

# DRONE



# STEAM

## DRONES@STEAM

**Fostering digital Transformation in VET schools  
and creating new job prospects in the labour market**

**Project Result No: 2**

**Activity 3: EDUCATIONAL PACK: TEACHING MATERIAL AND  
ASSESSMENT**

**UNIT 3, Chapter 3.3**

**Lead partner(s): Politeknika Txorierrri**



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## CONTEXT

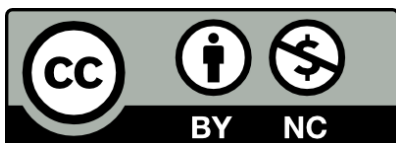
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## WEBSITE:

<https://dronesteam.eu/>

## CONSORTIUM: PARTNER LIST

- University of Crete (UoC) - Greece
- ECAM-EPMI (ECAM) - France
- Cyprus Computer Society (CCS) - Cyprus
- Politeknika Ikastegia Txorierri S. Coop (PIT) – Spain
- National Center for Scientific Research “Demokritos” (NCSR) - Greece
- A & A Emphasys Interactive Solutions Ltd (EMP) – Cyprus
- Regional Directorate of Primary and Secondary Education of Attica (RDPSEA) – Greece



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## UNIT 3: Lesson Plan 3.3

UNIT 3	
<b>Chapter 3.3</b>	<b>Drone commercial applications and entrepreneurship</b>
Equipment, Software, Consumables (if needed)	PC with access to the internet
Duration	2 teaching hours
<b>Short description</b>	In this worksheet, students will learn about the <b>job opportunities and the required profiles in the current drone market</b> . Students will also <b>research real-world applications</b> to help them come up with possible business ideas
<b>Learning Outcomes</b>	A deeper understanding of the various industries and sectors that can benefit from drone technology
	Analyze the potential benefits and impacts of drone technology on industries and sectors, including economic, social and environmental impacts
	Creative thinking, Collaboration and teamwork, Entrepreneurship
<b>Activities</b>	
Activity 1	Activity 3.3.1.1
Aim of the activity	The goal of this activity is to explore the various job roles within the drone industry and provide the students with insights into the required skills and competencies for each role
Duration	25 minutes
Type of Activity	Discussion
Teaching Objectives	By the end of this exercise, students will be able to explore potential career paths and professional development opportunities within the drone industry. This will involve researching different job roles and industries that require drone technology, as well as identifying the skills and qualifications necessary for each role
Resources	Worksheet 3.3.1 / Discussion 3.3.1.1
<b>Activity 2</b>	
Activity 2	Activity 3.3.1.2
Aim of the activity	The objective of this activity is to explore real-world applications for drone use, learn how to choose the correct drone model, examine business opportunities, entrepreneurship and analyze the benefits and impacts of drone technology
Duration	70 minutes
Type of Activity	Worksheet
Teaching Objectives	By the end of this exercise, students will be able to analyze the technical specifications of different drone models and evaluate their suitability for various real-world applications
Resources	Worksheet 3.3.1 / Exercise 3.3.1.1
<b>Further Reading</b>	
Resources/Links	<p><a href="#">European drones outlook study - Publications Office of the EU (europa.eu)</a></p> <p><a href="#">COM 2022 652 drone strategy 2.0.pdf (europa.eu)</a></p>

	<p><a href="#">Drone Strategy: Creating a large-scale European drone market (europa.eu)</a></p> <p><a href="#">COMMISSION STAFF WORKING DOCUMENT (europa.eu)</a></p> <p><a href="https://www.easa.europa.eu/en/light/topics/urban-air-mobility">https://www.easa.europa.eu/en/light/topics/urban-air-mobility</a></p> <p><a href="#">List of unmanned aerial vehicle applications - Wikipedia</a></p>
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## Activity worksheet 3.3.1 (student version)

### Chapter 3.3: Drone commercial applications and Entrepreneurship

#### Level: Intermediate

In this worksheet, we will learn about the current drone market. More specifically, we will

- Research the various job roles within the drone industry and the required skills and competencies for each role
- Explore real-world applications to analyze the technical specifications of different drone models and their suitability for different applications
- Examine the potential benefits and impacts of drone technology on industries and sectors, including economic, social and environmental impacts

#### Discussion 3.3.1.1: Growing Drone Market

According to Drone Strategy 2.0 European Union report, it is projected that by 2030, with the right framework in place, the drone services market in Europe could reach a value of €14.5 billion, with a compound annual growth rate of 12.3%, creating more than 145,000 jobs in the EU countries.

