

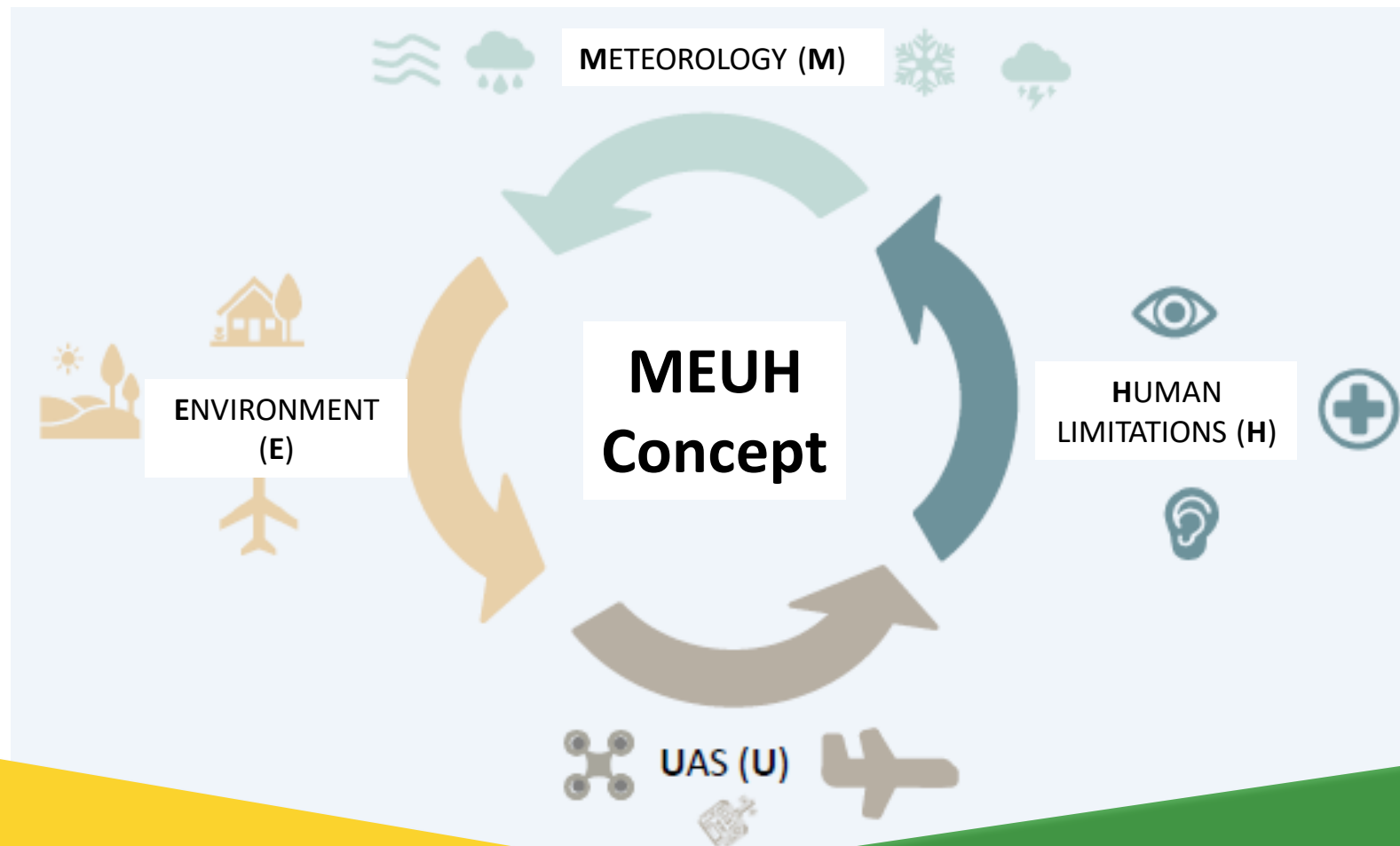


# OPERATIONAL PROCEDURES

DRONE PILOT COURSE

# PRE-FLIGHT OPERATIONAL PROCEDURES

Before starting a flight with UAS, a series of elements must be checked that may affect the safety of the operation. To carry out this check, the operator or the remote pilot must verify, using the "MEUH concept", the following components:



