LEARNING MADE EASY

Drone Piloting

for dummies®

A Wiley Brand

Conquer flying basics and care for your drone

Prep for certification and learn the regulations

Refine your photography and videography skills

Curt Simmons

Professional drone pilot

Drone Piloting

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by Curt Simmons

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Drone Piloting For Dummies®

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Contents at a Glance

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Introduction

First it's the sound — that distinctive loud, buzzy droning noise — that sparks your excitement. Then you suddenly realize that even though you're standing on the ground, you hold in your hands the power to see the world around you — from the sky! As you direct the aircraft to rise above the trees or buildings around you and move in any direction you want, it's like going on an adventure. And it's like that every single time you fly.

If this description of flying a drone sounds tempting, drone piloting may be calling your name!

Flying a drone is both challenging and thrilling, but it also increasingly offers career possibilities. Maybe you've picked up this book because you're just getting started with drone piloting as a hobby. Or maybe you have an established hobby, such as photography, but are thinking about doing more. You may even be a semi-professional drone pilot who wants to take things to the next level with a career or small business. Drones fulfill many important purposes these days, with more uses for them evolving all the time. And besides, drone piloting is just fun!

Becoming a drone pilot isn't easy. It takes time to learn to fly a drone safely, effectively, and within Federal Aviation Administration (FAA) rules when they apply, and gathering all the information needed to do that isn't the fun part of drone piloting. The internet is full of information, but sometimes (and, on social media, often) you find information that's contradictory or simply wrong.

Drone Piloting For Dummies is here to help you fly above a sea of information to find out what you need to know.

About This Book

This book answers pretty much all your basic questions about drones, including how they work, how to figure out which drone is best for your needs, which rules of flying apply to you, and where and under what conditions you can legally fly. This book also helps to prepare you to move beyond hobbyist to professional drone pilot if that's your goal.

I worked hard to make this book easy to understand. I cover beginning topics like flying a drone for the first time, but you also delve into airspace and how to understand FAA sectional charts. Grasping these concepts involves a lot of technical details, but I present them clearly and concisely, with quite a few illustrations along the way to enhance understanding. If you want to do anything commercially with a drone, you need to pass the Part 107 exam of the FAA. Having the Part 107 certification enables you to fly legally when you engage in for-profit or even non-profit endeavors. If you plan to take the Part 107 exam, you can find plenty of help and tips in this book. However, my goal is not to help you buzz the test; my goal is to help you understand and apply what the FAA wants you to know about drone piloting.

Foolish Assumptions

I wrote this book for you, the reader, because frankly, I needed this book some time back. I jumped into drone piloting head first, and then obtained my Part 107 exam certification, and *then* I opened a small business. A book like this would have saved me an immense amount of time and trouble figuring things out as I went along. So every bit of this book is dedicated to identifying and explaining what would have helped me (and now you) the most in my drone piloting journey.

In this book, I make no assumptions about your current knowledge of drone piloting, or even of how drones work. Maybe you're thinking about buying your first drone, or you've just bought your first drone, or maybe you've been flying for years. My only assumption is that you want to understand drones and take your drone piloting to the next level, and this book can help you do just that.

So, I wrote this book to help you fly higher . . . and faster . . . and to get your drone piloting goals off the ground quickly!


REMEMBER

This book isn't about a particular drone brand or model. You can use *Drone Piloting For Dummies* with whatever drone you own. This book also isn't a test prep book for the Part 107 exam, although I do explore a lot of the type of content you can expect on the test. The FAA expects you to know this stuff regardless of whether you decide to get certified.

Icons Used in This Book

Icons appear here and there in the book's margins to alert you to bits of information to pay special attention to, as follows:


TIP

A tip is meant to enhance your understanding or give you an additional idea to consider.


WARNING

When you fly a drone, you're flying a machine that could potentially harm a person or property. If something could potentially harm your drone, you, another person, or someone's property, this icon gives you a heads-up.


REMEMBER

Keep this information in mind at all times!

Beyond the Book

Thanks to my hard-working good friends at Wiley, extra content accompanies this book. Just visit `www.dummies.com` and search for *Drone Piloting For Dummies* to find the following:

- **Cheat Sheet:** I've created a Cheat Sheet that offers quick tips for buying a new drone, flying safely, and starting a drone piloting freelance business.
- **Updates to this book:** If this book needs updates, you can find them here as well.

Where to Go from Here

Each chapter serves as a reference for a specific topic in the drone piloting world. Each chapter is self-contained, so you don't have to read this book in order. For times when you need to refer to content from another chapter, I direct you to where you need to go.

With that said, you may find it best to read at least some of the chapters in order because the information in some will make more sense if you've read the previous chapters in a part. This situation applies especially to Parts 2 and 3.


