



The Pilot's Manual

PM **1**

# Flight School

How to fly your airplane through  
all the FAR/JAR maneuvers

*Fourth Edition*

**Full-Color  
Edition!**



**Foreword by Barry Schiff**

## **The Pilot's Manual 1: Flight School**

Aviation Supplies & Academics, Inc.  
7005 132nd Place SE  
Newcastle, Washington 98059-3153  
www.asa2fly.com

Originally published by Aviation Theory Centre  
© 1990–1993.

Fourth Edition  
© Copyright 2008 Aviation Theory Centre Pty Ltd

All rights reserved. This book, or any portions thereof, may not be reproduced in any form without written permission.

Nothing in this text supersedes any regulatory material or operational documents issued by the Federal Aviation Administration or the aircraft manufacturers or operators.

Published 2008 by Aviation Supplies & Academics, Inc.

*Acknowledgments:*

Graphics: Rob Lorient

Typesetting and Index: Stephanie Thompson

Photographs: FM Photographics, Aviation Theory Centre, Cessna, Cirrus and Lightwing. Cover: Rob Fox, Cirrus, Sky Arrow

**ASA-PM-1B-PD**

PDF ISBN 978-1-56027-835-1





# The Training Airplane 1

## Objectives

To name and describe:

- the main components of a basic training airplane; and
- the systems, controls and instruments used by the pilot.

## Considerations

### The Airframe

The structure of the airplane is called the *airframe*. It consists of a *fuselage* to which the *wings*, the *empennage*, the *landing gear* and the *engine* are attached. A propeller converts engine *torque* to generate *thrust* to propel the airplane through the air. Forward speed causes the airflow over the wings to generate an aerodynamic force, known as *lift*, that is capable of overcoming the force of gravity (*weight*) and that supports the airplane in flight. The airplane can even fly temporarily without thrust if it is placed in a *glide*—its forward momentum assisted by gravity keeps it moving through the air, and this allows the wings to produce lift. However, the path is inevitably downward. In the absence of vertical air currents, thrust is essential to allow level, turning and climbing flight.

*Lift is the means by which flight is attained.*

*Thrust is the means by which flight is sustained.*

The tail assembly of the aircraft is situated some distance to the rear of the main load-carrying sections of the fuselage and provides a balancing, or *stabilizing*, force much like the tail feathers on an arrow or a dart. The tail section consists of a *vertical stabilizer* (or *fin*) and a *horizontal stabilizer* (or *tailplane*), both of which are shaped to produce stabilizing forces. The pilot and passengers are housed in the cockpit, usually in side-by-side seating—the pilot (or *pilot in command* in a two-pilot aircraft) sits on the left side.



Figure 1-1 A Cessna trainer.



Figure 1-2 Tobago aircraft.



Controls and instruments are placed in the cockpit to enable the safe and efficient operation of the airplane and its systems, and for navigation and communication.

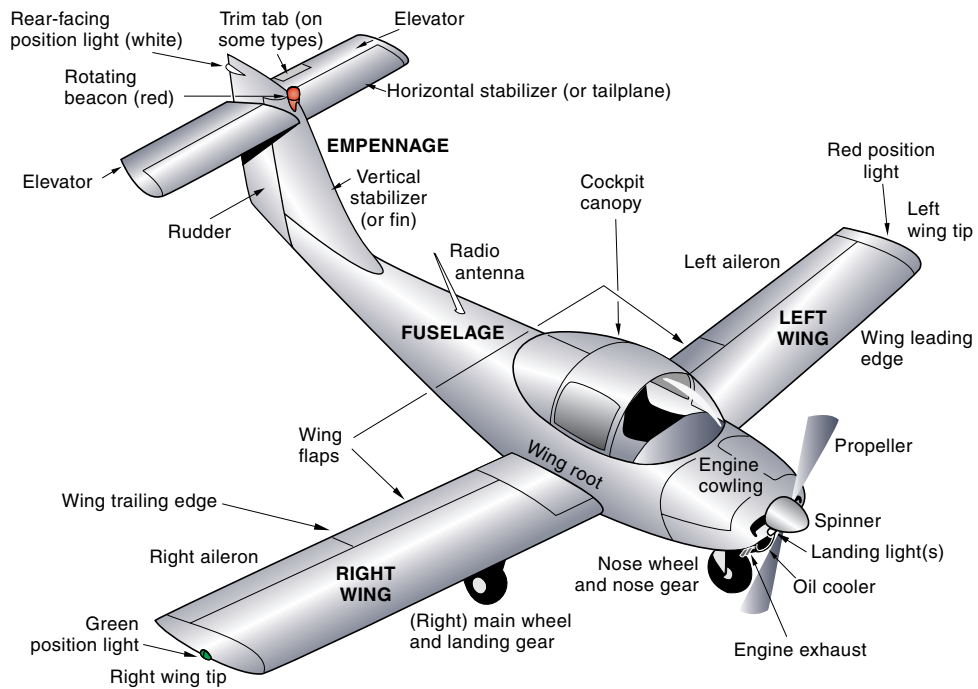


Figure 1-3 Parts of an airplane.

