

PILOTING WITH CONFIDENCE

CHARTS, CHECKLISTS, SYSTEMS & COCKPIT TIPS

WARNING

The purpose and intent of this book is to give the reader the benefit of the author's experience of over 30 years of flying general aviation aircraft. It is not intended to teach airmanship of piloting technique. THIS BOOK IS NOT A SUBSTITUTE FOR OFFICIAL SOURCE MATERIAL APPLICABLE TO THE READER'S SPECIFIC FLIGHT, FLIGHT OPERATION AND AIRCRAFT AS PROVIDED BY THE FEDERAL AVIATION REGULATIONS, FEDERAL AVIATION AGENCY, THE AIRCRAFT MANUFACTURER'S RECOMMENDATIONS AND THE PILOT OPERATING HANDBOOK. SHOULD THE INFORMATION CONTAINED IN THIS BOOK DIFFER IN ANY WAY FROM THESE OFFICIAL SOURCES OF INFORMATION, IT SHOULD BE DISREGARDED IN FAVOR OF THOSE OTHER SOURCES. FAILURE TO RELY ON OFFICIAL SOURCE MATERIALS MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

Because the aviation environment is constantly changing, as is technology's role in aviation, the reader must take responsibility for acquiring all the information applicable to his or her specific aircraft, as well as all government initiated rules, regulations and directives applicable to the specific flight operation he or she is conducting. Since this information is constantly changing, the reader must keep abreast of all new information applicable to his or her flight and related operation and the latest information should be relied upon rather than the information contained herein.

PILOTING WITH CONFIDENCE

CHARTS, CHECKLISTS, SYSTEMS & COCKPIT TIPS

First Edition

James Spudich

Piloting with Confidence - Charts, Checklists, Systems & Cockpit Tips
Copyright © 2004 by James Spudich

Published by AJ Publications, LLC
P.O. Box 7435
Menlo Park, California 94026
<http://www.ajpublicationsca.com>

Printed in the United States of America

First Printing, First Edition, July 2004

ISBN 0-9748117-0-X

No part of this book may be reproduced in any form or by any electronic or mechanical means including information storage and retrieval systems without permission in writing from the publisher, except by a reviewer, who may quote brief passages in a review.

This book is designed to illustrate how charts and checklists can be generated. It is sold with the understanding that the publisher and the author are not responsible for the accuracy of detailed information provided. The information contained herein is not intended to provide navigational information that is essential to flight operations. All critical flight information must be verified by the reader with official sources, such as official charts and publications.

Also, none of the information contained in this book supercedes any official documents, regulations or procedures issued by the Federal Aviation Administration (FAA). The author and publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damage caused, or alleged to be caused, directly or indirectly by the information contained in this publication.

To Mike Nash, my first instructor who took me through my private pilot certificate and beyond and taught me the meaning of feeling one with the airplane, and to Avram Goldstein, who trained me in precision instrument flying and emphasized the importance of making my own checklists.

Thank you for purchasing this book. While it has been carefully proofread, mistakes undoubtedly have been missed. Any corrections that you may have, no matter how small, would be greatly appreciated. They can be emailed to ajpublic@ajpublicationsca.com, or mailed to AJ Publications, LLC, P.O. Box 7435, Menlo Park, California 94026.

Contents

Illustrations.....	viii
Preface.....	ix
Acknowledgments.....	x
Chapter 1. Create Your Personal Written Checklist	1
Create Your Personal Checklist.....	2
Chapter 2. About Systems and the Purposes of Your Checklist Items.....	9
Before Start.....	9
Engine Start.....	17
Before Taxi.....	27
Taxi.....	30
Before Takeoff.....	32
Normal Takeoff.....	40
Cruise.....	44
Cruise Climb.....	47
Descent.....	48
Approach.....	50
Before Landing (on Downwind).....	51
Normal Landing.....	53
Go-Around.....	55
After Landing.....	56
Shutdown.....	58
Short Field Takeoff.....	61
Short Field Landing.....	63
Chapter 3. Create Other Personal Checklists & Flight Charts.....	65
Your Personal Progress of Flight Chart.....	65
V-Speeds and Performance Specifications for the Airplanes you Fly.....	70
RPM or MP Settings and Associated Descent Rates.....	73

