ETLV STI 2D

Préparation à l'épreuve orale
Terminale STI 2D

Présentation de l'activité :

Les élèves vont avoir pour tâche de présenter un système relativement connu : le drone.

Ce drone pourrait avoir différentes fonctions : livraison de colis, reconnaissance d'un lieu ou d'un sinistre, pistage d'individu…

Cette activité se base sur le principe de la classe inversée. Chaque groupe d'élèves vient présenter sa partie et le reste de la classe écoute et prend notes.

Déroulement :

- Présenter l'activité et la présentation Powerpoint qui est la tâche finale demandée.
- Répartir la classe en plusieurs groupes, un groupe par partie par exemple.
- Attribuer à chaque groupe une partie à présenter. La difficulté de présentation des parties n'est pas égale. On peut penser créer des groupes en fonction du niveau des élèves. Cela valorisera ceux qui ont des difficultés à l'oral.
- Distribuer à l'ensemble des élèves le document « Travail de préparation ».
- Distribuer à chaque groupe la partie du « Document ressource » correspondant à la partie qu'ils ont à travailler.

Les élèves travaillent en groupe pour compléter la partie qui leur a été attribuée sur le document « Travail de préparation » en essayant de reformuler le « Document ressource » afin que le message soit clair et facilement compréhensible par le reste de la classe.

Les élèves peuvent avoir accès à la diapositive de la présentation Powerpoint concernant leur partie pour la modifier et rajouter quelques éléments, sans toutefois la surcharger avec du texte.
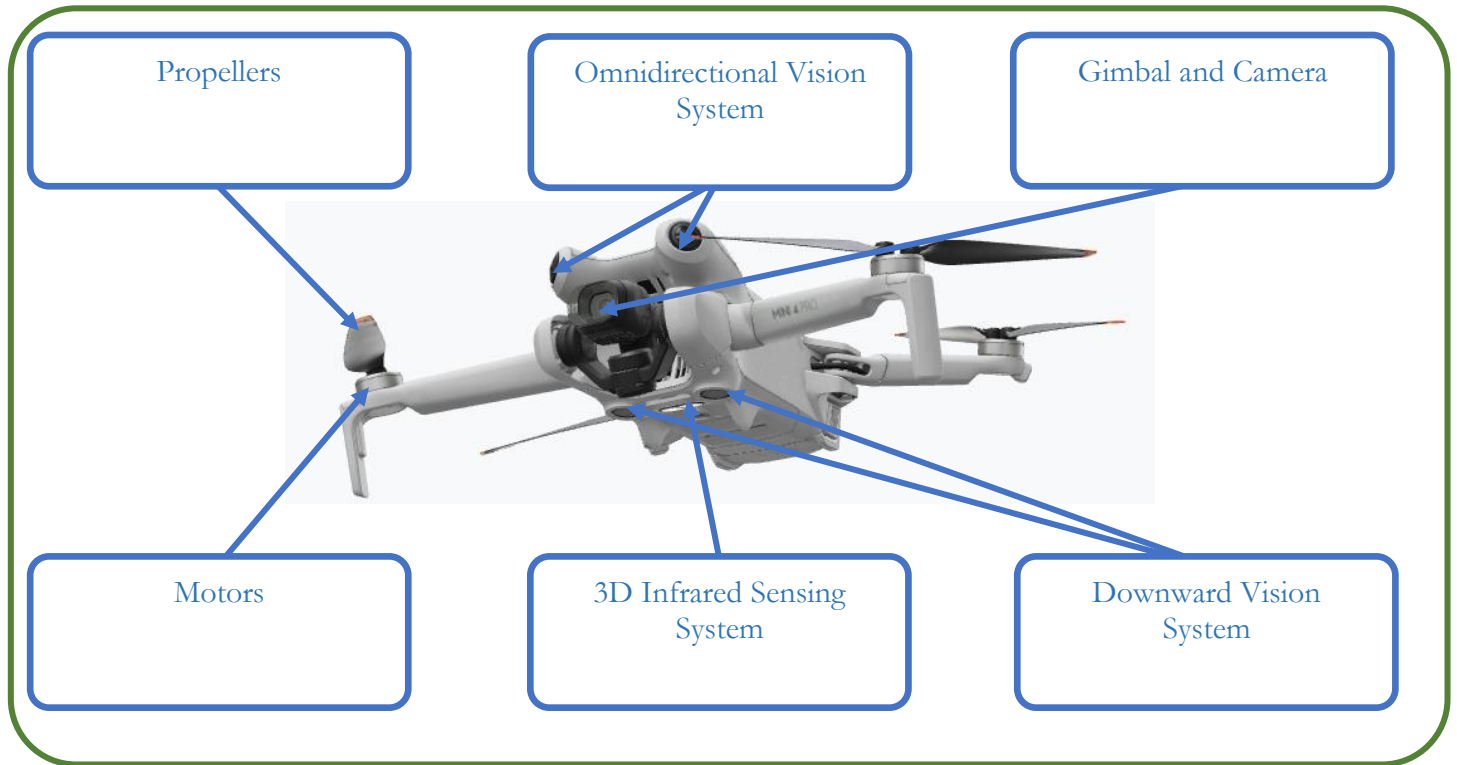
A tour de rôle, chaque groupe ou un représentant du groupe vient exposer leur travail au tableau.

Les autres groupes complètent les parties de la fiche « Travail de préparation » sur lesquelles ils n'ont pas travaillé.

Eventuellement une correction collective peut être envisagée avec l'aide du professeur d'anglais.

