within a "special category".

All UAV operators that have been registered with the Croatian Civil Aviation Agency must re-register. With this new UAV registration, from this year on the operator can perform open-air drone operations in any Member State of the European Union and will be given a unique registration number by which he must mark all his drones.

After a successful registration, the operator shall report all flight activities to Croatia's air traffic control sailing through the AMC portal (https://amc.crocontrol.hr/)

The registration differs weather flight operations are with or without constant contact with the drone.

A. If it is VLOS type - A type of operation in which the remote pilot can maintain constant visual contact with the drone without aids and thus, in order to avoid a collision, monitor its trajectory in relation to other cranes, humans and natural and artificial creatures the drone operator must be registered to the Croatian Civil Society Agency.
B. If it is BVLOS type, to perform flight operations out of sight of a remote pilot, it is necessary to obtain a special approval from the Croatian Civil Aviation Agency and pass exams.

Upon Regulation (EU) 2019/947 of 24 May 2019 on rules and procedures for the operation of unmanned aerial vehicles, remote pilots will be required to pass the theoretical knowledge test (s) before performing operations on unmanned aerial vehicles. The “open category” of UAV operations is divided into three subcategories: A1, A2, and A3, based on operating constraints, remote pilot requirements, and technical requirements for UAVs.

Croatian Civil Aviation Agency organize training for remote pilots for open subcategories A1 - A3 and taking exams as well.

8.3 Cyprus

A1/A3 Online Training Course – provided by DCAC. Learning outcomes from the following 9 lessons:

i) air safety; (ii) airspace restrictions; (iii) aviation regulation; (iv) human performance limitations; (v) operational procedures; (vi) UAS general knowledge; (vii) privacy and data protection; (viii) insurance; (ix) security.

- A2 Training Course – provided by UAS training entities. Learning outcomes from the following 3 lessons:

  (i) meteorology; (ii) UAS flight performance; (iii) technical and operational mitigations for ground risk

- STS Training Course – provided by UAS training entities. Learning outcomes from the following 8 lessons:

  (i) aviation regulations; (ii) human performance limitations; (iii) operational procedures; (iv) technical and operational mitigations for ground risk; (v) UAS general knowledge; (vi) meteorology; (vii) the flight performance of the UAS; and (viii) technical and operational mitigations for air risks.

Before 01/01/2021 the training for remote pilots was undertaken by approved organisations (RATO) and under current national law.

After 01/01/2021 the new EU regulations came into force. Now there is no mandate for training of the remote pilots in the Open Category

In the Specific category for special operations involving higher risks the training required is determined by the SORA and the OSO's arising from the determined SAIL.

9 MAPPING OF NATIONAL OCCUPATIONAL PROFILES AND EXISTING LEGISLATION

9.1 GREECE

Remote-controlled drones are regulated in European airspace by Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 laying down common rules in the field of civil aviation ("EASA Regulation").

The specifications and operation of unmanned aerial vehicle systems are laid down in Commission Regulation (EU) 2019/945 on unmanned aerial vehicle systems and operators of third country unmanned aerial vehicle systems.
The rules and procedures governing the operation of unmanned aircraft are laid down in Commission Regulation (EU) 2019/947 on the rules and procedures governing the operation of unmanned aircraft.

The regulatory approach to EU legislation is based on the risks arising from non-UAVs and on the principle of proportionality (paragraph 27 of the EASA Regulation). These Regulations set out the basic principles for safeguarding the safety, privacy and protection of personal data of unmanned aircraft.

In Greek legislation, the use of UAVs is regulated by the decision of the Hellenic Civil Aviation Authority (HCAA) no. D / ΥΠΑ / 21860/1422 entitled "Regulation - general flight framework of Unmanned Aircraft Systems - UAS (Unmanned Aircraft Systems - UAS)" (Government Gazette 3152 / B / 30-09-2016). However, the provisions of the above decision of the HCAA apply to the extent that they do not conflict with the provisions of the EU Regulations.

