

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

**for
dummies®**
A Wiley Brand



Drone Piloting

by Curt Simmons

for
dummies[®]
A Wiley Brand

Drone Piloting For Dummies®

Published by: **John Wiley & Sons, Inc.**, 111 River Street, Hoboken, NJ 07030-5774, www.wiley.com

Copyright © 2025 by John Wiley & Sons, Inc. All rights reserved, including rights for text and data mining and training of artificial technologies or similar technologies.

Media and software compilation copyright © 2025 by John Wiley & Sons, Inc. All rights reserved, including rights for text and data mining and training of artificial technologies or similar technologies.

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without the prior written permission of the Publisher. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, (201) 748-6011, fax (201) 748-6008, or online at <http://www.wiley.com/go/permissions>.

Trademarks: Wiley, For Dummies, the Dummies Man logo, Dummies.com, Making Everything Easier, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and may not be used without written permission. [Insert third-party trademarks from book title or included logos here.] All other trademarks are the property of their respective owners. John Wiley & Sons, Inc. is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002. For technical support, please visit <https://hub.wiley.com/community/support/dummies>.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media that is not included in the version you purchased, you may download this material at <http://booksupport.wiley.com>. For more information about Wiley products, visit www.wiley.com.

Library of Congress Control Number: 2024946990

ISBN 978-1-394-28211-1 (pbk); ISBN 978-1-394-28213-5 (ebk); ISBN 978-1-394-28215-9 (ebk)

Contents at a Glance

Introduction	1
Part 1: Becoming a Drone Pilot	5
CHAPTER 1: Finding Your Place in the Sky	7
CHAPTER 2: Flying for the First Time	27
CHAPTER 3: Maneuvering and Flying Your Drone	45
CHAPTER 4: Taking Care of Your Drone and Flying Safely	65
Part 2: Following FAA Regulations	77
CHAPTER 5: Exploring the TRUST Certificate and Part 107 Certification	79
CHAPTER 6: Following Flight Regulations	99
CHAPTER 7: Following More Flight Regulations	111
CHAPTER 8: Flying at Night	123
Part 3: Getting to Know the National Airspace System (NAS) and Sectional Charts	141
CHAPTER 9: Checking Out the National Airspace System	143
CHAPTER 10: Getting to Know Confusing Acronyms and Airport Radio Communications	163
CHAPTER 11: Discovering How to Read Sectional Charts	177
CHAPTER 12: Practically Interpreting Sectional Charts	191
CHAPTER 13: Flying Drones around Airports	207
Part 4: Flight Operations and Safety	219
CHAPTER 14: Piloting in Various Weather Conditions	221
CHAPTER 15: Flight Emergency Procedures	233
CHAPTER 16: Becoming a Safe, Responsible Drone Pilot	243
Part 5: Getting to Work: Drone Piloting in the Marketplace	257
CHAPTER 17: Taking Great Drone Photos	259
CHAPTER 18: Shooting Expert Drone Video	277
CHAPTER 19: Getting Drone Piloting Jobs	293

Part 6: The Part of Tens	313
CHAPTER 20: Ten Part 107 Test-Day Tips	315
CHAPTER 21: Ten Drone Piloting Myths	321
CHAPTER 22: Ten Common Drone Piloting Problems You Can Avoid.....	327
Index	333

Table of Contents

INTRODUCTION	1
About This Book	1
Foolish Assumptions	2
Icons Used in This Book	3
Beyond the Book	3
Where to Go from Here	3
 PART 1: BECOMING A DRONE PILOT	 5
CHAPTER 1: Finding Your Place in the Sky	7
Exploring Drone Piloting	8
Piloting as a hobby	8
Piloting as a profession	8
Should you become a remote pilot?	10
Looking at How Drones Work	12
How drones fly	12
Using the remote controller (RC)	15
Understanding camera gimbals	17
Shopping for a Drone	18
Checking out the 250-gram weight maximum	18
Exploring drone categories	19
Shopping tips to keep in mind	24
Considering Warranties and Insurance	25
Basic and extended warranties	25
Third-party plans	25
Replacement plans	25
Additional insurance	26
 CHAPTER 2: Flying for the First Time	 27
Registering Your Drone and Checking for Updates	28
Registering your drone with the FAA	28
Checking for updates	30
Getting Familiar with Your Remote Controller	32
Understanding How GPS Works with Your Drone	34
Downloading a B4UFLY App	35
Using Your Drone's Crash Safety Features	36
Understanding Geofencing	38
Choosing a First Flight Location	38
Following Pre-Flight Checks and Procedures	39

