



FIRE AUS Safety Manual: Aerial Robotics

The First-Year Innovation and Research Experience and
Perception and Robotics Group
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1 Protocol Zero: Ground Rules

In this document, we will lay down the elementary precautions, procedures and rules you **MUST** abide while working at **FIRE AUS Lab (AVW 3126)** for your own safety, safety of others around you and the robots itself.

1. Work **ONLY** on the projects allocated to you. **DO NOT** touch any equipment that does not belong to your project. If you need it, kindly ask the individual who owns/using it. If you have any doubts regarding any equipment, please contact the author(s) of this safety manual.
2. **ALWAYS** wear full toed shoes while working in the lab.
3. **DO NOT** wear loose clothing which can get stuck in moving parts and equipment.
4. Tie/Cover any loose hair so that they do not get stuck in moving parts and equipment.
5. **The quadrotors are very expensive and delicate. Handle them with care.**
6. **NEVER** attempt to fly the quadrotor outside the netted area.
7. **NEVER** attempt to fly the quadrotor while anyone is inside the netted area. Make sure there is nothing inside the area except the quadrotor(s).
8. Our primary aim is to make quadrotors fly autonomously in an unknown environment. You can manually fly the quadrotor using the phone application **ONLY** inside the nets.
9. **NEVER** fly the quadrotor alone. Make sure a lab-mate is ready to hit the Kill-Switch in case anything goes wrong.
10. **DO NOT** take the quadrotors or any other lab equipment outside the lab, this will be treated as theft unless given prior permission.

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11. Before every flight, make sure the forward direction of quadrotor is facing away from you and your lab-mates.
12. **NEVER** fully drain the battery. The DJI Tello should auto-land when the battery is low, but try to estimate how long the Tello flies and do not attempt a flight at low battery.
13. Charging the battery: **ONLY** charge the battery using the provided charger. **DO NOT** try to be creative with the charging methods.
14. **NEVER** keep the batteries connected to the quadrotor for long durations if not in use. The quadrotors do heat up when powered on and drain a significant amount of battery.
15. If the battery is not be used for a long duration, charge it before using.
16. Safety Goggles **MUST** be worn at all times if you are entering the netted area if you don't already wear correction glasses.
17. Before every flight, check that the propellers are *finger-tightened* properly so that they don't come off during the flight. Losing propellers from the quadrotor during the flight can result in **FATAL accidents**.
18. If the quadrotor starts beeping, **land it immediately**. Most likely, the battery is almost exhausted or it has gone to failsafe mode.
19. In case of a crash, first disconnect the quadrotor from your computer (connection to the phone application is fine) and then remove the battery before inspecting anything.
20. Always be ready to kill your code if the quadrotor is not behaving as expected. This should disarm the quadrotor. If killing the code does not disarm the quadrotor, wait till the quadrotor has landed or propellers stop spinning before entering the netter area.
21. Should **PROPS ON** before running your code so others in the lab can hear it and get far from the nets.

2 After a Crash

Follow the underlying instructions in the order mentioned below:

1. **Kill your code immediately**.
2. Make sure the propellers aren't spinning.
3. Make sure the 'throttle stick' (usually the left-joystick) is set to minimum.

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4. Hold the quadrotor from below (away from the propellers) and disconnect the battery from the quadrotor.
5. Inspect for damages
6. Once the quadrotor is inspected, try to ARM (with the phone/PC application) it once and check for any abnormalities. Remember the quadrotor has to be inside the net all the times and with no other person inside the nets.
7. Make sure the propellers are finger-tightened properly before you fly again.

Aerial robots use extremely flammable Li-Po batteries. In case of fire, use the fire extinguisher placed outside the netted area. DO NOT use water or any liquid to extinguish the fire. In case of any injuries, please use the medical kit placed next to the entrance door or call 911.

I have read the aforementioned instructions and I will abide the set guidelines and I have obtained training necessary to operate the quadrotors used in class.

Name

Signature

Date



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