The Regulation for the registration of UAVs, the classification, flight operation and the certification of UAV controllers have been published mainly at the EC Regulations: 945/2019, 947/2019, 639/2020, 746/2020, 1058/2020

The supervisory authority of the Greek non-UAVs market is the Hellenic Civil Aviation Authority (article 24 of law 714/1970).

9.2 CROATIA

Common European Rules for ACE Systems are in force since 31/12/2020, based on operational risk assessment and striking a balance between the obligations of aircraft manufacturers and pilots regarding safety, respect for the protection of private life, environment, noise protection and safety.

In particular, the institutional framework concerns:

(a) Delegated Commission Regulation (EU) 2019/945 of 12 March 2019 on unmanned aerial vehicle systems and operators of third country unmanned aerial vehicle systems.

(b) Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures governing the operation of unmanned aircraft.

(c) The Civil Aviation (Conditions for Conducting Flights to the Republic of Cyprus by Unmanned Aircraft) Decree of 2015, K.D.P. 402/2015.

On July 1, 2019, two regulations of the European Commission governing the field of unmanned aircraft came into force, namely:

1. Regulation (EU) 2019/945 on unmanned aerial vehicle systems and on unmanned aerial vehicle operators from third countries

2. Regulation (EU) 2019/947 on rules and procedures for the operation of unmanned aircraft

The concept of harmonization across Europe is one of the main objectives of the EU, and with this in mind, these regulations intended to simplify the entire process of conducting UAV operations and eliminate the need to refer to special regulations within each Member State or Contracting State. An additional, but no less important goal, was the desire for encouraging a larger European market that would promote the growth of the European UAV industry.

01/01/2021 the national regulation regulating the operations of unmanned aircraft in the Republic of Croatia ceases to apply and European regulations begin to apply.

Common rules in the field of civil aviation are laid down in the Regulation (EU) 2018/1139, which includes unmanned aircraft regardless of their operating mass. The main objective of the Basic Regulation is to establish and maintain a high uniform level of civil aviation security in the European Union. The basic regulation is adopted by the European Parliament.

UAS operator registration and taking exams for remote pilots:

Registration of UAS operators in accordance with Commission Implementing Regulation (EU) 2019/947 Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on rules and procedures for the operation of unmanned aircraft shall apply from 31 December 2020.

In accordance with the provisions of the Regulation, all UAS operators must register:

- when performing operations within the "open category" with unmanned aerial vehicles with a take-off mass of at least 250 g or unmanned aerial vehicles capable of transmitting kinetic energy greater than 80 J in the event of a human impact or unmanned aerial vehicles equipped

with sensors capable of collecting personal data on unmanned aircraft considered toys in accordance with Directive 2009/48/EZ.

- when drones, regardless of their mass, perform operations within a “special category”.

All UAS operators that have been registered with the Croatian Civil Aviation Agency for conducting flight operations in accordance with the Ordinance on drone systems must be re-registered.

With this new UAS registration, the operator can perform open-air drone operations in any Member State of the European Union and will be given a unique registration number by which he must mark all his drones.

The UAV pilot must be familiar with European Union and national rules before operations, in particular regarding security, privacy, data protection, liability, insurance policies and environmental protection. He must be familiar with the areas not to be flown over like hospitals, crowds of people, prisons, industrial plants, facilities of the highest public bodies and higher levels of government, protected natural areas, certain parts of the transport infrastructure.

Conditions for obtaining a permit is taking exams for remote pilots who plan to perform operations in the "open category". Upon application of Regulation (EU) 2019/947 of 24 May 2019 on rules and procedures for the operation of unmanned aerial vehicles, remote pilots will be required to pass the theoretical knowledge test (s) before performing operations on unmanned aerial vehicles. The “open category” of UAS operations is divided into three subcategories: A1, A2, and A3, based on operating constraints, remote pilot requirements, and technical requirements for UASs.