# PRE-FLIGHT OPERATIONAL PROCEDURES

## METEOROLOGY

The remote pilot must verify that the environmental and meteorological conditions before starting the operation, and during the duration of the flight, are adequate and compatible with the limits of the UAS (defined in the instructions provided by the manufacturer). For a correct planning of the date of the operation, the remote pilot must previously consult the meteorological information. The following factors can affect aircraft performance, causing undesirable effects and putting flight safety at risk:

- Wind: Wind can affect the range and maneuverability of the aircraft.
- Temperature: Temperature can affect battery life and performance.
- Visibility: Light level or fog affects the remote pilot's ability to keep the aircraft in VLOS mode.
- Rain or snow: Consult the instructions provided by the UAS manufacturer to find out if it can be operated safely in these conditions.

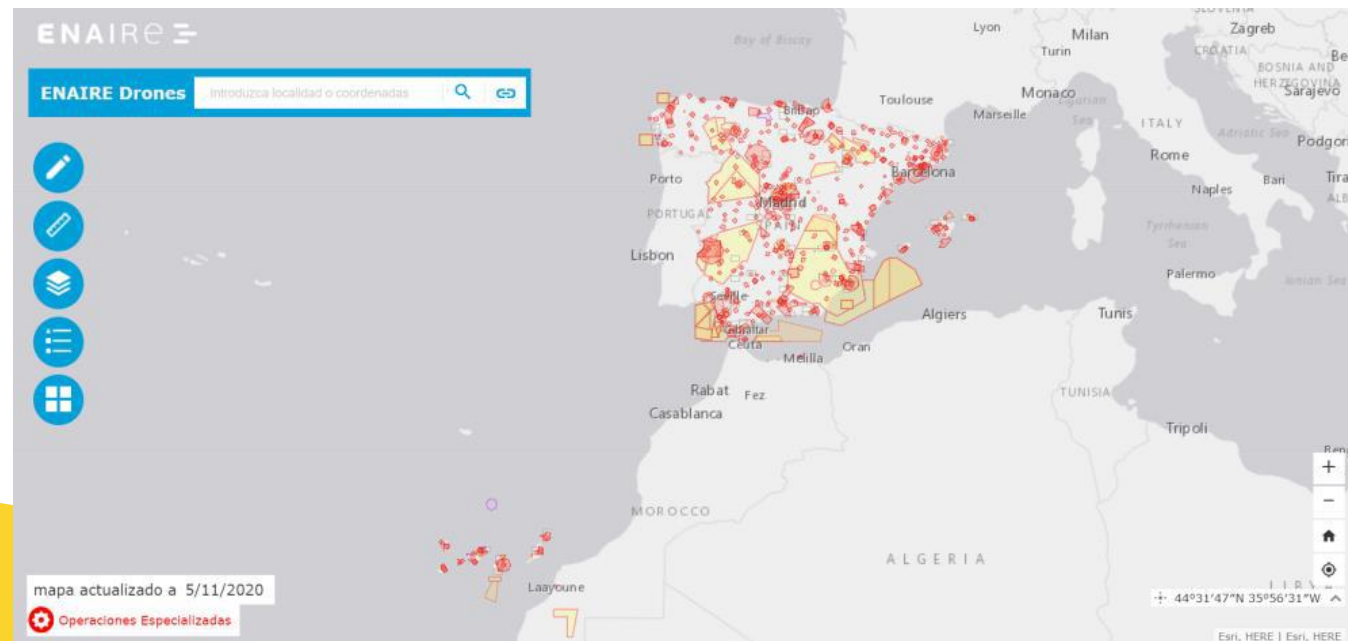
If during the operation the pilot observes a change in the meteorological conditions that could affect the safety and performance of the aircraft, he will cancel the flight.

