



An Aviator's Field Guide to
**Tailwheel
Flying**

Practical skills and tips for flying
a taildragger

Jason Blair

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Aviation Supplies & Academics, Inc.
Newcastle, Washington

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ASA-TAILDRAG-EB

ISBN 978-1-61954-591-5

Contents

Acknowledgments	vii
Introduction	ix
1 Finding the Right Tailwheel Instructor	1
2 The Basics	5
3 Getting It Started	9
4 Tailwheel Taxiing	13
5 High-Speed Taxiing	17
6 Normal and Soft-Field Takeoffs	19
Skipping	21
Yaw Fluctuation	22
Takeoff Stall	22
7 Short-Field Takeoffs	23
8 Tailwheel Aircraft Landings	25
The Three-Point Landing	28
The Wheel Landing	29
Tail-Low Wheel Landing	32
9 Short-Field and Soft-Field Landings	35
Short-Field Landing	35
Soft-Field Landing	36
Landing Challenges	37
10 Tailwheel Crosswind Operations	39
Crosswind Taxiing	39
Crosswind Takeoffs	40
Crosswind Landings	41
11 The Ground Loop	43

12	Considering Differences Between Tailwheel Aircraft	45
	Different Types of Tail Wheels	45
	Narrow or Wide Gear, Long or Short Aircraft	47
	Toe or Heel Brakes	47
	Tandem or Side-by-Side Seating	49
	Engines	50
13	Older Planes	53
	Parts Availability	54
	Mechanic Availability	54
	Insurance	55
	Manuals and Documentation Availability	56
	Benefits of Older Aircraft	57
14	The Many Modifications of Tailwheel Aircraft	59
	Bigger Engines	59
	Propeller Changes	60
	Short-Field Performance Modifications	61
	Big Tires	61
	Main Gear Modifications	63
	Bungees vs. Spring Steel Gear	63
	Tail Wheel Changes	64
15	Primary Training and Testing in a Tailwheel Aircraft	67
16	So You Want To Be a Tailwheel Instructor	69
17	“General Rules” of Tailwheel Flying	73
	Resources	77
	The Tailwheel Endorsement	81
	About the Author	83

Acknowledgments

A special thanks to Greg Brown, Jonathan “JJ” Greenway, and Kevin Spaulding for their help in reviewing the content of this book. Their guidance and input were extremely valuable throughout the writing and finalization process.

Thanks very much to all of these individuals for the years of friendship and their help on this project.

Introduction

Flying a tailwheel aircraft is oftentimes thought of as being “more difficult” than flying a tricycle-gear aircraft. In reality, it is not necessarily harder, but takeoffs and landings in tailwheel aircraft might best be described as being flown “differently.” Most of the fundamentals that are learned in tricycle gear flying are exactly the same as those used when flying a tailwheel aircraft.

Since the Federal Aviation Administration (FAA) does require that specific training and an endorsement be completed in order to qualify to pilot tailwheel-equipped aircraft, it seems obvious that notable differences must exist between these and tricycle-gear aircraft. This is exactly the truth, but it by no means indicates that the average pilot should be considered incapable of making a good transition to being a competent and proficient tailwheel pilot.

While some will contend that tailwheel aircraft are only older, antiquated things that modern pilots no longer fly, there is a next generation of tailwheels, and pilots must still learn how to fly these special aircraft. Many experimental aircraft, and a few new-production aircraft, are equipped with tailwheels and are not just flown by the last generation of pilots. With the next generation of pilots, these aircraft—both old ones that we still maintain and new ones being built by individuals or companies—have a place in our aviation community. Some tailwheel aircraft have performance characteristics that cannot be served by similarly sized tricycle-gear aircraft. With that in mind, I offer this book as a resource for tailwheel pilots in their transition and proficiency development process.

The intent of this book is not to teach you everything you need to know about tailwheel aircraft so you will have the ability to jump into the pilot’s seat without further instruction and guidance from a

competent instructor. No mere text could ever do that. It is intended to provide introductions, concepts, discussions, knowledge, and procedures that you can consider and incorporate into the training process to supplement the effort. Any good pilot will be well-served to learn as much as they can both during and outside of the actual flight training they receive. I am hopeful that this text will help facilitate that process!

I am not going to tell you that I have flown every tailwheel aircraft out there or that I am absolutely the most accomplished tailwheel instructor you can find anywhere. But as a competent instructor with many years teaching flight in tailwheel aircraft, I have learned a great deal that I can pass along to help you. Most importantly, I have learned that not every tailwheel aircraft is the same and not just any tailwheel-qualified instructor is the best choice for every tailwheel aircraft a pilot may choose to fly.

