

# First Flight Test Project

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# Chapter 1 Objects

Through this flight test, the following performance should be examined.

## 1.1 Communication:

The communication test mainly consist of 2 aspects:

- Communication between the Icrest 2.0 and DJI M300 (along with Zen-Muse Camera.)

Processing the image and detecting the forest fire and smoke require high computational resources, which may cause the deficiency of the command and states communication between the Icrest 2.0 and DJI M300.

- Communication between the Icrest 2.0 and the ground monitoring computer.

There is no screen of the Icrest 2.0, thus a real-time states monitoring from the ground is critical to the security and convenience.

As long as the Icrest 2.0 and Ground monitoring computer are in the same Local Area Network(LAN), the states and even the videos processed by the detecting algorithm could be easily accessed by using ‘WiFi’ and ‘ssh’ tool.

But in the future, we should seek for more long-distance connecting method, like radio modem.

## 1.2 Navigation

- Joystick Commands:

In this test, the Navigation method is based on the dji osdk ros command ‘Joystick commands’. The drone will simply fly along the zigzag flight path as shown in the following figure.

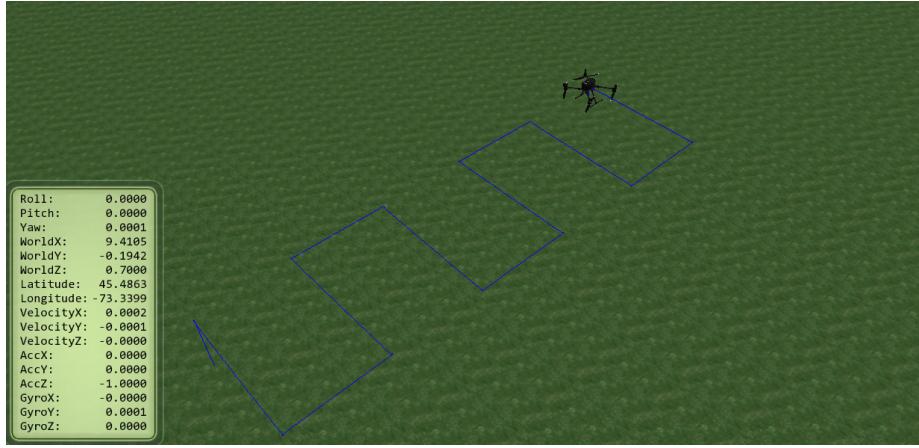


Figure 1.1: the zigzag flight path

### 1.3 Fire and smoke detection:

- A Unet based forest fire and smoke segmentation algorithm will be tested on line with the ZenMuse camera. More specifically, the detecting speed and segmentation accuracy are tested. The indoor real time test is shown in the following figure:
- In this task, both original and masked video are stored as the database to be used in the future.

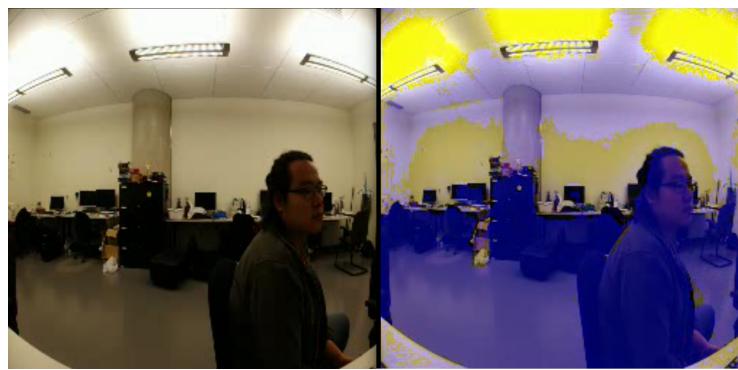


Figure 1.2: indoor test for fire and smoke detection

Please note that we did not use the Infrared Image because the deep learning model is not ready to specify the thermal information.

# **Chapter 2 Schedule and Preparation**

## **2.1 Date**

11, October 2021, which is Monday.

## **2.2 Test Outline**

- waypoint flight and detection
- data base image and video collection including the thermal and RGB imge from the ZenMuse camera.

## **2.3 Preparation**

- The portable power bank for the outdoor WiFi
- Oven and some woods to produce the fire and smoke.