	Taking Off and Landing for the First Time	40
	What to Do When You Don't Know What to Do	42
	Following Post-Flight Checks	42
CHAPTER 3:	Maneuvering and Flying Your Drone	45
	Exploring Foundational Flight Principles	46
	Safety first.	46
	Consider the weather	47
	Always perform pre-flight checks	47
	Practicing Basic Drone Flight Maneuvers.	47
	Straight up, straight down	48
	Straight forward, straight back	49
	Circle	50
	Rectangle	50
	Triangle	51
	Plus sign	52
	Stairs	53
	Pushing Forward with Complex Maneuvers	54
	Spiral	54
	Orbit	55
	Fly with gimbal rotation	56
	Flying with Built-in Maneuvers	58
	Shooting with Active Tracking	59
	Using DJI MasterShots	61
	Growing Your Skills and Confidence.	63
CHAPTER 4:	Taking Care of Your Drone and Flying Safely	65
	Keeping Current with Updates	66
	Inspecting and Changing Propellers.	66
	Inspecting propellers	67
	Changing propellers	68
	Cleaning Your Drone and Camera	68
	Cleaning the drone body and propellers.	68
	Cleaning the drone camera and gimbal.	69
	Calibrating the Drone	70
	Taking Care of LiPo Batteries.	71
	Troubleshooting Common Problems.	73
	Environmental effects.	73
	Camera issues	74
	Connectivity glitches	74
	Getting help	74
	Exploring Foundational Safety Practices	74
	Maintain visual line of sight	75
	Fly in authorized airspace	75
	Do not fly in a dangerous manner	75

Stay away from emergency scenes and personnel	75
Do not fly under the influence of drugs and alcohol	76
Don't talk to people when you fly	76
PART 2: FOLLOWING FAA REGULATIONS	77
CHAPTER 5: Exploring the TRUST Certificate and Part 107 Certification	79
Clearing the Air about TRUST Certificates and the Part 107 Exam	80
Drone weight	80
Recreational flyers and TRUST certificates	81
Certified remote pilots	82
Determining Whether You Need a Part 107 Certification	83
Beach photos	83
Family reunion	83
Small business photos	84
Nonprofit photos	85
Friends building a house	85
Insta-famous mountains	86
Checking out the Part 107 Exam	86
Understanding airspace	87
Checking out flight regulations	88
Dealing with weather	89
Considering loading and performance	90
Understanding airport operations	91
Understanding Crew Resource Management	92
Studying for the Part 107 Exam	94
Registering for the Part 107 Exam	96
CHAPTER 6: Following Flight Regulations	99
Understanding Maximum Height	100
Understanding MSL and AGL	100
I told you there are two exceptions	102
Exploring Speed and Weather Visibility	103
Keeping a Visual Line of Sight (VLOS)	104
Flying During Twilight	105
Complying with Remote Identification	106
Standard Remote ID	106
Remote ID broadcast module	107
FRIA exception	108
CHAPTER 7: Following More Flight Regulations	111
Flying Over Property and People	112
Flying over property	112
Flying over people	113
Flying over large groups of people	116