# PRE-FLIGHT OPERATIONAL PROCEDURES

## OPERATION ENVIRONMENT

The remote pilot must evaluate the environment where he is going to carry out the flights before starting the operation. For this, it is essential to verify that the operation complies with the regulations and complies with the possible limitations and restrictions imposed in the area of operation. AESA has prepared the Guide on UAS flight requirements and limitations based on the place of operation (zoning) available on its website <https://www.seguridadaerea.gob.es/es/ambitos/drones/operaciones-uas-drones/vuelos-con-uas-drones-zonificacion>

This verification will be carried out by consulting the web application <https://drones.enaire.es/>



# PRE-FLIGHT OPERATIONAL PROCEDURES

## OPERATION ENVIRONMENT

Once the possible restrictions and limitations in the planned area of operation have been verified, the remote pilot, already on the ground, must carry out an exploration, either visually or by walking through the area of operation. The purpose of this exploration is:

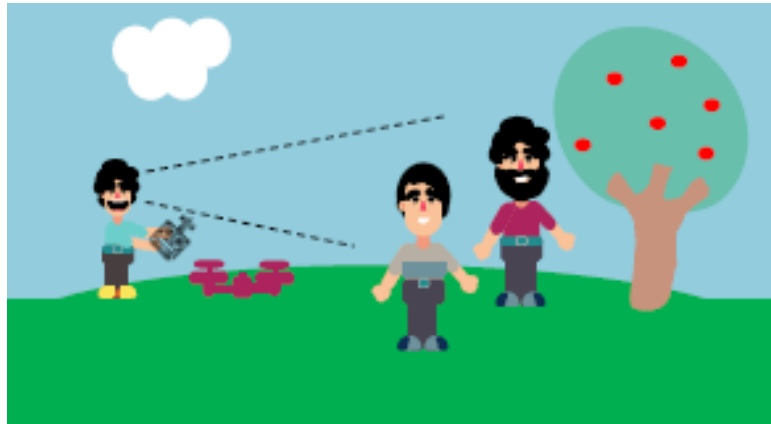
- Detect and take into account possible obstacles (buildings, vehicles, public roads, mountains, trees, antennas, power lines, antennas, etc.) that may prevent the aircraft from keeping the aircraft in VLOS mode at any time during the flight and therefore affect the safety of the operation or interfere with the planned route.



# PRE-FLIGHT OPERATIONAL PROCEDURES

## OPERATION ENVIRONMENT

- Detect the presence of people not participating in the operation or concentrations of people. If people not participating in the operation are detected, they must be given instructions to move away from the controlled land area.



- Detect possible electromagnetic interference produced by radio waves, television, mobile phones, wireless connections (Wi-Fi, bluetooth, etc.) that can cause signal degradation or loss. This effect will be even greater in urban environments, so the remote pilot must check, before the flight, that the status of the signal is adequate.



# PRE-FLIGHT OPERATIONAL PROCEDURES

## UAS

Before any flight, the remote pilot must check that the unmanned aircraft is in proper condition and that maintenance has been performed necessary.

To do this, he must carry out an external inspection of the equipment following a sequence of action according to the manufacturer's instructions. The use of checklists is recommended to ensure that all the necessary points have been verified.

It must be taken into account that certain elements are more susceptible to wear or deterioration, so they need to be given more attention in the pre-flight inspection.

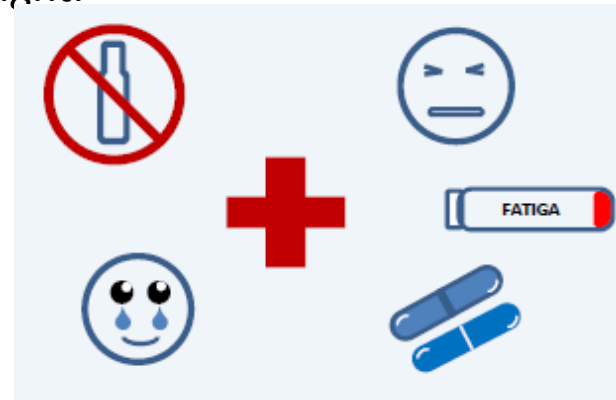


# PRE-FLIGHT OPERATIONAL PROCEDURES

## HUMAN LIMITATIONS

Before starting an operation, the remote pilot must verify that he is in optimal conditions to carry out the operation. To do this, the remote pilot must use the I'M SAFE methodology, as seen in the "Limitations of human factors" section of this training course.