Croatian civil aviation agency has developed a manual for adaptation to the new regulatory framework for operators and remote pilots of unmanned aircraft.

The manual can be found at the following link: http://www.ccaa.hr/file_inline.php?file=638fd62915172c429e101c3e9410af3f078

One of the novelties in the European regulation is the training and checking requirements for remote pilots that need to be fulfilled for the individual pilots, which have been incorporated by the Croatian air flight relevant authorities.

All UAV operators that have been registered with the Croatian Civil Aviation Agency must re-register in line with the new EU regulation from the year 2021. With this new UAV registration, from this year on, the operator can perform open-air drone operations in any Member State of the European Union and will be given a unique registration number by which he must mark all his drones.

After a successful registration, the operator shall report all flight activities to Croatia's air traffic control sailing through the AMC portal - https://amc.crocontrol.hr/

Training and requirements for remote pilots and other personnel involved in operations according new regulations and training needs can be found: http://www.ccaa.hr/file_inline.php?file=1095afdcb2f62d1992c4193067204242f5b7

Registration is not required if:

- The maximum permissible mass of the drone at take - off is less than 250 grams and
- Your drone cannot transmit kinetic energy greater than 80J and
- Your drone is not equipped with sensors for collecting personal data (camera, microphone).

Conditions for registering at Croatian Civil Aviation Agency:

- To be a Natural person with permanent residence in the Republic of Croatia
- To be a Legal entities with the main place of business in the Republic of Croatia

Natural and legal persons from countries that are not members of the European Union, if they have not already registered in one of the EU member states prior to the registration procedure, it is necessary to obtain a compulsory insurance policy in accordance with Regulation (EU) 785/2004. Compulsory insurance policies are not mandatory only for operators operating aircraft models with a take-off operating mass of less than 20 kg.

9.3 CYPRUS

Common European Rules for ACE Systems are in force since 31/12/2020, based on operational risk assessment and striking a balance between the obligations of aircraft manufacturers and pilots regarding safety, respect for the protection of private life, environment, noise protection and safety.

In particular, the institutional framework concerns:

(a) Delegated Commission Regulation (EU) 2019/945 of 12 March 2019 on unmanned aerial vehicle systems and operators of third country unmanned aerial vehicle systems.

(b) Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures governing the operation of unmanned aircraft.

(c) The Civil Aviation (Conditions for Conducting Flights to the Republic of Cyprus by Unmanned Aircraft) Decree of 2015, K.D.P. 402/2015.

All UAS operators whether professionals or hobbyists are required to register online (provided their drone has MTOM > 250g (or if <250g but carries a camera). Registration is done via DCAC web portal at www.drones.gov.cy

9.4 MAIN DUTIES AND TASKS OF UTM/UAV OPERATORS PER COUNTRY

9.4.1 Croatia

Prior to operations, the remote pilot must be familiar with European Union and national rules, regarding security, privacy, data protection, liability, insurance policies and environmental protection.

Must develop the following precautions for drone operations:

- establish working procedures adapted to the type of operation and the associated risk
- ensure that radio spectrum is used efficiently in all operations while avoiding harmful interference
- ensure that remote pilots and other personnel in charge of operations-related tasks are familiar with the UAS manufacturer's user manual
- ensure that the remote pilot is adequately trained for his tasks in the subcategory of planned UAS operations, that he is fully acquainted with the procedures of the UAS operator and that he has appropriate information on possible geographical areas published by the Member State before the operation
- update the information in the geoinformation system as necessary in accordance with the planned location of the operation
- the persons involved in the area of operation must be informed of the risks and must explicitly agree to attend

Should know:

- how far the drone can fly
- how long the drone can fly before it consumes battery or fuel
- whether the drone has a "return to home" function, which means that it can return to the remote pilot if a problem occurs.

