

# 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 2, Chapter 2.4, Worksheet 2.4.1

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



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## CONTEXT

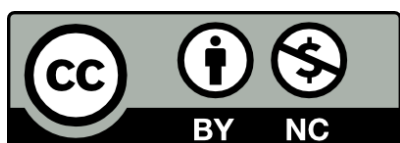
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## WEBSITE:

<https://dronesteam.eu/>

## CONSORTIUM: PARTNER LIST

- University of Crete (UoC) - Greece
- ECAM-EPMI (ECAM) - France
- Cyprus Computer Society (CCS) - Cyprus
- Politeknika Ikastegia Txorierrri 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 2: Lesson Plan 2.4.1

UNIT 2	
<b>Chapter 2.4</b>	<b>Drone flying and remote control programming</b>
Equipment, Software, Consumables (if needed)	PC with access to the internet
Duration	1 teaching hour
<b>Short description</b>	In this worksheet the students will <b>identify and understand the basic parameters and conditions of flying and remote controlling a drone</b>
<b>Learning Outcomes</b>	Identification of issues related to remote drone flying: equipment, weather conditions or communication issues
	Awareness of ethical and privacy issues
	Collaboration, Teamwork, Critical Thinking, Creativity, Communication, Decision Skills
<b>Activities</b>	
Activity 1	Presentation 2.4.1.1: The MEUH Concepts
Aim of the activity	The aim of this activity is to introduce students to the "MEUH concept" as a guide to ease the identification of parameters related to the remote piloting of drones
Duration	5 min
Type of Activity	Presentation
Teaching Objectives	By the end of this exercise, students will understand how each of these categories affects drone operations and learn about the specific factors that fall under each group.
Resources	Worksheet 2.4.1 / Presentation 2.4.1.1
<b>Activity 2</b>	
Activity 2	Exercise 2.4.1.2: Mind Map for the four MEUH categories
Aim of the activity	This activity is designed to deepen the knowledge of the parameters related to remote drone flight. The aim is to identify as many parameters as possible through collaborative work
Duration	20 min
Type of Activity	Collaborative Mind Map
Teaching Objectives	By the end of this exercise, students will learn to identify the key concepts and sub-concepts related to each category and develop a deeper understanding of how they impact drone operations
Resources	Worksheet 2.4.1 / Mind Map 2.4.1.2
<b>Activity 3</b>	
Activity 3	Exercise 2.3.1.3: Questionnaire on the MEUH concepts
Aim of the activity	This activity is focused on students explaining the concepts they already know and learning the unfamiliar ones autonomously
Duration	35 min
Type of Activity	Questionnaire
Teaching Objectives	By the end of this exercise, students will reinforce their understanding of the main parameters and conditions of remote piloting of drones
Resources	Worksheet 2.4.1 / Questionnaire 2.4.1.3
<b>Further Reading</b>	
Resources/Links	<a href="https://www.easa.europa.eu/en/domains/civil-drones">https://www.easa.europa.eu/en/domains/civil-drones</a>