Flying from a Moving Vehicle	117
Reporting an Accident to the FAA	117
Logging Your Flights and Maintenance	118
Obtaining Airspace Authorization or Waivers	119
Getting airspace authorization	119
Getting LAANC authorization	120
Understanding the Effects of Alcohol and Drugs	121
CHAPTER 8: Flying at Night.	123
Exploring FAA Regulations for Night Flights	124
Flying over people and moving vehicles at night	124
Airspace and LAANC waivers	124
Anti-collision lighting	125
Understanding Drone Limitations with Night Flights	126
Camera limitations	126
Sensor limitations	127
Battery limitations	128
Considering Eyesight Limitations at Night	128
Understanding the basics of your eyesight	129
Exploring rods and cones	130
Adapting to dark conditions	132
Understanding Night-Flight Visual Problems and Illusions	133
Phantom motion	133
Fascination	133
Autokinesis	133
Flicker vertigo	134
Size-distance illusion	134
Reversible perception illusion	134
Developing Night-Flight Best Practices	136
Check out the area in the daytime	137
Don't ignore pre- and post-flight checks	137
Don't forget LAANC approval if needed	137
Use off-center viewing and scanning	138
Be physically and mentally ready	139
 PART 3: GETTING TO KNOW THE NATIONAL AIRSPACE SYSTEM (NAS) AND SECTIONAL CHARTS	 141
CHAPTER 9: Checking Out the National Airspace System	143
Class A Airspace	144
Class B Airspace	145
Class C Airspace	149
Class D Airspace	151

Class E Airspace	153
Starting from the ground up	154
Starting from 700 feet AGL	155
Starting from 1,200 feet AGL	157
Class G Airspace	157
Types of Special-Use Airspace	157
Warning	158
Restricted	158
Prohibited	159
Alert	159
Military Operations Area (MOA)	160
CHAPTER 10: Getting to Know Confusing Acronyms and Airport Radio Communications	163
Understanding Sectional Charts	164
Exploring Common Acronyms and Notations	165
NOTAM	165
TFR	166
MTR	167
Victor Airway	170
VFR Checkpoint	172
Deciphering Airport Radio Communications	172
UNICOM and CTAF	173
CT and ATIS	174
CHAPTER 11: Discovering How to Read Sectional Charts	177
Understanding Latitude and Longitude	178
Reading locations on a sectional chart	179
Understanding GPS digital coordinates	182
Touching on Isogonic Lines	183
Understanding Elevation	183
Natural elevation maximums	184
Maximum Elevation Figures (MEF)	184
Towers and other obstructions	185
Pop Quiz! Bringing Everything Together	186
CHAPTER 12: Practically Interpreting Sectional Charts	191
Zoning In on Questions about Airspace and Airports	192
Testing supplement: Figure 20	192
Testing supplement: Figure 21	194
Testing supplement: Figure 25	195
Focusing on Elevations and Locations	197
Testing supplement: Figure 26	197

Dodging Towers and Obstructions	199
Testing supplement: Figure 24	199
Testing supplement: Figure 25	201
Staying Alert to Special-Use Areas	202
Testing supplement: Figure 75	202
Testing supplement: Figure 69	204
CHAPTER 13: Flying Drones around Airports	207
Reading Chart Supplements	208
Understanding Towered and Nontowered Airports	210
Exploring Airport Traffic	211
The rundown on how runways work	211
Understanding runway markings	214
Knowing how planes land	214
Understanding Right of Way	218
PART 4: FLIGHT OPERATIONS AND SAFETY	219
CHAPTER 14: Piloting in Various Weather Conditions	221
Exploring Air Masses	222
Connecting cloud types with weather systems	222
Getting current on stable and unstable air	224
Piloting through Convection Currents	225
Dealing with the Wind	226
Flying with obstructions in mind	226
Maneuvering through wind shear	226
Staying up in downdrafts	227
Watching Out for Humidity and Fog	227
Working harder in low and high humidity	227
Figuring out fog and visibility	228
Understanding METAR and TAF Reports	229
METAR	229
TAF	230
Tips for Flying in Bad Weather	232
CHAPTER 15: Flight Emergency Procedures	233
Looking at Common Drone Emergency Causes	234
Lost link	234
Weather	234
Batteries	235
Birds	235
Overdependence on obstacle avoidance	236
Carelessness	236
Practicing Foundational Emergency Responses	237
Understanding Lost-Link Procedures	238
Knowing why lost links occur	238
Dealing with a lost link	239

