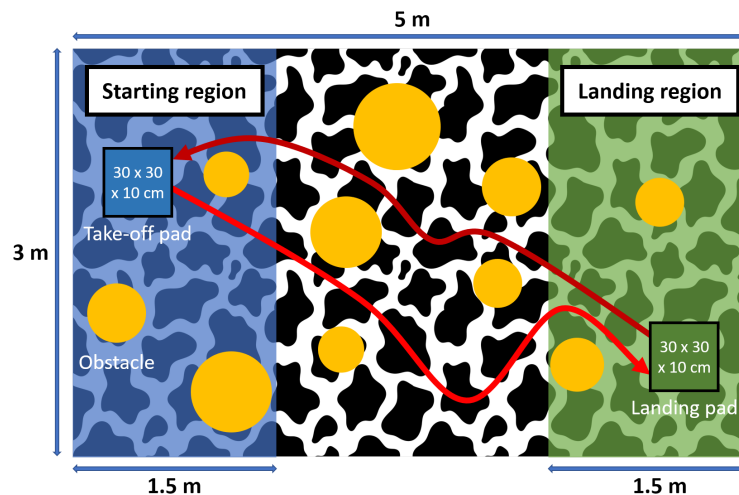


CrazyPracticals

In this practical, you will learn how to program a Crazyflie to find and precisely land on a platform with the help of minimal sensory information. Additionally, you will use sensor readings to design a robust algorithm that can avoid obstacles present in the environment. You will do so in a team of maximum three members and show its performance in a live demonstration towards the end of the course.



The arena for the final demonstration is shown in the figure above. The **task** you are required to complete in this arena is composed of multiple phases:

- The drone takes off from a take-off pad placed within the starting region.
- Thanks to the optic-flow sensor and a z-range finder the drone can track its movements and find the landing pad in the landing zone.
- Once the landing pad is found, the drone has to precisely land on it.
- Upon successful landing, the drone takes off, flies back and lands on the take-off pad.
- In the workspace, there can be a few obstacles of previously unknown dimensions which it can detect with the multiranger deck. Your developed algorithm should allow the drone to avoid any collisions.

The **learning objectives** for this practical are:

- assembling a plug-and-play drone
- interfacing with the python lib to control the drone
- mastering different flight phases
- designing a robust algorithm to conduct a flight mission in the presence of obstacles
- reporting performance results in a scientific manner

The **final demonstration** will take place in the MED building according to the schedule in the table below. For this demonstration, we expect from you:

- Short presentation (4 slides max)
- Video recording of one of your trials
- 3 trials with obstacles (best grade counts)

The *presentation* (max 4 slides, max 7 min) should contain:

- 1 slide on the experimental setup (environment layout)
- 1 slide on the strategy (algorithm, what you spend most time on)
- 1 slide on the results (statistics on mission time/success/...)
- 1 optional slide (with anything relevant to add)

The *video* you submit should show a trial run demonstrating your algorithm's performance at home. The video should:

- max 2 min long
- contain no edits except speed ups (indicate speed up factor) and text additions
- show at least one of the team members
- show a clock/stop watch that indicates seconds at the beginning and at the end
- be in mp4 format

Complementary information

- **Submit by Sunday 30th May, 23:59** (your code with comments, the video as MP4, presentation as PPTX) in a zip file named `GROUPNUMBER_LASTNAME1_LASTNAME2_LASTNAME3.zip` on moodle.
- We will show the PPTX from our computer during the demonstration.
- Return the material directly after the demonstration.
- Check that the returned material is complete.
- Make sure you set up and make space quickly.

The **grading** will be according to the level of task you are able to solve:

- Level 0: presentation and video of working algorithm, <=4
- Level 1: takeoff, move according to a search pattern, 4-4.5
- Level 2: avoid obstacles in the way, 4.5-5
- Level 3: locate and land on the landing pad, 5-5.5
- Level 4: go back, land on take-off pad, 5.5-6

In case of a clear gap between flight performance at the exam vs at home, we will account for the performance in the video you sent.

Schedule for demonstration on 1st of June

		MED11518	MED-11422
Start time	End time	Group	Group
11:15	11:30	1	2
11:35	11:50	3	4
11:55	12:10	7	8
12:15	12:30	9	10
12:35	12:50	11	12
16:15	16:30	13	14
16:35	16:50	15	16
16:55	17:10	17	18
17:15	17:30	19	20
17:35	17:50	21	22