1. Parts

Label these parts of the aircraft.

Propellers	Omnidirectional Vision System	Gimbal and Camera

Motors	3D Infrared Sensing System	Downward Vision System

Describe the product focusing on these parts.

You can use

It consists of   It includes   It contains   It features

You can also use

To + BV to indicate the purpose of the components.

The drone consists of 4 motors and propellers.

It includes a camera to record the flight and take some pictures.

It features a Vision System and Infrared Sensing System to detect and avoid obstacles.

2. Specifications

Describe the specifications of the drone. Write full sentences.
You can use

long   wide   high

You could convert meters per second into kilometers per hour.
You can also use the comparative form

as long as, as big as…

The drone weighs just less than 249g.

It is 29.8 cm long and 37.3 cm wide. / Its footprint is 29.8 cm by 37.3 cm.

It is only 10 cm high.

It can travel at 16 m/s. That is around 57 km/m.

It can fly as high as 4 km. / The maximum altitude (that) it can reach is 4 km.

It can fly as far as 18 km from the remote control (the user).

The maximum distance (that) it can fly from the user is 18 km.

With a full battery, it can fly as long as 34 minutes.

3. Remote control

Describe the remote control.
What can you find on it?
You can use:

There is / there are

On the remote control, we can find 2 sticks to control the drone and a touchscreen.

There is also the RTH button.

There are 2 dials and 2 buttons to control the gimbal and take pictures.

4. Controlling the aircraft manually

What do the left stick and the right stick control?
Explain how the user controls the drone.

You can use a "if" clause to describe one stick and a causative structure to describe the other one.
Examples:

<div align="center">
If you push this button, it will open the door.
Pressing this button makes the door open.
</div>

Write a sentence using a double comparative form to sum up the 4 sentences regarding the speed of the aircraft according to the position of the sticks.

The right stick controls the pitch and the roll.

If you push this stick up or down, the drone will fly forward or backward.

If the user pushes this stick left or right, the drone will fly left or right.

The left stick controls the throttle and the yaw.

Moving this stick up or down makes the drone go up or down.

Moving this stick left or right will make the drone rotate on itself.

The more one stick is pushed away from the center, the faster the aircraft moves.

5. Controlling the aircraft automatically

How can a user trigger the automatic control?

The user drags and selects the subject (vehicles, boats or people) on the touchscreen.

They tap the subject once again to start the tracking.

What is the difference between the Point of Interest and Active Track Modes?

In POI mode, the aircraft tracks the subject in a circle

The subject can be moving or stationary.

In Active Track mode, the aircraft follows a moving subject.

The user can choose between keeping the same distance from the subject or the same direction (heading)

6. RTH

What does RTH stand for?

RTH stands for Return To Home.

What does it mean?

It means the aircraft is brought back to the last recording Home Point.

What is the condition for the aircraft to record a Home Point?

The aircraft needs a strong GPS signal.

When the aircraft receives a strong GPS signal, the location will be recorded.

When can the user update a Home Point?

The user can update a Home Point before takeoff or during a flight

(if their position has changed, for instance)

If the user changes location, the Home Point can be updated on the application.

How can the user trigger the RTH function manually?

The user can trigger the RTH function by pressing the button on the remote control.

When is the RTH function triggered automatically?

The RTH function is triggered automatically

when the aircraft has low battery, (just enough battery to go back to the Home Point)

or when the control signal between the remote controller and the aircraft is lost for more than six seconds.

7. Obstacle avoidance system

Describe an omni directional system. What is the principle of the vision system?

An omni directional system consists of 2 cameras. It detects obstacles by image ranging.

How many vision systems does the aircraft have? Where are they located?

It has four cameras that are located at the front and at the top of the aircraft.

It also has a downward vision system consisting of two cameras located at the bottom of the aircraft.

What else helps the aircraft to assess the distance to the ground?

The 3D infrared sensing system consists of a 3D emitter and a receiver.

It helps to assess the distance to the ground.
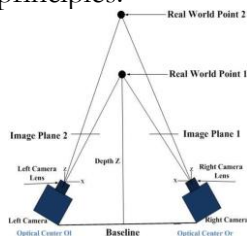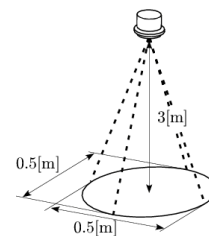
Label the detection principles.

image ranging

3D infrared sensing system

Give an average measurement range and an average Field of View for the Vision System and the 3D Infrared sensing system.

Those Vision systems can detect obstacles approximately between 0.5 m and 12 m and

have an average Field of View of 90° for the horizontal axis and 72° for the vertical axis.

The infrared system can detect obstacles from 18 meters at an angle of 60°

for both the horizontal axis and the vertical axis.

8. Comparison with other models

The mini 4 Pro is the new version of the series.

It is as heavy as the previous one, which is convenient because you don't need a license to fly it.

It can go further (20 km instead of 12 km) and it has more features.

In fact, it is as good as the Air 3 version but it is about £300 cheaper.

9. Further questions

If you had the money, would you like to buy this drone?
What could the use of this drone be in your work?
Can you think of some improvements that could be made to this aircraft?

I would definitely like to buy this drone. I would use it to take beautiful pictures of the scenery.

I would not buy it because I would be afraid of breaking it.

This drone could be used in case of natural disaster or any kind of hazard, to identify the risks and rescue people.

We could think of adding some sort of clamp that would be controlled remotely to carry small packages to secluded places.