As you read this, you may think of additional things that could be covered. I certainly welcome any feedback and contributions readers have as we consider expansion of the material and improvement for future editions.

Chapter 1

Finding the Right Tailwheel Instructor

Before we dive into the details of what you will personally do as a tailwheel pilot, with my experience as both an instructor and examiner, I believe it is important to start with a discussion of how to find the correct tailwheel instructor. The “right” instructor does not just mean one who is tailwheel endorsed or even one who has flown the particular make and model of aircraft you will use in the training.

As you consider potential tailwheel instructors, key questions to ask include whether they have ever flown the particular make and model before, if they have flown tailwheel aircraft recently, and if they have previously taught someone in a tailwheel. Many instructors have flown tailwheel aircraft, but not all have taught someone in a tailwheel or conducted a tailwheel transition for a customer. Flying a plane yourself is different than instructing and training another person and ensuring they develop the competent knowledge, skills, and risk management to safely operate the aircraft.

Don't be afraid to travel if you don't find the right tailwheel instructor near where you live. This can even mean travelling with your plane if you have purchased a tailwheel plane. Another option if you already have an aircraft is to pay for a great tailwheel instructor to travel to provide training to you at your home airport. For most pilots, a tailwheel transition will not take weeks or months; with quality training and a little dedicated time, it can usually be satisfactorily completed (with a little cooperative weather) in a few days. This can keep travel expenses to a minimum while perhaps

allowing a pilot to secure better training than might be available locally. This investment can be well worth the money, increasing the quality of instruction and potentially resulting in a tailwheel endorsement in an aircraft that is more similar to the one the pilot plans to fly.

When choosing an instructor, it is therefore important to also consider what type of aircraft you plan to fly after completing your endorsement. If you are shopping for a Citabria, getting your tailwheel endorsement with a local instructor who rents out their Cessna 170 for instruction may be fun, but travelling to another instructor who has a Citabria will probably be a better long-term training strategy. Shop around and be willing to travel to obtain the best instruction for your long-term training needs.

It is also important to consider insurance requirements. Many insurance underwriters will require a pilot to have specific experience in make and model of aircraft to be able to solo a tailwheel aircraft and for coverage to be in effect. The same holds true of an instructor who will provide training. This could be a factor in what type of aircraft you seek for your training and how much training you should plan to complete. It can also be a factor in choosing an instructor if you are looking for an instructor for an aircraft you own. Make sure the instructor has the required experience necessary for any insurance coverage to be effective (although hopefully you will never need it).

Although many people may automatically assume it's the case, it is always worth confirming that the instructor conducting your training has the proper commercial training to meet insurance minimums for the aircraft being flown. And once your training is completed, you will likely have to meet experience minimums to rent such an aircraft alone. The same will hold true if you provide your own aircraft both for you to fly as the pilot and to be used by the instructor. Insurance policies may also require that instructors provide a pilot history form detailing their experience in general, in tailwheel, and in particular make and model aircraft if the insurance policy does not have an open pilot warranty that offers a blanket provision for others to fly the aircraft with experience minimums.

Determine these questions prior to actually receiving instruction in the aircraft to ensure that if any unexpected damage happens during the training process, the insurance coverage in place will be effective. This discussion can be a major factor in choosing which instructor is appropriate to engage for your training.

So, with these considerations in mind, let's dig into more detail about tailwheel flying.

Chapter 2

The Basics

I would be lying if I didn't admit what the accident records indicate: Tailwheel pilots encounter more accidents, incidents, or—in most cases—minor mishaps with their aircraft than tricycle gear pilots. This is part of the reason that tricycle-gear aircraft are produced in larger quantities than tailwheel aircraft. Tricycle-gear aircraft are more forgiving of actions during takeoff and landing procedures than tailwheel aircraft, so it could be said that a tailwheel pilot must focus on the fundamentals and perform duties as the pilot-in-command with fewer breaks in attention than a tricycle gear pilot.

Flying a tailwheel aircraft requires a greater attention to detail, and that detail must be adhered to for a longer period of time, than flying a tricycle-gear aircraft.

We know that once a tricycle-gear aircraft is on the ground, its natural tendency is to continue to travel forward based on the position of its center of gravity in relation to the position of its gear. Even after landing, a tailwheel pilot must pay greater attention to rudder and brake control, because if the center of gravity is displaced, the tailwheel aircraft is more likely to turn about its center of gravity than a tricycle-gear aircraft.