TIP

Take your time and have fun along the way. And don't forget to fly! The more you practice, the better your skills develop, so get out there!

1 Becoming a Drone Pilot

IN THIS PART . . .

Explore drone piloting jobs and career opportunities.

Get familiar with your drone and flying it.

Practice drone flight techniques and maneuvers.

Take care and manage your drone and controller.

IN THIS CHAPTER

- Exploring drone piloting
- Looking at how drones work
- Shopping for a drone
- Considering warranties and insurance

Chapter 1

Finding Your Place in the Sky

As someone who loves nature photography, my purchase of a drone provided a natural extension of seeing the world around me. I remember nervously taking off for the first time, rising into the sky, and seeing the world from a completely different point of view. "I'm flying!" I thought. And that was it; I was hooked!

That first drone flight led to more drone flights, shooting photos and video in many different locations (of course I take my drone on vacation!). Those flights led to a new drone, and then Federal Aviation Administration (FAA) certification, and then another drone, and then people starting to ask, "Could you take some photos of our house that's under construction?" and so forth.

Most people sort of fall into a drone piloting career. You start out with a hobby, and the more your hobby grows, the more you may start to think, "Maybe drone piloting could be a career for me." Whether you're a committed hobbyist or considering expanding your horizons, this book covers all the essential aspects of drone piloting. From choosing a drone, learning to fly it, studying for the FAA certification exam, and understanding flight rules and safety to pursuing a drone piloting career, you can explore everything you need to know to find your place in the sky.

In this first chapter, you get an overview of drone piloting as both a hobby and a profession. You also delve into how drones work and what you need to know about shopping for and buying a new drone.

Exploring Drone Piloting

As is true of most popular technology, drones, or Unmanned Aircraft Systems (UAS), have changed a lot in recent years. Frankly, drones are really good these days. They fly well, have a lot of built-in technology rich with safety features, and their cameras are fantastic. All kinds of drones are designed for different industries and with different purposes in mind. You can buy a drone that will actually fly and take photos and video for under $50. Or, you can spend tens of thousands of dollars for a wide variety of sophisticated drone equipment. The sky is truly the limit, and the drone industry is vast and complex.

Piloting as a hobby

Years ago, my wife said, "You like photography; why not get a drone?" Honestly, I didn't think much of it at the time. It seemed that every extra dollar always went to some kind of camera or lens for photography at ground level. In fact, I even had a water camera to get some great snorkeling shots. I just didn't think that much about drones.

But as time went on, I discovered that many drones have very good cameras, and the angles I could capture could give me an entirely new look at the world. So I bought an inexpensive drone and played around. And it was fun. Something about the experience of flying is thrilling. Later, I purchased a prosumer-level drone (a cross between a professional- and consumer-level drone) and started getting serious about capturing great photos and videos. I even took this drone on vacation and shot the details of a coastline cliff. I remember saying to myself, "You would have never captured this footage without the drone."


TIP

My point is that I started out at the hobby level for fun. The odds are good that you started in the same place or are about to start there. For many people, though, this hobby tends to lead to professional considerations.

Piloting as a profession

For me, the turn from hobbyist to professional work began with a simple conversation with a friend who is a building contractor. He said, "You know, it would be

great to have some aerial footage of some of my building projects. I could really use those on my website and social media." That conversation moved me in the direction of taking a hobby to a more professional level. Today, I shoot content for real estate agents, contractors, landscape designers, and a host of individuals who need aerial footage of personal property or events. I enjoy photography, so I stay in that realm with my drone.

However, your story may be different. You may be interested in piloting a drone in a completely different career path. Or you may already work in an industry that uses drones, so it's natural to think, "If I could pilot in my existing industry, I could advance my career!" That's not a bad thought.


TIP

In fact, drones are used by many different industries (see Figure 1-1), and many drones are even designed for specific industries as well. Here are just a few examples of industries utilizing drone technology today:

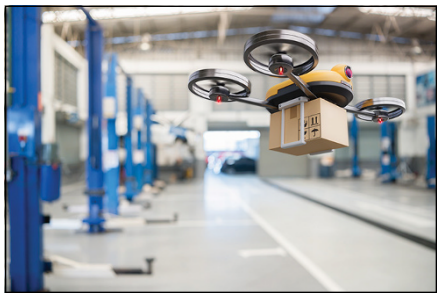
- **Construction:** All kinds of construction projects use drones to get aerial views — from homes, commercial buildings, roads, bridges, and much more.
- **Real estate and marketing:** Drones are commonly used to shoot aerial content for real estate and related marketing needs.
- **Delivery:** There is a growing trend and many new trial programs for using drones in package delivery and fulfilling e-commerce orders.
- **Law enforcement and public safety:** Drones are becoming commonplace in law enforcement, traffic safety, and search and rescue.
- **Agriculture:** Specific types of drones can be used for all phases of agricultural management.
- **Security:** Security and surveillance operations often use drones.
- **Film:** The commercial film industry uses drones and employs them in almost all movies filmed today. Social media influencers also use them frequently in content development.