Make sure that the drone is ready and adequate for the flight and check that:

• is no visible damage,

• the rotating parts are free to rotate,

• all electrical and radio lines are reliably connected,

• the load and antennas are securely fastened.

Should be familiar with the meteorological conditions in which he will operate the drone

Should be prepared psychophysically and know how to take quick and safe action if something changes during the flight.

9.4.2 Greece

However, an indicative job description of a drone controller is provided here, as conducted through a relevant desktop research.

Job Description

A Drone Pilot is responsible for operating a drone, which is sometimes called an unmanned aerial system (UAS). Drones are operated remotely, which is why Drone Pilots are also known as Remote Pilots. A Drone Pilot controls a drone, causing it to take off, stay on course, and land safely. Also, Drone Pilots conduct safety tests, oversee vehicle performance, and assess drone systems' capabilities. They may also operate cameras or other equipment the drone carries.

Typical Duties and Responsibilities

- Check drones before a flight to ensure safe and proper operation
- Analyze weather forecasts to ensure safe flights
- Document pre- and post-flight logs
- Monitor drones during flight
- Plan drone flight routes
- Navigate drones along designated paths
- Gather information or produce aerial photographs, as needed
- Perform equipment testing, troubleshooting, and maintenance

Skills and Competencies

- Strong communication skills
- Robust problem-solving abilities
- Excellent electronic and mechanical skills
- Expertise in multitasking
- Keen attention to detail[24]

9.4.3 Cyprus

- check drones before flying
- ensure safe operation
- monitor drones flight
- navigate drones on allowed areas
- face unexpected problems may occur

9.5 TOOLS, EQUIPMENT, SUPPLIES & MATERIAL A DRONE CONTROLLER AT POST OFFICE WILL USE AS IDENTIFIED BY PARTNERS

The tools/equipment/supplies considered as necessary for performing the UTM/UAV operations have been identified by the partners of the consortium as follows:

9.5.1 Croatia

- Mobile communication for drone tracking
- Tablet
- Communication software
- Drone guidance software
- UEV

9.6 FUTURE TRENDS & CONCERNS

The idenbtified future trends & concerns regarding drone operations as described by partners can be seen below:

[24] https://www.4cornerresources.com/recruiting-expertise/aerospace-and-aviation/drone-pilot/

9.6.1 Croatia

a. GDPR regulations - Understanding the risks posed by drone operations to privacy and data protection and understanding the principles of keeping personal data in accordance with the GDPR is of utmost importance.
b. Airspace restrictions - Obtaining up-to-date information on any restrictions or conditions published by the Member State.

9.6.2 Cyprus

- Security concerns
- GDPR concerns

To minimize the above concerns, adequate training should be followed.

9.6.3 Greece

Most of the concerns that may affect the future commercial use of UTM/UAVs are related to privacy and safety:

- Privacy issues: Many are concerned about drones doing deliveries where they fly over residential neighborhoods and potentially capture data of people.
- Legal issues: There are certain legal concerns regarding drone deliveries of products, such as the possibility of surveillance issues with drones and attached cameras, invasion of privacy with others in the area and complications with products delivered.
- Safety issues: Drones are not infallible. Batteries remain the weakest link on any electric solution (most of the proposed new drones are electric). The weight and size, or aerodynamics, of the product being delivered will have a huge adverse impact on the drone's range. Range changes a lot with heat, cold and various weather events. Through global positioning technology, a drone can fly from one point to another and land at a predestined location. However, the drone may not recognize a threat or may see something as a threat that is not. This could lead to the drone landing on a person, crashing into an individual thus causing severe injuries. The drone could also cause damage to the property where it lands or delivers goods. This may lead to certain law implications.
- Air traffic management, as drone deliveries and UAV use will increase.
- Potential damage of parcel when transported: Online shoppers raise the issue of packages getting damaged during delivery by drones or the drone getting stolen or hacked.