## Activity worksheet 2.4.1 (student version)

### Chapter 2.4: Drone flying and remote-control programming

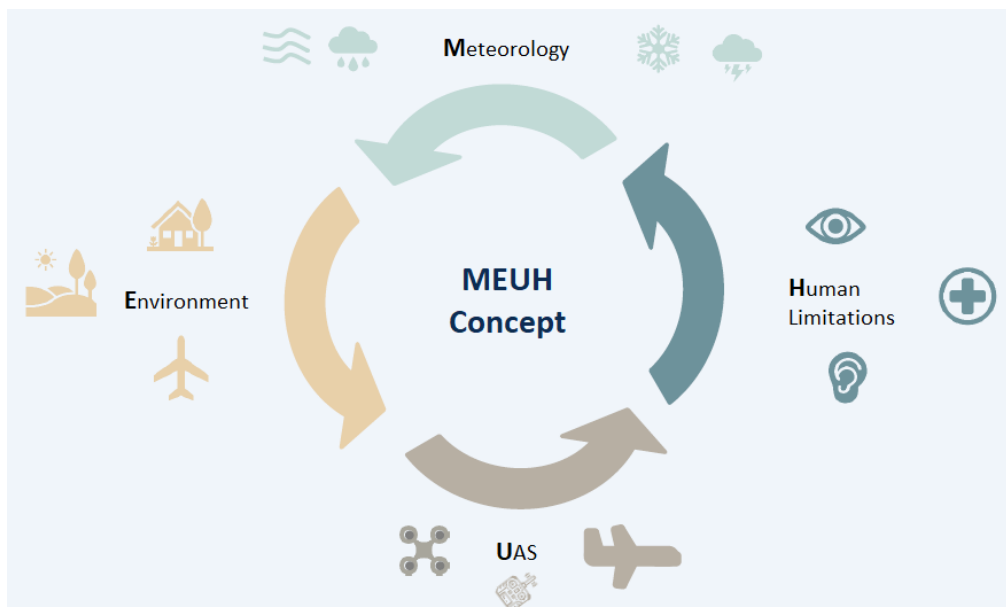
**Level:** Intermediate

In this worksheet we will learn about the main parameters and conditions to consider when flying a drone by remote control:

- The MEUH concept (**M**eteorology, **E**nvironment, **U**AS, **H**uman Limitations) will serve as a basis for classifying the parameters into 4 main categories
- The main parameters of each category will be identified through the development of a collaborative mind map
- A final questionnaire will help to understand the main parameters involved in the remote flying of a drone

#### Presentation 2.4.1.1: The MEUH Concepts

Flying a drone can be a fun and rewarding experience, but it is important to know the parameters involved in the remote operation of drones before flying them because drones are sophisticated and powerful machines that can cause harm to people, property and other aircraft if not operated correctly.



*MEUH Concept Categories*

Drone pilot training emphasises the importance of assessing several parameters before and during the flight of a drone. The MEUH concept establishes four factors to be taken into account by every pilot:

## 1. METEOROLOGY

Meteorology plays a critical role in aviation as weather conditions can significantly impact the safety and efficiency of flight operations. Changes in temperature, humidity, wind speed and cloud cover can affect visibility, air pressure and aerodynamic performance, leading to turbulence, icing, reduced visibility and other hazards. Accurate weather forecasting is essential for flight planning and decision-making, as it helps pilots and air traffic controllers to identify and avoid adverse weather conditions, plan alternative routes and adjust flight parameters accordingly. In addition, aviation weather services provide timely and relevant weather information to support safe and efficient flight operations, making meteorology a vital component of aviation safety and performance.

## 2. ENVIRONMENT

Environmental conditions can have a significant impact on drone flying, affecting the safety, stability and performance of the drone. Factors such as temperature, wind, precipitation, obstacles and environmental factors like electromagnetic interference and air pollution can all disrupt the drone's sensors and communication systems.

The flight must also be checked for compliance with regulations and possible limitations and restrictions imposed in the area of operation.

## 3. UAS

UAS stands for Unmanned Aircraft System, which is also commonly referred to as a drone or UAV (Unmanned Aerial Vehicle). A UAS consists of several key components, including an unmanned aircraft or drone, a ground control station and a communication link between the two.

Before any flight, the remote pilot must check that the UAS is in proper condition and that maintenance has been carried out.

## 4. HUMAN LIMITATIONS

The role of the pilot in drone flight is critical, as they are responsible for the safe and efficient operation of the drone. Pilots must have a thorough understanding of drone technology, regulations and safety procedures and must be able to assess environmental conditions and adjust flight parameters accordingly. It is therefore also important to assess the factors that may affect his/her capacities.

### Exercise 2.4.1.2: Mind Map for the four MEUH categories

In this activity, we will create a collaborative mind map to expand in more detail on the four MEUH categories related to remote drone flying. The starting point is four categories: meteorology, environment, UAS and Human Limitations.

Research as a group to identify as many concepts as possible from each category. You can use applications such as Bubbl.us, mindmomo, Lucidchart or Canva to design your maps.

### Exercise 2.4.1.3: Questionnaire on the MEUH concepts

It may be that unfamiliar concepts have arisen during the elaboration of the mind map. To clarify these doubts and reinforce learning about the parameters related to the remote piloting of drones, in this activity we are going to answer a questionnaire as a final review.

1. **What are VLOS and BVLOS in the context of drone operation? Why do you think it is obligatory in many countries?**
2. **Which are the main fly modes of a drone?**
3. **How can weather factors like moisture, air density, wind, temperature, visibility, rain or snow affect the flight of the drone?**
4. **Which environmental elements should be checked before flying a drone?**
5. **What tool can be useful to check the condition of the drone before flying it?**
6. **Which items are related to data transmission in remote piloting?**
7. **What is the I'M SAFE methodology?**
8. **What is human perception?**
9. **Do you think a pilot on the ground can correctly perceive the drone he is flying? Why?**
10. **Give examples of factors that may affect the visual range of the unmanned aircraft (VLOS mode)**