Note: In case you're curious, the industry that uses drones the most is real estate. Customers basically expect aerial views of houses, neighborhoods, and properties, so drone pilots are frequently employed for real estate shoots.


TIP

If you want to know more details about some specific kinds of drones that are used in specific industries, check out Chapter 19 for some examples.

Andrey Popov/Adobe Stock Photos



Shutter2U/Adobe Stock Photos

kinwun/Adobe Stock Photos

FIGURE 1-1: Drones are used in many different industries.

Should you become a remote pilot?

If you're a drone hobbyist, you may reach that point where you wonder, "Should I become a professional remote pilot?" Of course, only you can answer that question, but before you ever begin the process of moving toward professional piloting, here are a few things to consider:

- **Do you see opportunities?** As you think about professional drone piloting, do you see opportunities near you? Do you already know some people who would hire you for some projects? Do you work in an industry that uses drones and do you see a possibility of career advancement?
- **Do you like working with people?** Here's a reality: You may enjoy flying your drone for fun and personal enjoyment, but flying professionally means you'll fly missions for someone else. That in turn means that you'll need to make other people happy with your work and fly missions that adhere to a set of goals defined by your customer. Does working under these conditions sound enjoyable to you?
- **Are you willing to study?** In a nutshell, you must have an FAA Part 107 license to do virtually anything at all commercially. Are you willing to study and learn all the rules and regulations that the FAA expects you to know?

Along with the preceding questions, it's also important to take a hard look at yourself. Effective and safe drone pilots share some common characteristics. Do these sound like you?

- **Drone pilots are lifelong learners.** Effective drone pilots are always learning something new. The drone industry is about technology, and technology is always changing. Do you enjoy learning and reading about new drone technology, features, and related issues? Do you enjoy applying that new knowledge and putting it to work?
- **Drone pilots are methodical.** Safe drone pilots always think about safety and use checklists, employ effective methods of organization, and keep their drones in tip-top shape. Are you methodical in your thinking and your actions?
- **Drone pilots like to plan.** Good drone pilots carefully think through their missions, make notes, and execute plans. Do you like making plans, or are you more impulsive?
- **Drone pilots remain calm.** As a professional drone pilot, you may have to work with a frustrating client, deal with a frustrating mission, or grapple with things that go wrong during a mission. Good drone pilots remain calm because they know emotions can impact the safety of any mission.
- **Drone pilots have good communication skills.** Drone pilots may have to communicate with a wide variety of people, even during missions. Are you a clear and concise communicator?
- **Drone pilots pay attention to detail.** A common aviation term for drone piloting is *situational awareness.* This means that as a pilot, you're paying attention not only to your drone but also to the mission parameters and everything else that's happening in the area you are flying.
- **Drone pilots are technically proficient.** Safe and effective drone pilots are very good at maneuvering the aircraft and using the remote control (RC). You become technically proficient with a lot of practice. Do you like to fly a lot and constantly work to improve your skills?

Whether you wind up evolving from a hobbyist to a professional drone pilot comes down to your goals, skills, and drive. I would say the odds are pretty good that you're ready to start moving in the professional direction — after all, you're reading this book!

Looking at How Drones Work

Most people rely heavily on technology today, but fortunately, few of us need to understand how it works. For example, you probably have a cellphone in your hand a lot of the time, but do you really know much about its inner workings?

As with most technology, you don't have to understand many of the technical details that operate under the hood of a drone in order to fly one. Unless you want to design and build drones, you probably don't particularly care about *how* it works, as long as it works.


TIP

It's a good idea, however, to know some of the basics because knowing how a drone flies can help you be a better pilot and make better piloting decisions in a variety of flight situations. Specifically, you should know how drones fly, how the remote controller works, and how the gimbal helps you take great photos and videos. Don't worry; I skip the boring technical stuff and just tell you what you need to know.

How drones fly

Although there are many different kinds of drones, some of which even work like airplanes, most drones are effectively *quadcopters*, which refers to a type of drone that uses four rotors. Basically, a drone has four different sets of propellers on each of its four arms. These four rotors provide all the maneuverability you get when you fly the drone.

To understand how these rotors work together, you need to get familiar with a few terms and what these mean for your drone's ability to fly.

Thrust and drag

Thrust is the force that is necessary for your drone to fly. In other words, the rotors have to spin fast enough to lift the drone's weight up into the air. While that's happening, the opposite force, called drag, is at work. *Drag* is created by friction in the air as well as air density. The drone must have enough force to overcome drag or it can't fly. This is why your drone will perform better or worse depending on how much drag exists from the air pressure and other atmospheric conditions.