#### Drone Strategy 2.0

The Drone Strategy 2.0 (December 2020) is a policy framework developed by EU to promote a safe, sustainable and competitive drone industry in Europe. It sets out the EU's vision and objectives for the next years, focused on four main objectives:

1. Foster the competitiveness of the EU's drone industry
2. Ensure a high level of safety and security for drones
3. Protect privacy and the environment
4. Promote harmonization and international cooperation

The actions and initiatives that will be undertaken to achieve the objectives include developing a regulatory framework for drones, promoting research and development, supporting the adoption of drones in various sectors and improving coordination between EU Member States.

The strategy also recognizes the importance of education and training in the drone industry, emphasizing the need to ensure that VET students, professionals and entrepreneurs have the necessary skills and knowledge to take advantage of the opportunities presented by the expanding drone market.

Within the framework of the Drone Strategy 2.0, students interested in working in the drone sector should familiarize themselves with three concepts presented below, as they are likely to shape the future of the European drone industry:

- 1. IAS (Innovative Aerial Services).** IAS refers to new and innovative aerial services that drones or unmanned aerial vehicles (UAVs) can provide, including surveillance, inspection, mapping and imaging. IAS also offers customized drone solutions to various industries, such as agriculture, construction, energy and mining.



For students interested in working in IAS sector, there are several related job roles:

- Drone Operator/Pilot. Operation and control of the drone during a mission.
- Drone Technician. Maintaining and repairing drones.
- GIS Technician: A Geographic Information System (GIS) technician is responsible for collecting and analyzing geographic data to create maps and visualizations.
- Surveyor. Uses various tools and techniques to measure and map land, including using drones to collect aerial data.
- Photographer/Videographer. Works with drones to capture aerial images or video footage for marketing or promotional purposes

The profile for these jobs may include:

- Technical proficiency in drone operation
- Knowledge of aviation regulations and safety procedures
- Familiarity with GIS software and mapping techniques
- Strong analytical, mathematical and creative skills

Students interested in pursuing a career in IAS services can consider courses in aviation, engineering, GIS, photography or videography. They should also consider obtaining the Drone Pilot License regulated by the EASA. Participating in apprenticeships or internships in drone companies can provide an excellent opportunity to gain practical experience in this field.

2. **IAM (Innovative Air Mobility).** This concept was first introduced by EASA in 2017 and it refers to the emerging field of electric vertical take-off and landing (eVTOL) aircraft and the associated infrastructure and services that will support them. These aircraft are designed to provide more efficient and sustainable transportation options, particularly for urban mobility.



For students interested in working in IAS sector, there are several related job roles:

- Aircraft Technician. Maintaining and repairing eVTOL aircraft.
- Aerospace Engineer. eVTOL aircraft design and development.
- Software Developer. Responsible for developing the control and automation systems used in eVTOL aircraft.
- Operations Manager. Management of the day-to-day operations of an eVTOL service, including scheduling, maintenance and customer service.
- Infrastructure Engineer. Responsible for designing and developing the infrastructure needed to support eVTOL aircraft, including vertiports and charging stations.

The profile for these jobs may include:

- Strong understanding of aircraft mechanics and electronics
- Knowledge of the specific systems and components used in eVTOL aircraft
- Knowledge of aerodynamics, materials science and control systems
- Knowledge of programming languages, software engineering and control systems
- Knowledge of civil engineering, materials science and energy systems
- Organizational, analytical, mathematical and communication skills

Students interested in pursuing a career in the IAM field can consider courses in aerospace engineering, aviation technology, computer science or civil engineering. They can also consider obtaining relevant certifications or licenses, such as an Aircraft Maintenance Engineer license or a Commercial Pilot License with an eVTOL rating. Participating in apprenticeships or internships in drone companies can provide an excellent opportunity to gain practical experience in this field.