In general, the level of drone delivery reliability needs to be improved in the next years, especially when it comes to delivery in densely populated urban areas. And this may happen through

technology innovations, extended flight tests and strict training and certification procedures for drone controllers.

9.7 Knowldedge, Skills & Competences Identified by partners

KEY LEARNING AREA	KNOWLEDGE, SKILLS, COMPETENCES, BEHAVIORS	CYPRUS	CROATIA	GREECE
General Soft skills	Self-awareness	✓	✓	✓
	Autonomy			
	Creativity			
	Critical Thinking		✓	✓
	Adaptability		✓	
	Emotional Intelligence			
	Self-discipline		✓	✓
	Professionalism	✓		✓
	Ability to work in teams	✓		
	Problem Solving	✓	✓	✓
Intercultural Skills	Respect for people from other countries	✓		
	Good level of foreign languages	✓		
	Open mindedness	✓		
	Adaptability to culturally new contexts	✓		
	Valuing cultural diversity	✓		
Digital Skills	Computer skills	✓	✓	✓
	Use of Microsoft Tools	✓		
	Browsing, searching and filtering digital information	✓		
	Ability to store and recover multimedia files			
	Data literacy			
	Privacy (GDPR)		✓	✓
	Safety at the net	✓		

	Online Communication	✓	✓	✓
Communication	Customer Service skills			
	Communication & Body Language Principles			
	Planning a promotional Campaign	✓		
	Techniques and Methods in Digital Marketing			
	Social networking			
	The tome of online communication			
Entrepreneurial Skills	Leadership and Vision	✓		
	Spotting Opportunities			
	Working with others			
	Conflict Resolution			
	Organizational Skills	✓		✓
	Planning and Management			✓
	Financial and Economic Literacy			
	Evaluation			
	Privacy and confidentiality policy (GDPR)			
Sector Specific/Technical Skills	Check drones before a flight to ensure safe and proper operation	✓	✓	✓
	Document pre- and post-flight logs	✓	✓	✓
	Analyze weather forecasts to ensure safe flights	✓	✓	
	Monitor drones during flight	✓	✓	✓
	Plan drone flight routes	✓	✓	✓
	Navigate drones along designated path	✓	✓	✓
	Gather information or produce aerial photographs, as needed	✓	✓	

	Perform equipment testing, troubleshooting, and maintenance	✓	✓	

10 PREPARATION OF OCCUPATIONAL PROFILE

10.1 Purpose of occupational profiles

In the first place, **OP (Occupational Profiles)** have been developed for several purposes: analysing, projecting and forecasting skill needs as well as for determining and measuring education/skills matches and mismatches in different countries, sectors or occupations. Moreover, they are useful for comparing and monitoring differences among European countries, including determining change over time in labour sectors.

An OP highlights essential characteristics required for a given job:

- *the level of education and training;*
- *the field of education and training;*
- *supplementary requirements, concerning knowledge, skills, and optional competences.*

11 RELEVANT EUROPEAN FRAMEWORKS

11.1 The ESCO FRAMEWORK

ESCO (Skills, Competences, Qualifications and Occupations) is a European Framework providing a multilingual classification of Skills, Competences, Qualifications and Occupations. The ESCO framework works as a definition, description, identification and classification guidance towards professional occupations, skills and qualifications that are relevant for the EU labour market and education and training. The framework includes description of nearly 3,000 occupations and more than 13,000 skills linked to these occupations. Additionally, the framework involves over time to include the qualifications that are certified by the national education and training systems of the Member-States, as well as the ones issued by private awarding bodies. The main aim of ESCO is to support job mobility across Europe by providing a common frame of qualifications that will enable the recognition of skills and therefore a more

integrated and efficient common labour market. The ESCO Framework is organised in three pillars, including a) occupational profiles b) skills & competencies and c) qualifications. All pillars are structured hierarchically and interconnected to each other. The relationship between the three pillars highlights the interconnections between the learning outcomes produced per institution, the accreditation provided per member-state and the occupational profile that it links to.

