DRONE PRIMER by David Hersman, Certified Flight Instructor

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I have heard and read lots of criticism of various drones, including EXO, so I thought I'd share some points and procedures that may be helpful. Keep in mind that I am also relatively new to drone flying, and have only flown two different drones. Many of the general procedures are the same.

I will tweak this article and publish it on my web site as a PDF file. You're welcome to it!

I have successfully taught scores of people to fly full scale airplanes, and I approach the drone learning curse with the same philosophy: safety, caution, carefulness, thoroughness, precision, and taking your time.

FIRST read the instructions, and watch the EXO videos. When I bought my EXO drone, they sent me an email with links to these resources. This included a **40-page PDF file of a pretty comprehensive manual.** Be sure to work your way through that manual, or the one appropriate for your drone.

We live in a world seeking instant gratification. We want a QUICK START MANUAL for everything! It's true that too much detail at once can give you "information overload." The problem is, what if it doesn't fly "straight out of the box" like the one in the video? What if your drone doesn't do what the Quick Start Manual predicts? Mine did not, so some of my guidelines came from that experience. Turned out to be a connection and calibration problem. There was nothing wrong with the drone or the controller.

Go to a spacious open place, not surrounded by structures, trees, etc. This will give you better GPS signals, and less likelihood of a bad input destroying your propeller blades, or worse. Be sure the weather is good, and the wind is light. A heavy overcast may interfere with GPS reception.

Always do a "preflight inspection checklist" to be sure everything is set up right.
1. BE SURE all three batteries are fully charged, or nearly so. (drone, phone, and controller)
2. Be sure the arms are extended all they way.
3. Check the condition of the blades, and the security of the motors.
4. Remove the gimbal cover from the camera.
5. Set the drone on a flat surface with plenty of margin around it, at least 10 feet from cars, metal roofs, guard rails, power lines, etc. If it doesn't connect properly, move farther from such things.
6. In the phone app, experiment with the buttons and settings. There is probably a SETTINGS symbol in the upper right corner of the app screen. This is the path you'd begin for four different calibration procedures. (Compass - Gyro – IMU – Horizontal). I have the "return to home" set to 45 meters, about 150 feet. Try to have the app in the "Normal (N) mode" as opposed to S (sport) or F (film). My controller has a button for this right on the controller, but it can be found in the app as well. Also, find the place to configure the control sticks, and choose MODE 2, which will give you standard control inputs.

ALWAYS have the “GPS Safe Take” tuned ON! That way, if you just take your hands off, it will stop where it is, and wait for you to redirect.

I set the parameter units to “Imperial” so the screen will show me altitude and distance in feet instead of meters. Some things in other places will still be metric.

I usually have the phone on when I TURN ON THE CONTROLLER - BEFORE THE DRONE. It seems to me that this helps the controller recognize the phone more quickly as the controller comes to life.

I have also been turning on the AIRPLANE MODE on the phone, to prevent interruptions or interference from wifi and cell tower signals. Later, though, you’ll need the Internet connection to synch your flight log. I think this works through the EXO cloud.

The manual implies to have the app on, but wait for it to connect to the phone, then ENTER DEVICE, then finally ENTER THE MAIN INTERFACE. Using my Samsung phone, this method connects quickly.

I am an Android guy, and my experience has been that SAMSUNG works great with my drone, (EXO Blackhawk 2 Pro) whereas LG and Motorola phones have more connection problems. Iphone has a good reputation with all drones, I think.

AVOID a start up or shut down sequence where the drone is turned on, but your control devices are not!

Keep in mind that my drone may not be exactly like yours, but I assume you have the proper EXO (or other) app for yours. When it comes up, wait to see if the drone, controller, and phone get connected. There should be a picture on your phone of what the drone is seeing, even though the camera is not recording. WAIT for “Ready to Fly” to appear in the upper left green box. The controller screen probably says GPS at this point. Both the controller and the phone should be showing at least 6 satellites by this time, preferably more. Eleven or more is real good.

I like to manually start the motors with the paddles (joy sticks). This gives you a chance to see how it sounds and assure that everything is running smoothly. Also, helps you to begin acquiring a feel for the controls.

One of the most frustrating issues is when the controller says “Can Not Fly” and the Phone message is either “Not connected” or “USB cable not connected.” I am glad to report that this does not happen for very long if the phone is connected. Since I bought my new Samsung A13 and use it exclusively as my drone platform, I have not had this problem at all. It passes though this startup stage quickly.

So when the controller says GPS and the phone says “Ready to Fly,” start the motors. Then slowly push the left paddle (joy stick) forward. If something doesn’t appear right, pull the stick back and set it back down. Normally, let is come up to about chest high, make sure it will hover

steadily, right there in front of you, several feet away. If it doesn't, you probably need to recalibrate the compass.

During this hover would probably be a good time to turn the camera on, and assure that the record indicators are working, etc.

Experiment with light movements of the controls: LEFT STICK takes it up or down, or causes the drone to rotate around its vertical axis (yaw). RIGHT STICK: takes it forward or back, and moves it to right or left without rotation. KEEP IN MIND, if the drone is aimed toward you, right and left for the drones seems reversed to you. This takes some getting used to, so make slow easy movements.

There is always a relationship between TIME, SPEED, and DISTANCE. From many things I read and watched, I see many people are obsessed with SPEED and RANGE of the drone without wanting to invest much TIME in learning the proper and accurate use of the controls. Consequently there are already many YouTube videos focused on crashes. I am more interested in PREVENTION!

BE SURE to keep the drone within your sight, and no higher than 400 feet. Learn the regulations. In some places you need a special clearance even to fly 100 or 200 feet high. Some places are out of bounds completely! You're flying an AIRCRAFT in the National Airspace System, not playing with a toy.

Remember any drone weighing more than 250 grams is required to registered with the FAA. Go to FAA Drone Zone. An FAA "REMOTE PILOT LICENSE" is required for any operation which could be used to earn money, commercial activity, or the furtherance of a business. You'll see this referred to as Part 107 of the Federal Aviation Regulations.

I recommend obtaining the Part 107 license. You will learn a lot, and it will help enhance the usefulness of your drone. It might even inspire you to get HIGHER EDUCATION, and learn to fly manned aircraft.

ALOFT is a company specializing in Drone Management for commercial fleet operators, but **they have a couple freebies which are very relevant and useful to all of us.** One is an app called **B4UFly**. This can be used to determine the airspace requirements where you are intending to fly. It also includes other valuable "checklists."

ALOFT is also one of the vendors through which you can obtain a Low Altitude Authorization and Notification Capability (LAANC). See this FAA page for a more thorough explanation https://www.faa.gov/uas/getting_started/laanc I use the ALOFT app called **Air Control.** Using this app, you can often obtain instant approval to fly in certain airspace where you would not be legal to fly otherwise. For instance, the Class D airspace around our local airport (LWB) is in place because they have an operating control tower from 9 am till 7 pm. Local control towers do NOT give permission to drone pilots in fly in their airspace. Instead you apply for a certain area, altitude, and time frame through the **Air Control** app. In about 30 seconds you receive your authorization by a text. Works very efficiently.

Take your time, and learn thoroughly. Happy Flying!

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https://studio.youtube.com/channel/UCw6jXwtiXV1YwK4MOnRJ-gQ/videos