**WHAT DO YOU NEED TO GET INTO THE DRONE BUSINESS**

**By: Lamar Ellis, Drone Education Services**

Buying a drone can be a stressful adventure.  There are so many brands and if you don’t have access to someone with a drone it’s hard to know what you are shopping for.  Here are some suggestions in getting started and hopefully finding and purchasing the right drone for you.

If you have absolutely no experience in drones then do yourself a favor and buy a toy drone.  A toy drone is typically a small drone which is manually controlled for less than $100.  They are small and will teach you all the basics of the technology.  There are higher grade drones between $100 - $200 which offer programmable features, stability and 720p cameras.  They are small enough to be called toys but they are similar to the $1,000 commercial drones you can get with the added bonus of being able to be flown indoors.  Some of the best brands out there are the DJI Tello and the Parrott Mambo.  I suggest you get extra batteries and possible a case.  The only problem is that you will probably understand the technology quick and want to upgrade immediately.  However, you could also realize that it isn’t for you and have a nice toy to pass on to a friend or family member.

Go to your local box retailer like Best Buy or Frye to look at and compare drones.  Talk to the sales associates and try to gain some knowledge.  Just remember they are out to sell you and may not really know anything about drones.  The great thing about this is that you will get the opportunity to pick it up and compare them directly to other drones.  This can offer you a real advantage if you go to purchase on line.  Patience is a virtue so taker the time to get online and read customer reviews.  Take the time to figure out how to accessorize your drone and the ancillary products that you can use with it, such as mapping programs.  Also use the online sources for information such as customer service and part replacement.

Watch YouTube videos.  YouTube is a great source for information.  There are product reviews and demonstration videos of all different types of products.  After a few views you may be able to determine those sites which offer the most helpful information.  You will also be able to tell if someone works for the company there pitching or is actually someone who is flying for work or fun.

Go to your local bookstore and pick up a drone magazine.  Two years ago there were five mainstream magazines.  It has now dwindled to two but there are semi-annual releases which give you everything from tips to becoming a professional photographer and videographer to product reviews.  Each magazine and each issue offers a unique perspective into this growing technology and the pictures are stunning.  The magazines are also great sources to lead you to helpful YouTube channels for both information and recreation.

Finally, once you have settled upon a drone make sure to go to the manufacturer’s website.  Also, do a search about the company online.  Don’t take chances on a company that doesn’t have a proven track record unless you can see the backers.  In today’s market it appears the DJI has conquered the drone industry.  They are a Chinese based company that not only produces great drones at a reasonable price but they also have companies that are providing services that can integrated into the drones, such as flight programs, log books, and mapping programs.  I only have one concern with DJI drones. The main concern is that it is technology from China and the United States and China are competing in the technology realm.  I also know that any US government entity (supplier, researcher, user) is not allowed to use Chinese technological components in their drones. I wonder if it will be a matter of time before this gets more heavily regulated.  As for now, there does not seem to appear to be a US competitor that can offer a reasonable price for a commercial use drone.  GoPro and 3DR Solo were forced to give up their drone programs because of DJI’s dominance.  I recommend the newest versions of the Mavic and the Phantom.  They are top of the line right now for consumer based drones.  If you want something more professional than look at the Inspire.

After you decide on the drone that you want to purchase, here are some tips to considerer.  Here are the essential tools to set up a drone operation.

25 ESSENTIAL ITEMS FOR EVERY DRONE OPERATION

1. 3 64+ Gb SD Cards
2. 3 Fully Charged Batteries
3. Anemometer (Wind Gauge)
4. Asset Management Log Book
5. Battery Charger
6. Cell Phone
7. Cables
8. Cleaning wipes
9. Cloud Storage
10. Compliance Folder
11. Crash Pack
12. Drone Carrying Case or
13. Backpack
14. External Hard Drive
15. Fastener Glue
16. Filters for Lens
17. First Aid Kit
18. Flight Log Book
19. Fully Charged Controller
20. Hard Hat
21. Heat checker
22. High Visibility Vest
23. Landing and Take-off Pad
24. Tool Kit
25. Traffic Cones

3 64+ Gb SD Cards - I always make sure that I have at least SD cards.  For my drones they need to be Micro SD Cards.  Make sure that if you go to the store to pick them up that if they have to come out of the back room that you get the correct ones.  I walked out of one store with regular SD cards because the clerk mistakenly grabbed them.  Also, I like to have at least 64 Gb or better for storage.  Who knows, you could end up with a full day of flying because it is just a perfect day.  You want to be prepared for those days.  I also like to keep the dummy card in the drone case.  That is for the occasion where I might forget to have my SD cards with me.  It’s always good practice to have extras if one were to get corrupted.

3 Fully Charged Batteries - I like to have at least 3 fully charged batteries for every operation and the ability to recharge them on site.  I like to have a car charger that I can connect my batteries to.  I take the used batteries to charge my cell phone, controller and tablets.  It is all about efficiency and batteries are important to the successful completion of your operations.

Anemometer (Wind Gauge) - Winds can certainly be greater at a higher altitude but this is a tool for every professional flier.  It allows you to check the wind speed from different locations.  Wind with an average speed of 7mph can have gusts up 15mph.

Asset Management Log Book - This is essential for every operation.  You need to log in the battery percentages, air time and any repairs that you have made.  It is important to have a Log Book for every drone you own.

Battery Chargers - Recommended to look into portable, multi-port with LED indicators that displays the status of the battery being charged.

Cell Phone - It is always good to be connected to the outside world.  There may be situations where airport or heliport facilities would need to get in touch with you.  If you are using your cell phone as a monitor for your drone than it kind of defeats the purpose.  I use a tablet as a monitor and I have my phone on me at all times.  I can also use my cell phone as a two-way radio in the field.