11.1.1 Current references to UTM/UAV related competences in ESCO Framework

Found in	Category	Description	Concept URL
unmanned air systems	Knowledge	The systems used to remotely control unmanned aerial vehicles by onboard computers or by a pilot on the ground or in the air.	http://data.europa.eu/esco/skill/a521903b-aa32-4954-9790-961b0df1261f
operating aircraft	Skill	Controlling the movement of aircraft, including fixed wing aircraft, helicopters and drones.	http://data.europa.eu/esco/skill/S8.9 http://data.europa.eu/esco/skill/S8.9.0
make use of personal robots for practical support	Skill	Use semi-autonomous or autonomous machines which automatically carry out complex actions while being guided by digital or electronic software, such as driverless cars, drones and other machines.	http://data.europa.eu/esco/skill/abf982c1-6b59-4572-a38c-97d3a6869af4

11.2 EQF Framework

According to EU, qualifications have traditionally offered information about the duration of learning and the institution or location where the learning has taken place. The EQF, and all National Qualifications Frameworks (NQFs) that have been referenced to it, follow a learning outcomes approach. This means that both the content and the level of a qualification highlights what holders are expected to know, understand and be able to do (learning outcomes). A learning outcome approach further supports a better match between the skills needs of the labour market

and education and training provision, while also facilitating the validation of learning acquired in different settings[25].

By focusing on what a learner knows, the occupational profiles' methodology can summarize what the learner can do and can understand, what skills are needed and why as well as to open qualifications to a wider variety of learning pathways and experiences. The EQF Recommendation invites Member States to reference their NQFs or systems to the EQF, in order to establish a clear and transparent relationship between their national qualification levels and the eight EQF levels. Given that the EQF is first and foremost a translation tool, qualifications are not directly included in the EQF. They are instead included in the NQFs, where their level and value abroad can be understood with reference to the eight EQF levels. This translation becomes visible to citizens as EQF levels are increasingly added to national certificates and diplomas and included in the NQFs.

Using EQF's approach[26] on identifying level of competences and skills, the EU has proposed the following process to be adopted:

LEVEL 1	**Basic general knowledge.**	**Basic skills required to carry out simple tasks.**
LEVEL 2	Basic factual knowledge of a field of work or study.	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and solve routine problems using simple rules and tools.
LEVEL 3	Knowledge of facts, principles, processes and general concepts in a field of work or study.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information.
LEVEL 4	Factual and theoretical knowledge in broad contexts within a field of work or study.	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study
LEVEL 5	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study, and an awareness of the boundaries of that knowledge.	A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems.
LEVEL 6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles.	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study
LEVEL 7	Highly specialised knowledge, some of which is at the forefront of knowledge, in a field of work or study, as the basis for original thinking and/ or research.	Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures, and to integrate knowledge from different fields.
LEVEL 8	Knowledge at the most advanced frontier of a field of work or study, and at the interface between fields	The most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/ or innovation, and to extend and redefine existing knowledge or professional practice.

[25] https://europa.eu/europass/system/files/2020-05/EQF%20Brochure-EN.pdf
[26] The same as above

Based on the above, EQF has an impact on the following ways:

- ***Aligning skills with labor market demands***: Qualifications give access to jobs and provide the basis on which careers are built. The EQF also helps employers to better assess qualifications from other countries and institutions not known to them. They can better facilitate the level of each candidate, compare their qualifications with national qualifications, understand the relevance of those qualifications and see how the learning outcomes are aligned with the needs of the company or sector.
- ***Promoting a common language***: By promoting the shift to learning outcomes, EQF can also facilitate dialogue on the needs of the labour market and its provisions of the education and training systems. In this way, Occupational profiles that are identified in the European sphere, can also be aligned in terms of competences and skills with those of National frameworks.
- ***Supporting other transparency tools***: The European Commission, in close cooperation with Member States, has launched a number of tools supporting the modernisation of European education and training systems over the last decade. In this framework, ESCO(as we have seen above) is also connected to EQF's approach.