In addition, as we have seen previously, the pilot must take into account the limitations of human perception in order to carry out a safe flight.



## I'M SAFE CHECKLIST

**I**llness—Do I have any symptoms?

**M**edication—Have I been taking prescription or over-the-counter drugs?

**S**tress—Am I under psychological pressure from the job? Worried about financial matters, health problems, or family discord?

**A**lcohol—Have I been drinking within 8 hours? Within 24 hours?

**F**atigue—Am I tired and not adequately rested?

**E**motion—Am I angry, depressed, or anxious?





# OPERATIONAL PROCEDURES DURING FLIGHT

## NORMAL FLIGHT PROCEDURE

Normal operation is considered to be that operation of a routine nature in which no circumstance is expected to occur that puts the safety of the flight at risk (pilot, UAS, environment or people).

The remote pilot will be focused on piloting his aircraft, guaranteeing a safe flight at all times, avoiding all kinds of distractions that may affect the safety of the operation. During the flight, the pilot will be aware of the following parameters:

Coordination and communication between the operation personnel (remote pilot, UAS observer, airspace observer, camera operator, etc.) and between the operator and third parties (air traffic service, other aircraft, controlled land area guards, etc.)"



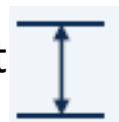
Evolution of weather conditions



Fuel management (battery charge consumed and remaining)



Maximum and minimum flight altitudes



Telemetry data and notices or alerts



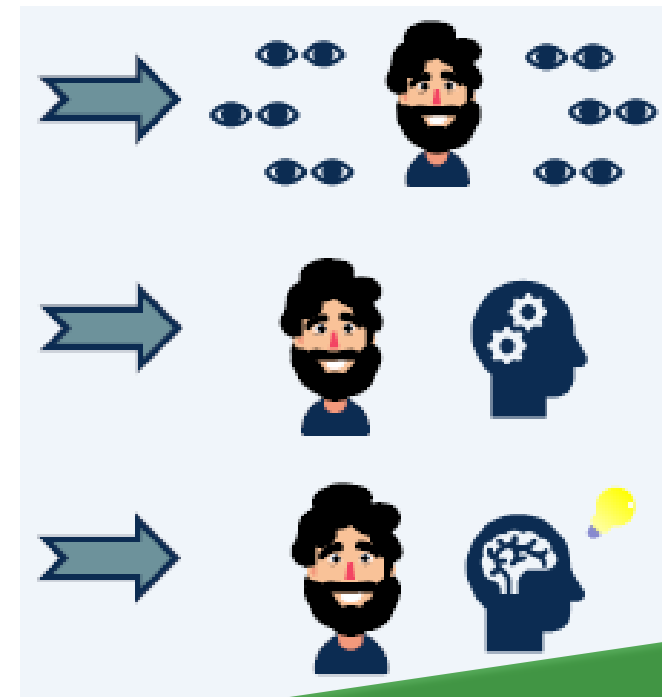
# OPERATIONAL PROCEDURES DURING FLIGHT

## NORMAL FLIGHT PROCEDURE

In addition, during the flight, the pilot must have situational awareness, so that he is able to perceive and understand what is happening in his environment, and this guides him in making decisions; THE PILOT SHOULD BE ALERT.