Cables - Having a variety of different cables will allow you to be able to perform drone operations in different environments.  Have a cable for iphone and ipad along with one for an android.  I also carry headphone cables for communication.  I also carry USB cables.  Just make sure you also have the ability to plug them into walls or the automobile.  You can never have enough cables.

Cleaning Wipes - Cleaning you drone after every operation is quick way to determine if there has been any damage incurred.  I use a variety of different types of wipes in the field.  I clean the drone, camera lens, monitor screens, sunglasses and propellers.

Cloud Storage - Storing your data in the cloud is efficient.  It can allow you access to your data anywhere in the world.

Compliance Folder - This is the place that has all your essential information in regards to yourself, the drone, insurance, weather data, flight data, contracts and any permissions required to fly.   Having it all in one place is good for ease of access and professionalism.

Crash Pack - This pack typically has extra batteries, extra propellers and other essential items that can be easily replaced if you were to crash your drone.  This is the one items that you do not want to have to open up.  This is recommended for those who want to make on the spot repairs of their drones.

Drone Case - This is dependent on what you use the drone for.  If you are hiking to remote locations than you might want something that is more portable than if you are just packing for the car.  Also, you want something that is more accessible for traveling on air flights.

Backpack -This can be your most essential item to carry to an operation because it has to carry everything neatly, efficiently, and safely to and from the site.  It has to have an area that protects the drone, a place for your tools, transmitter, extra batteries, chargers, and essential parts and accessories necessary for flight.  Also consider backpacks that have spaces for water bottles and other additional equipment.  I like to have places I can attach carabiners so that additional items can be easily attached.

External Hard Drive - You are going to be using up a lot of memory when flying your drone.  You are going to need a place to store your data.  You can use your computer but I have found it more efficient to have an external hard drive.  This allows me to have access on the road to my files so that I can work in the hotel late at night.  I also can store my data on multiple hard drives for redundancy.

Fastener Glue - This is good to make quick repairs if your screws begin to loosen in the drone.  You use the glue to secure the screws.

Filters for Lens - Polarized filters help bring out the blue skies without under exposing the land.  ND filters act like sunglasses for your lens.  They come in different strengths from N2 to N100.  The higher the number the darker the shade.  This helps you control your exposure.  When you shoot in “auto” settings on the drone it does not always work.  On sunny days it may over compensate by increasing the shutter speed.  High shutter speeds don’t always work from a drone’s perspective.  It is good practice to use a filter to bring down your exposure rate so you don’t have to bring down your shutter speed.  How to use filters – your shutter speed should be double your frame speed.  If your shooting 25fps then you want your shutter speed to be 1/50.

First Aid Kit - Accidents happen and it is always good practice to be prepared for the unexpected.  A first aid kit is essential.

Flight Log Book - Most of todays commercial drones have the capability to keep logs of flight.  However, if you were to have an accident then the FAA has the authority to take your log books.  If you have a hard copy it is easy.  If you have to hand them your phone or tablet, who knows when you will get it back.

Fully Charged Controller - Make sure that your controller is always fully charged before the operation and that you have the ability to recharge it in the field.  I like to use my used drone batteries to recharge or I keep a portable battery charger for that specific purpose.

Hard Hat -You have a machine in the air that you are responsible for.  That means you will be the closest to it if something were to go wrong.  A hard hat is an extra layer of protection.  It is also required for construction and mining sites.

Heat Checker - This is essential to make sure that the drone batteries are not overheating and that the motors are running efficiently.  Each should be checked and logged into in the Asset Management Log Book after every flight.

High Visibility Vest - Wearing a vest shows that I am a professional and that I am performing a commercial operation.  I have noticed through experience that people leave me alone when I have a vest on.  My vest states clearly on the back that I am an FAA Licensed Drone Pilot.

Landing and Take-off Pad - This is a high visibility area for the drone to take-off and land upon.  It is essential that you find a clear area with no overhead obstructions. It is great for grass because they won’t interfere with the rotors and it also prevents loose sediment from being blown up into your camera lens.  Don’t throw away the stakes.  They have actually come in handy in slightly windy conditions and flying at the beach.

Tool Kit - Instead of relying on a third party to fix your drone go ahead and invest in a tool kit specific for your drone.  The DJI Mavic Pro has screws that require specialized tools to remove them, such as a Torx screwdriver.    Get a kit that can not only work on field wiring repairs but also has a set of screwdrivers to make sure that all your parts are securely attached.  It is recommended to get carbon steel tools that are blackened to prevent glare and rubber hand grips.

Traffic Cones - I know you think that this is a crazy item to carry for inspection but the day someone drives over your drone is the day you realize how important they are.  I use traffic cones to line a 15’-25’ radius around my Landing and Take-off pad so that individuals will know that this is not an area to be allowed in.  Be careful, kids seem to think that cones denote a play area.

Now you can get a lot of the necessary items by buying a pro pack.  A pro pack usually has a case, extra batteries, battery chargers, and extra propellers.  And most drones come with a controller.  However, it can get pricey pretty quick.  As far as post production equipment, you can get some free versions to get started.

Adobe Lightroom – can mass import/export, watermark, and has all the advanced editing features.  Get Lightroom CC as part of a Creative Cloud plan starting at US$9.99/mo.  Or purchase for $119.99 for 1-year, purchase $149.99

PhotoScape X Pro - $39.99

Editing images is subjective.  Ones man’s treasure is another man’s trash.  It is best to give your client a sample of the same image with edits and let them choose the ones they like.  Give the customer what they want.

And don’t forget insurance.