CHAPTER 16: Becoming a Safe, Responsible Drone Pilot	243
Understanding Loading	244
Force equilibrium	244
Figuring load factor	245
Taking center of gravity into account	247
Understanding the critical angle of attack for fixed-wing drones	248
Making Sound Flight Judgment Calls	249
Considering Other Models	250
DECIDE model	250
IMSAFE model	251
PAVE model	252
Getting Rid of Incorrect Thinking	252
Anti-authority	253
Impulsivity	253
Invulnerability	254
Machoism	254
Resignation	255
 PART 5: GETTING TO WORK: DRONE PILOTING IN THE MARKETPLACE	257
CHAPTER 17: Taking Great Drone Photos	259
Considering the Basics of Good Drone Photography	260
Understanding shooting modes	261
Focusing on Exposure	262
Considering File Types and Resolution	266
Drone file types	266
Photo resolution	267
Shooting Good Angles and Using ND Filters	268
Applying composition	268
Shooting with good angles	269
Working with ND filters	273
Editing Drone Photos	274
Consider cropping	274
Improving exposure	275
Improving color	275
 CHAPTER 18: Shooting Expert Drone Video	277
Filming Great Drone Video	278
Make a plan	278
Consider the audience	278
Modify on the fly	279
Deliver the details	279
Shoot three times what you need	279

Understanding File Formats, Resolution, and FPS	280
File formats.....	280
Resolution.....	281
FPS.....	281
Shooting with the Best Drone Movements	282
Ascend and descend.....	282
Orbit	283
Semicircle	284
Bird's-eye rotation	285
Fly in/pull back.....	285
Sweep	287
Track	287
Getting Started with Video Editing	288
Importing video clips.....	289
Editing each clip on the timeline.....	289
Arrange clips and apply transitions	290
Edit for color and exposure	291
Add music, voiceovers, and other effects	292
Finalize, export ... and then review!	292
CHAPTER 19: Getting Drone Piloting Jobs	293
Exploring Drone Piloting in Business	294
Real estate and mapping	294
Agriculture	296
Law enforcement.....	297
Search and rescue.....	298
Construction and inspections	299
Shipping and logistics	300
Film and photography	301
Security	301
Finding Your Drone Piloting Career	302
Looking at your current job	302
Exploring your area of interest	303
Developing skills as you work	304
Setting Up a Drone Piloting Freelance Business.....	304
Defining your business.....	305
Setting up your business	305
Making first contact.....	306
Establishing an internet presence.....	307
Advertising your business	308
Getting paid	309
Juggling income and expenses	311
Considering drone insurance	311
Paying your dreaded taxes.....	312

PART 6: THE PART OF TENS	313
CHAPTER 20: Ten Part 107 Test-Day Tips	315
Eat, Sleep, Repeat	315
Buy a Magnifying Glass and Cheap Calculator	316
Make Notes Before You Start	316
Slow Down	317
Increase Your Odds	317
Read at “Face Value”	318
Mark Tricky Questions	318
Quickly Guess at Questions You Don’t Know	319
Dress for Success	319
Know the Test Details	320
Remember That the World Won’t End	320
CHAPTER 21: Ten Drone Piloting Myths	321
You Don’t Need Certification or Registration If Your Drone Is Small	321
Crewed Aircraft Do Not Fly under 400 Feet	322
You Don’t Have to Worry About Airspace as Long as You Fly under 400 Feet	323
You Don’t Need Line of Sight If Your Drone Has a Good Camera	323
You Don’t Have to Report an Accident to the FAA	324
You Don’t Have to Worry About MTRs	324
Elevation Doesn’t Impact Drone Battery Life	325
After You Learn How to Fly, You Don’t Need RTH	325
The Built-In Drone Lights Are All You Need to Fly at Night	326
Drone Piloting Jobs Don’t Require State Sales Tax	326
CHAPTER 22: Ten Common Drone Piloting Problems You Can Avoid	327
Software Glitches and Errors	327
Shaky Video and Blurry Images	328
Flying in the Wrong Airspace	328
Connectivity Problems with the Drone and RC	329
Overestimating Battery Life	329
Losing VLOS	330
Flights Seem Tilted or Off Balance	330
Poor GPS Connectivity	330
Overdependence on Obstacle Avoidance	331
You	331
INDEX	333

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.

- » 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.