Provided the input of initial desk research, partners and sector experts the occupational profile has been created following the ESCO structure. More specifically:

- **General coding** (Each Occupational profile has a unique code aligned to ISCO's coding)
- **The link** of the Occupational Profile which can be found and analyzed on ESCO platform
- **The Prioritization category** which applies to what occupational category the Job applies (i.e. Elementary profession)
- **A unique title of each Occupational profile** (i.e. Building construction worker)
- **Alternative titles of occupations** that are related to the Occupational Profile we examine (for instance in Belgium the Building Construction worker can be pronounced with a different title)
- **Educational background**: The relevant EQF that applies to each occupational profile (Generally under the scope of Blueprint project we have identified that all professions that will be updated should focus on EQF levels 3-6)
- **Description and Tasks**: Each relevant Occupational Profile has a unique description; a summary of tasks and responsibilities. All these characteristics are generated by using the ESCO platform
- **Core skills and knowledge**: According to ESCO's methodology, each occupational profile has specific core skills and knowledge that should be followed and applied.

Furthermore, keeping in mind that the penultimate goal of this endeavor is to create a roadmap of competences and skills to be included in the training curriculum the challenges and new trends of the sector are also included.

12 THE OCCUPATIONAL PROFILE

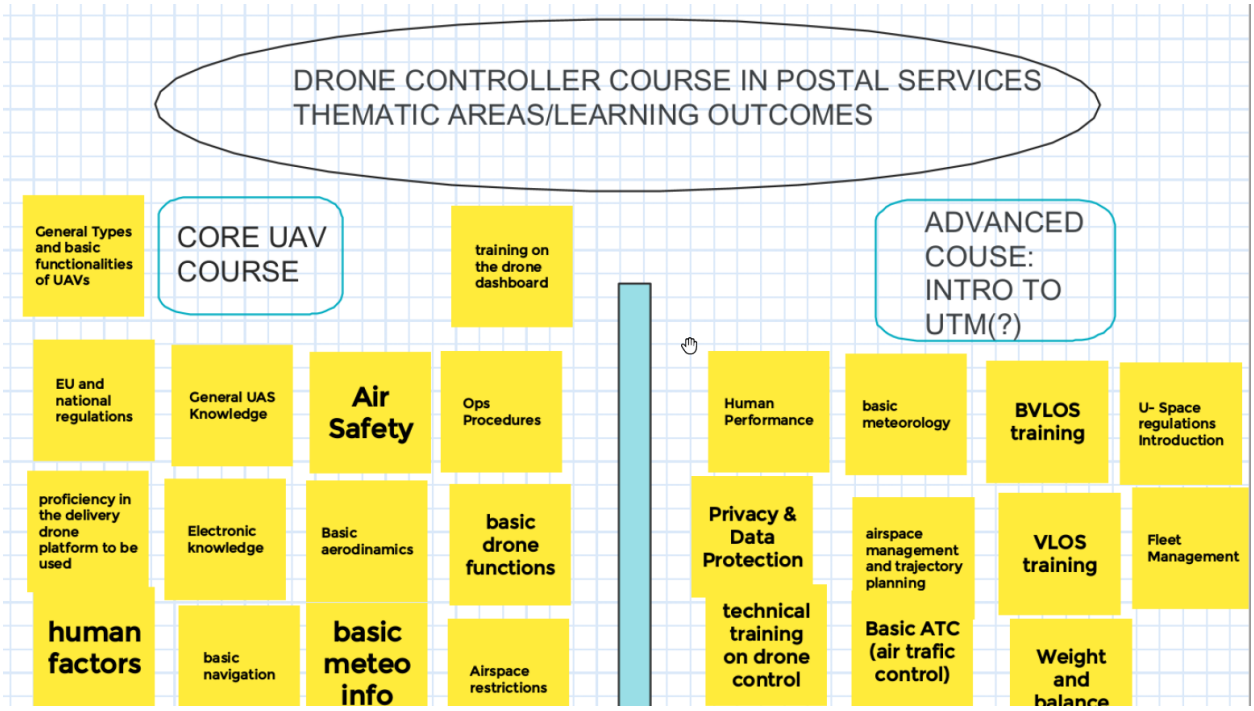
TITLE:	UTM/UAV Controller for Postal Services
DESCRIPTION	A UAV/UTM Controller in postal services is responsible for the conduction of postal services (parcel/mail delivery) with the use of an unmanned aerial system (UAS). Since UAVs are operated remotely, UAV controllers can be referred to as Remote Pilots. He/She is responsible for pre-flight, during the flight and post-flight activities. These include adherence to safety protocols for take-off, flying and landing. The conduction of safety tests & oversee vehicle performance, including logs for maintenance checks. The operation of relevant equipment of cargo delivery: pick-up & drop- off (PUDO) system. Also, they are responsible for the accuracy in deliveries & correct documentations of postal activities.
EQF REFERENCE	EQF Level 4
EDUCATIONAL LEVEL	Upper Secondary Diploma, Vocational School
REFERS TO	Supervisor of Distribution Center
REPLACED BY	Another UTM/UAV controller
TASKS/DUTIES	<u>A. Pre- flight:</u> • Mission Preparation (Pre-flight procedures, Briefing etc.) • Conduction of Safety Checks for drones to ensure safe and proper operation • Flight Planning & drone flight routes • Analyze weather forecasts to ensure safe flights • Load the parcel to the UAV <u>B. During Flight:</u> • Monitor drones during flight • Flight Operation, Performing necessary maneuvers for a smooth flight • Familiarity with procedures of last-mile delivery • Competent handling of geo-mapping services • Navigate drones along designated path • Gather information or produce aerial photographs as proof of deliveries needed • Ensure weight of the parcel remains centered <u>C. Post Flight Procedures:</u>