The three main components of situational awareness are:

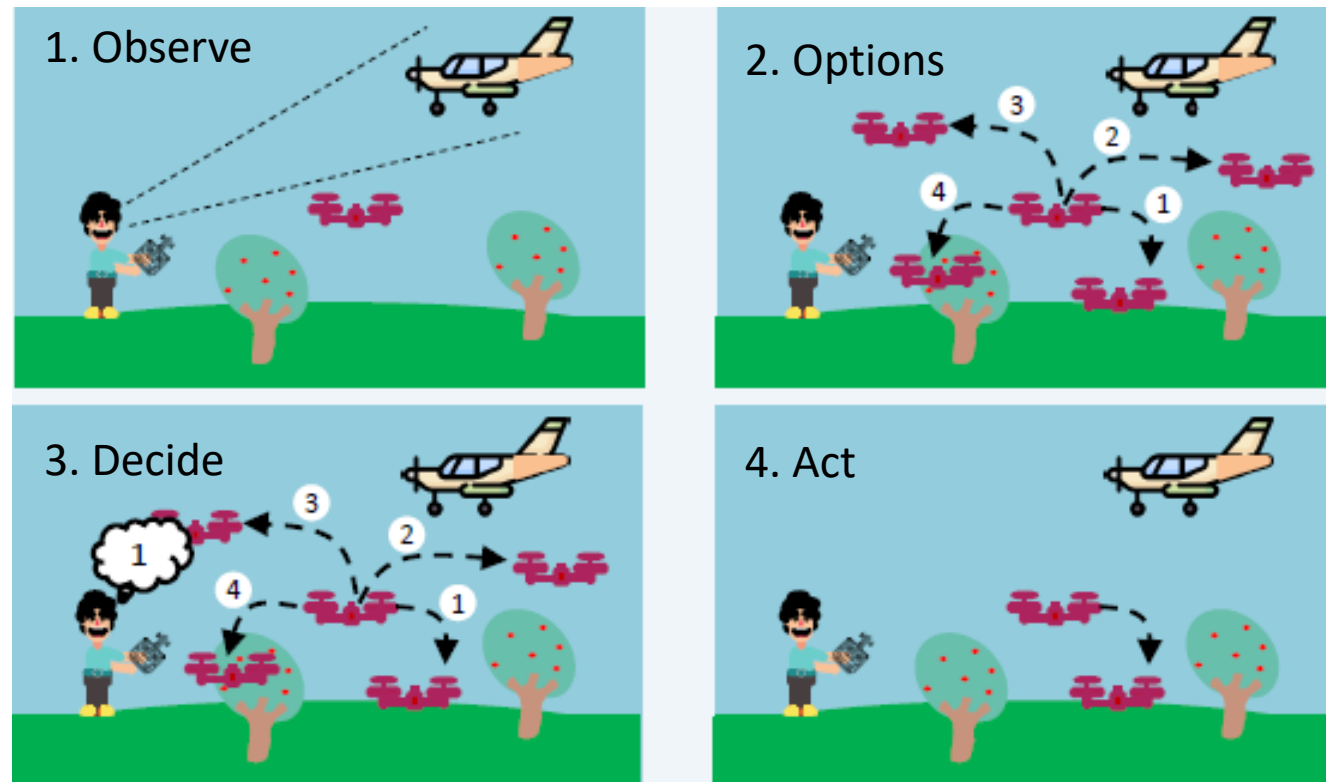
- Perception: The remote pilot is able to perceive and recognize all the elements around him.
- Comprehension: The remote pilot is able to understand and interpret the elements he perceives.
- Projection: The remote pilot is able to mentally anticipate and prevent possible events based on previous understanding.



# OPERATIONAL PROCEDURES DURING FLIGHT

## NORMAL FLIGHT PROCEDURE

The components of situational awareness (perception, understanding and projection) are put into practice through the **OODA** technique, which consists of the remote pilot being able to **O**bserve - See **O**ptions - **D**ecide - **A**ct



# OPERATIONAL PROCEDURES DURING FLIGHT



## CONTINGENCY OR EMERGENCY PROCEDURE

Contingency or emergency procedures are those that the remote pilot must carry out when he perceives a potential risk, understands the circumstances that may arise from it and carries out the appropriate actions to avoid it.