3. **U-SPACE.** Introduced in 2016 as part of the SESAR program. The objective of this initiative is to create a harmonized and safe framework for the operation of drones in European airspace through a set of digital services and procedures. U-Space is designed to enable the safe operation of drones in all types of airspace, including urban and densely populated areas.



For students interested in working in the field of U-Space, there are several related job roles:

- UAS Operator. Operation and control of a drone during a mission, following U-Space procedures and regulations.
- U-Space Manager. Coordination of U-Space services and procedures.
- Software Developer. Development of the software and systems related to U-Space: traffic management systems, communication protocols,....
- Air Traffic Controller. Management of air traffic flow in a designated airspace.
- U-Space Analyst. Analysis of U-Space data to identify trends and patterns to make recommendations for improvements.

The profile for these jobs may include:

- Technical proficiency in drone operation
- Strong understanding of software engineering, data analysis and drone technology
- Knowledge of U-Space procedures, airspace regulations, traffic management systems and communication protocols
- Strong analytical, mathematical or communication skills

Students interested in pursuing a career in the U-Space field can consider courses in aviation, engineering, computer science or data analysis. They can also consider obtaining relevant certifications or licenses, such as a Remote Pilot Certificate or an Air Traffic Controller License. Additionally, they may consider participating in

apprenticeships or internships with U-Space companies or regulatory agencies to gain practical experience in the field.

Considering the information about the Drone Strategy 2.0 and the European drone market pillars (IAS, IAM and U-Space), divide into small groups to research, discuss and debate about:

- The different job roles, their potential for growth, the skills/training needed and average salaries
- Would you be interested in any of the jobs mentioned before?
- Do you know companies in that sector? Do you know if they have internship programmes? How would you apply?
- How would you prepare yourselves for a career in the field?

To close the discussion, ***what do you think the drone industry will look like in 2030?***

## Exercise 2: Real-World Applications

To further increase our knowledge of the drone market, we are going to do an activity focused on real-world drone applications.

Below, you can see a list of 8 blocks that include different categories of real-world applications of drone use.

Divide into 8 groups, assign one block to each group and complete the following tasks:

1. Think about possible applications for each category of your block. Then research and compile a list of real-world drone applications in your assigned categories. Did you guess any of them?
2. Propose a new application per category. Take into account the current challenges or inefficiencies in the industry, and the potential benefits of drone technology. Analyze the technical specifications of different drone models to check their suitability for the applications. Include information about the selected drone type and sensors that would be required for the application.
3. Analyze the business opportunities and entrepreneurship potential of your proposed application. Consider factors such as the potential customer base, competitiveness, regulatory framework and the potential costs and revenues of implementing it.
4. Examine the environmental, social and economic impacts of your proposal. Reflect on the potential benefits (efficiency, safety,...) and the potential negative impacts (privacy, environment,...).

5. Finally, represent each proposal in an infographic that includes its main characteristics. Share it with the class to get feedback.

### **BLOCK 1: NATURE AND THE ENVIRONMENT**

Agriculture

Environmental monitoring

Wildlife and habitat management

Waste management and remediation services

### **BLOCK 2: PRESERVATION AND CONSERVATION**

Archaeology and heritage conservation

Art and cultural conservation

### **BLOCK 3: MEDIA AND ENTERTAINMENT**

Advertising and marketing

Film and photography

Sports and entertainment

Journalism and news

### **BLOCK 4: SECURITY AND LAW ENFORCEMENT**

Border control and customs

Civil administration and law enforcement

Security

## **BLOCK 5: CONSTRUCTION, INFRASTRUCTURE AND RESOURCE EXPLORATION**

Construction and engineering

Infrastructure inspection

Mining, quarrying and resource exploration

Oil and gas industry

## **BLOCK 6: EMERGENCY RESPONSE**

Emergency Public Services

Humanitarian aid and disaster relief

Public health and emergency response

Search and rescue

## **BLOCK 7: ENERGY AND WEATHER**

Energy

Meteorology and atmospheric research

## **BLOCK 8: VARIOUS SERVICES AND INDUSTRIES**

Insurance

Delivery and logistics

Public administration

Telecommunications

Transport, infrastructure and traffic management