	• Document post-flight logs (Lessons learned, logbook compliance) • Perform equipment testing, troubleshooting, and maintenance
SKILLS/COMPETENCES	• Communication skills: listens to and understands others, reads and understands written information, expresses oneself clearly by applying the oral & written speech. • Judgment & decision: Choose the most appropriate solution, considering the pros and cons of the new data. • Excellent command of information & IT equipment • Nearby & distant vision: The ability to see details at a near or distant distance • Space-perceived ability: The ability to know its place in the environment or to perceive the position of other objects in relation to it. • Accident prevention & problem-solving skills • Self-discipline & Self-Awareness: Human Limitations • Digital Skills: Browsing, searching and filtering digital information, Ability to store and recover multimedia files
EQUIPMENT	• UAV • a ground stations • Power supply (Batteries) • Mobile communication for drone tracking • Tablet • Communication software • Drone guidance software • UEV
CHALLENGES	• GDPR awareness • Public's /Customers' Acceptance • Harmonization • Regulatory framework, e.g. lack of rules and standards regarding drone operators • Overreaching traffic system infrastructure, e.g. availability of landing pads and charging pods • Standardized flight profiles
NEW TRENDS	• New U-Space Regulations • Harmonization • EASA drone regulation 945 & 947, transition period

13 LEARNING OUTCOMES TO BE ACHIEVED

During the DACUM Validation Workshop, held online, in response to the Covid-19 pandemic situation, the partners and expert workers contributed by identifying the thematic areas to cover in the training courses to be developed in the upcoming project's IOs. Their input along with the results of the national reports will lead to the formulation of the training course outline based on the identified needs.

The identified thematic areas of the courses are the following and based on these the curriculum outline will be drafted:



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