The remote pilot must evaluate the flight situation and if situations arise that could compromise safety, he will proceed to activate the contingency and/or emergency procedures. Among the main circumstances that can degrade flight safety are:

1. Encounter with manned aircraft.
2. Presence of non-participants.
3. Loss or degradation of communications with operator personnel and third parties.
4. Loss or degradation of command and control link.
5. Loss or degradation of command and control link.
6. Loss or degradation of the GNSS signal.
7. Loss of data, sensors or telemetry.
8. Damage of batteries (exhausted, fire, etc.).
9. Autopilot failure.
10. Engine or propeller failure.

# OPERATIONAL PROCEDURES DURING FLIGHT



## CONTINGENCY OR EMERGENCY PROCEDURE

The measures that the remote pilot must take for each anomalous flight situation will be different depending on the type of aircraft with which he operates and, therefore, he must verify the action procedure according to the instructions of the UAS manufacturer given in your instructions. In general, these are the procedures to follow for the failures indicated above:

- In the event **of loss or degradation of the command and control link**, the pilot must try to recover it using the following methods:
  1. Approach the aircraft with the control unit.
  2. Activate the return-to-home (“RTH”) function, if the UAS has it.
  3. Turn off and on the application that controls the aircraft and the remote control, to automatically activate the return to home (RTH) function.

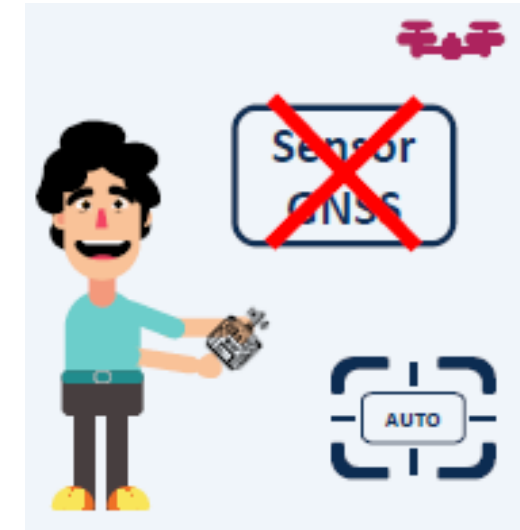


# OPERATIONAL PROCEDURES DURING FLIGHT



## CONTINGENCY OR EMERGENCY PROCEDURE

- In case of **loss or degradation of the GNSS signal**, the remote pilot must activate the manual mode and land the aircraft. On land, the operation of the system must be verified and it must be repaired if necessary.
- In the event of loss or degradation of a sensor, the pilot must activate manual mode and return the unmanned aircraft to the takeoff point. On land, the operation of the system must be verified and it must be repaired if necessary.
- Before the flight, it is necessary to define an alternative area for an emergency landing near the area of operation, and in case of damage to the batteries, propellers, engine or in case the maneuverability of the equipment is seriously compromised, an emergency landing will be made. emergency at that location, or if not possible at the nearest and most suitable location.

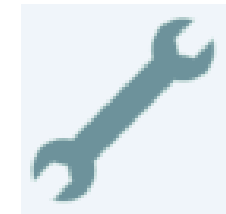


# OPERATIONAL PROCEDURES DURING FLIGHT

## POST-FLIGHT OPERATIONAL PROCEDURES

The procedures that must be carried out once the flight with the UAS has been completed include the records of the operation and maintenance of the UAS.

- OPERATION RECORDS: Once the operation has been completed, the pilot must enter all the relevant flight information in the aircraft's flight log, especially the flight hours of the flight. In this way, there is control over the overall status of the aircraft and the total flight hours, in order to carry out the necessary maintenance.
- UAS MAINTENANCE: Once the operation has been completed, the pilot must:
  - Carry out an external inspection of the equipment to detect possible damage or deterioration produced during the flight. The use of checklists is recommended.
  - If an error has occurred in any of the UAS systems during the flight, you must carry out the appropriate maintenance and record the incident in the log.



In addition, the operator, taking into account the flight records, must periodically carry out the necessary maintenance as indicated in the instructions provided by the UAS manufacturer.



# Thanks for your attention

DRONE PILOT COURSE