



**DRONES**

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# **POCKET GUIDE**

*Where to start and how to continue*





## Insurance

Accidents involving aircrafts can be costly. An insurance covers damage to third party property or persons. Legislation in some countries demands a mandatory insurance when operating drones commercially. It's important to sort this out prior to your flight.



## Permission from authorities

In many countries, flying a drone for a scientific or commercial business, might need a permission from civil aviation authorities. Make sure that you follow the procedures to obtain a valid license or permission.

The authorities sometimes require to maintain a log for all performed flights.

## Battery safety



A vast majority of all energy sources for drones are lithium-ion polymer batteries. These are high energy packages and need to be handled and transported in a safe way. IATA will give you guidelines when bringing your batteries on an airline.



## Never fly nearby an airport

Manned airports will establish a controlled airspace, which extends from surface to a specified upper limit together with positions in longitude and latitude, forming a protective "box" around the airport. This box is named CTR or control zone in USA airspace class D. The CTR is controlled by the air traffic control, ATC, which will coordinate all aircrafts in that airspace. You need to coordinate with and get permission from the ATC to fly in a CTR.

Unmanned airports usually don't have any ATC and you need to coordinate directly with any manned aircrafts and pilots that are going to use that airport.

Get yourself an aeronautical chart. There are online charts or apps that will show no-fly zones but you can also buy a traditional paper printed aeronautical chart.



## Keep a safety distance

Rotating propellers, even on a small aircraft, may cut off your fingers.



## Fly in a wide and open area away from people, animals or property

A falling or flying aircraft can cause a lot of damage in an event of an impact.



## Fly within safe altitudes

The height limit in the airspace nearby your field station may differ, but usually no flight above 120m/400ft should be performed as this will interfere with regular manned air traffic. Also consider that many INTERACT field stations do have regular helicopter or aircraft connectivity flying on low altitudes near ground.



## Fly within line of sight, LOS

Make sure that you can see the aircraft with your eyes all the time. Usually, no national regulatory framework on any INTERACT field stations allows flying beyond visual line of sight, BVLOS, without special permission or license.



## Follow local rules and regulations

National parks, restricted areas, animal preservation areas and military areas are often marked in an aeronautical online chart but some information needs to be obtained from additional sources. In some countries and stations, there are exceptions for using drones for scientific research within restricted areas, which will make your life a bit easier. Just don't forget to apply for that permission.





A **rotor helicopter** usually has one single lifting rotor with two or more blades. Helicopters are manually controlled and difficult to fly.




A **fixed-wing aircraft** must have air moving over their wings to generate lift. This means they must stay in forward motion and cannot hover in one spot in the way a helicopter can. Usually the fixed wing will give you a longer flight time for less energy.




A **multirotor** is a vehicle with more than one rotor, generally 4-8 rotors. The multirotor needs an internal flight controller, a computer that makes it easier to fly the drone.

## Batteries

 Batteries will lose much of their capacity when exposed to cold climates. This may result in a sudden drop of power to the motors without prior notice, resulting in a crash. Therefore, it is important to keep batteries warm until the takeoff.

## Navigation

 Your UAV will use a compass to navigate. The compass is particularly important for a multirotor, as it will hover in one position. High latitudes, which is common for many INTERACT stations, will alter the angle between the geographical and the magnetic north pole, which may influence the compass and sensors in your UAV. A fixed wing will maintain a continuous motion, and can therefore navigate using GNSS.

Reception from the GNSS satellites can be less accurate in the polar region than in other places around the globe, but usually it should be sufficient to allow position lock. Make sure that your UAV can lock to the GNSS before takeoff.

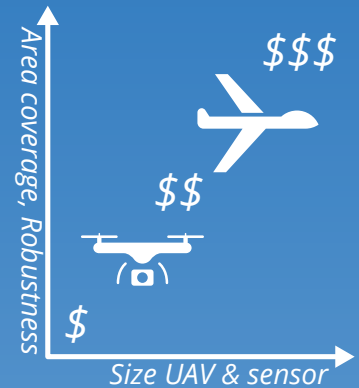
## What to choose

In general, large drones can cost a lot of money and small drones will be cheaper. Large drones will lift heavy equipment while small ones will not. Everything is a tradeoff and it's difficult to give any specific recommendations on what to select. First of all, start by finding an answer to the question "what do you want to do"? This will hopefully tell you what type of sensor or equipment you want the drone to carry.

Many of the commercial drones available on the market will come with a camera and specific features for that. This may not be optimal for the type of work you would like to do. If you need the drone to carry other types of sensors, you might need a custom made drone.

Flying your drone may also require a certain amount of training... and even crashing. In the end you might realize that hiring a drone expert service is preferable to buying your own equipment.

As a very rough rule of thumb, on a multirotor drone, one gram extra weight of payload will reduce the flight time by one second.





## **FACTS AND BUZZWORDS**

**FPV** First Person View. Flying is performed with assistance from a camera. Information is transmitted to the pilot and usually displayed on a video monitor or in FPV goggles.

**CTR** Controlled Traffic Region. A control zone which is a controlled airspace, usually around an airport.

**ATC** Air Traffic Control. The guys in the tower.

**UAV** Unmanned Aircraft/Aerial Vehicle

**UAS** Unmanned Aircraft/Aerial System

**GNSS** Global Navigation Satellite System

**RPAS** Remotely Piloted Aircraft System

**MTOM** Maximum Take-Off Mass

**(V)LOS** (Visual) Line of Sight

**BVLOS** Beyond Visual Line of Sight

## **LINKS AND APPS THAT WILL GUIDE YOU FURTHER**

These links will assist you with aeronautical data and services for drones.

**IATA**



**AirMap  
Android**



**AirMap  
Apple**



**Transport  
Canada**



**FAA UAS**



**EASA**