As many old timers will remind a young tailwheel pilot, “keep flying it until you have it tied down.”

Once a tailwheel aircraft is airborne, it is fundamentally the same as any other aircraft. This is why the majority of tailwheel transition training focuses on the takeoff and landing procedures. The main difference between tailwheel and tricycle-gear aircraft is the position of the center of gravity. In a tricycle-gear aircraft, the center

of gravity is in front of the main wheels. But with the center of gravity *behind* the main wheels in a tailwheel, the airplane does not naturally tend to “pull” itself straight, a fact which allows the center of gravity to be more easily disrupted and may result in the tail spinning around the main gear. This is predominantly counteracted with right rudder.

For pilots who originally learn in a tailwheel aircraft, they may wonder what the big difficulty is of a tailwheel aircraft for people who transition into them. It is simply based on proficiency and experience. There is no reason that anyone should be afraid to learn to fly a tailwheel aircraft, but they should be aware that they will need to adapt to slightly different techniques and modify their style of flying to match the particular type of aircraft that they are flying. For a pilot with quality training and who makes a continued effort to maintain proficiency, tailwheel aircraft are equally—and in some cases more—capable and safe aircraft to operate.

One area in which tailwheel aircraft are certainly different than tricycle-gear aircraft is operations in crosswinds. A good tailwheel pilot will respect both the aircraft limits and—potentially more limiting—their own experience limits in tailwheel-equipped aircraft. ***It is not true that a good tailwheel pilot can operate in any wind that a tricycle gear pilot can operate in.*** The fundamental reason why a tailwheel aircraft cannot be flown in winds as strong as a tricycle-gear aircraft can is related to the aircraft’s angle of attack while sitting on the ground. A tailwheel’s three-point attitude without a nose wheel on the ground, having a tail wheel on the ground instead, allows crosswinds experienced on the tail and empennage surfaces to more easily dislodge the aircraft from a straight travel path down the runway. This results in the aircraft being more prone to yaw in a way that a tricycle-gear aircraft is less susceptible to experiencing. This can potentially result in a dreaded ground loop.

What exactly is the dreaded ground loop? We will talk more specifically about it later, but for the purposes of a basic understanding, it is a loss of directional control in the lateral direction that causes the aircraft to spin around, commonly resulting in a wing strike against the ground or other objects. A simple way to

visualize a ground loop is that it occurs when the tail stops following the nose of the plane and instead spins around it. Obviously, you should try to avoid ground loops, but hopefully this description provides you with a simple mental image of what a ground loop is if the concept is new to you. In a later chapter, I will cover ground loops in more detail, including how to avoid them and how to respond if one occurs.

In a tailwheel aircraft, the pilot must cancel all sideways motion with respect to the ground at the moment of touch down. The longitudinal axis of the aircraft must be aligned with the centerline of the runway. The difficulty in this procedure is canceling the sideways drift with crosswinds and in gusty conditions. Most tricycle gear pilots spend less effort working to eliminate side-load and thus develop bad habits that make it more difficult to fly the tailwheel. These bad habits of tricycle gear pilots who infrequently fly tailwheels are some of the most common factors that cause problems when flying tailwheel-equipped aircraft.

A tailwheel aircraft is much more sensitive to pilot error than the tricycle. However, differences between various tailwheel aircraft make some more difficult than others, and some more forgiving of errors. Factors such as wheelbase length, overall length of the aircraft, height of the gear, type of struts, and many others can determine which aircraft are easier or harder to fly for a transitioning pilot. When you are considering your tailwheel training, find a good instructor who is familiar with the particular make and model, and spend the required time to really develop proficiency before heading off down the next runway in a 15-knot crosswind on your own or with family and friends.

Tailwheel aircraft do not have to be less safe to fly than tricycle-gear aircraft, but a strong understanding of the physics behind the configuration is needed to mitigate the problems that many have experienced when flying them. This must include an understanding of the dynamics of aircraft stability, rudder and brake control, and how the pilot can recognize a developing situation and react to it appropriately.

With this in mind, the next two chapters cover the first steps for a pilot operating a tailwheel aircraft: starting and taxiing.

About the Author

Jason Blair is an active instructor and FAA-designated pilot examiner who has worked for many years in the aviation training industry. He has flown and instructed in more than 90 makes and models of general aviation aircraft, many of them tailwheel, and through his experience has learned enough to share some knowledge that may be useful to others. He writes for multiple aviation publications and has worked for and with aviation associations and the FAA as an industry representative within the general aviation community.

To learn more about Jason Blair and his industry involvement, visit www.JasonBlair.net.