## Aircraft Types

Light aircraft were traditionally classified under Federal Aviation Regulation (FAR) 23 which described structural and performance standards. These represented the fleet of General Aviation aircraft up to a certain weight limit.

More recently, the FAA has introduced a new category - the *Light Sport Aircraft* (LSA) category which offers relaxed construction, performance and licensing standards for pleasure flying and for training.



Figure 1-4 Cessna 162 SkyCatcher LSA on its maiden flight.

The LSA category allows a wide range of designs that are placed between the ultralights and the GA categories. It allows adventurous designs and fun flying at lower cost, using less energy and with less of the burden of regulations and testing.

Many pilots are now introduced to aviation via the LSA category and traditional, well respected manufacturers such as Cessna are now testing new designs that will be placed within this category.

This manual describes flight techniques which are equally applicable to all GA and LSA airplanes although there will be unique characteristics shown by some more radical designs and configurations. The techniques remain a vital foundation for a trainee pilot.

## Primary Controls

### Flight Controls

The most common primary flight control has been the wheel or *yoke*. This is still prevalent although there are more diverse options available now. The yoke came about because of high control forces and the need to be able to use both hands for control inputs. It also allowed relief so that the pilot could change hands. Also, the yoke provided a convenient place for transmit buttons, trim switches and some autopilot functions. It is retained in many larger aircraft even though the control forces have now been overcome by hydraulic actuators.

With the widespread use of ultralights and homebuilt aircraft there was a reappearance of the central control column or *joystick*. Many feature the transmit button on the top and some even have electric trim switches. The stick is better for highly maneuverable aircraft – for aerobatics, display flying and crop dusting – as it provides greater leverage and instantaneous control deflection. (It can also be held between the knees when cruising).

As more advanced types have been introduced into the General Aviation (GA) fleet the *side-stick* as used in modern complex transport airplanes, has appeared. The control forces and response have been refined to the point where only a small mechanical advantage is needed. The magnificent Cirrus and Sky Arrow aircraft both used side sticks – as does the Australian Lightwing Speed.



Figure 1-5 Traditional control wheel or yoke



Figure 1-6 Traditional joystick – Lancair.



Figure 1-7 Side stick control – Cirrus

## The Pilot's Manual (PM) Series

A complete, self-paced, home-study course designed to be all you need to pass the private, commercial and instrument knowledge and practical tests.

### ■ **PM 1 Flight School**

There's nothing better than preparing for your flight lessons at home to maximize your efforts and increase the efficiency of each flight lesson. Time is money in an airplane and with an instructor. *Flight School* will save you on both as you progress through your private and commercial certificates. Check with your flight instructor which maneuvers will be covered in your next lesson and then prepare yourself by reading the relevant chapters and working through the reviews. Use it afterward to consolidate what you have learned in the air. Flight instructors will also benefit from better-prepared students.

### ■ **PM 2 Ground School**

You couldn't ask for a more complete textbook on how to operate general aviation airplanes. *Ground School* walks you through each segment of knowledge required to pass both your private and commercial FAA knowledge exams. The information is clear, thorough, and broken down into easy-to-digest chapters with detailed review quizzes every step of the way. Ninety percent of the text is for the private pilot, and the additional ten percent—clearly identified—will raise you to commercial standard.

### ■ **PM 3 Instrument Flying**

The instrument rating is considered the pilot's ticket into the full spectrum of the airspace system. *Instrument Flying* covers all topics, from basic attitude flying, navigation and meteorology, to the actual IFR maneuvers flown in the air. Thorough review sections help hone your knowledge for the FAA examination, while detailed prose and illustrations fill in the blanks, preparing you for your oral and flight test. Complete your set with the text chosen by leading universities and colleges as their standard classroom fare.

Aviation Supplies & Academics, Inc.  
7005 132nd Place SE  
Newcastle, Washington 98059-3153

Visit ASA's website: [www.asa2fly.com](http://www.asa2fly.com)