Chapter 4. Cockpit Tips.....	77
Climbs and Descents.....	77
How Far from Your Destination You Should Start Your Descent.....	77
Organization of your kneeboard.....	79
Organization of Your Flight Bag.....	83
 Chapter 5. Weight and Balance.....	 87
Consequences of Not Being within the Center of Gravity Envelopes.....	87
Weight and Balance, an Easy Way.....	88
Weight and Balance, the Easiest Way.....	91
 Chapter 6. The Global Positioning System.....	 99
GPS Will Take Over as the Primary Navigation System....	99
Some Basics.....	101
Getting Started with the Garmin GNS 530 Simulator.....	103
How to Fly Directly to an Airport.....	106
Creating a Flight Plan.....	107
A Practice VFR Flight.....	110
Flying an IFR Approach.....	113
 Chapter 7. Tips on How to Remember All Those Rules and Regulations.....	 117
A surplus of Information.....	117
The Requirements for You to Take Passengers Could Surprise You.....	117
Logging Time.....	118
When can you log PIC time?.....	118
Logging time in complex and high performance airplanes.....	120
How to Remember the Basic VFR Weather Minimums....	120
The Flashcard Method for Refreshing Your Memory of All Those Rules and Regulations.....	124
Final Remarks.....	130
Glossary of Terms.....	131
Additional Reading and Resources.....	133
About the Author.....	134

Illustrations

Fig. 1A. Checklist for all phases of flight — front side.....	3
Fig. 1B. Checklist for all phases of flight — back side.....	5
Fig. 2. Load shedding chart in the event of alternator failure for a Piper Dakota.....	23
Fig. 3. Progress of flight chart.....	68
Fig. 4. V-Speeds and performance specifications.....	71
Fig. 5A. RPM settings for straight and level flights and descents for particular airspeeds for a Skyhawk C172.....	74
Fig. 5B. MP settings for straight and level flights and descents for particular airspeeds for a Piper Dakota.....	75
Fig. 6. Distance out to start a descent.....	78
Fig. 7A. Chart concerning engine failure emergencies.....	80
Fig. 7B. Chart and graph concerning engine failure emergencies and local airport information.....	81
Fig. 8. Organization of flight bag.....	83
Fig. 9. A center of gravity limits graph for the Cessna 172.....	88
Fig. 10. A simple weight and balance spreadsheet for a Cessna 172 Skyhawk.....	89
Fig. 11. Weight and balance for a Cessna 182 Skylane.....	92
Fig. 12. A center of gravity limits graph for a Cessna 182.....	93
Fig. 13. Formulas for the box on the right of Fig. 11.....	94
Fig. 14. Formulas for the box in the middle in Fig. 11.....	94
Fig. 15. Formulas for the box on the left in Fig. 11.....	95
Fig. 16. A weight versus center of gravity envelope for the Piper Dakota.....	96
Fig. 17. Diagram illustrating the meaning of track, heading, desired track, bearing, cross track deviation and track angle error.....	102
Fig. 18. The Garmin GNS 530.....	103
Fig. 19. Card showing the four main groups for the Garmin 530 and the subgroups under them.....	105
Fig. 20. The Garmin GPSMAP 196.....	108
Fig. 21. A diagram of airspace to remember the four basic rules for VFR weather minimums.....	122
Fig. 22. Two sample flashcards.....	125

Preface

Organization in the cockpit is essential to safe flying. A good pilot is never finished improving his or her organizational skills. The point of this book is to instill into young pilots' minds the importance of generating their own charts, checklists and other helpful aids that reflect their own personal needs and habits. Examples of such charts, checklists and cockpit tips that I have generated for myself over the last thirty years of flying are illustrated in this book.

I find the charts and checklists that I describe invaluable for every flight that I take. I love flying in the West, and scattered throughout the book are selected photographs from various trips. These are a reminder of how spectacular and magical flying can be.

While a major point of this book is to stimulate you to create your personal charts and checklists, you may find mine useful as basic templates. The more you indulge in this activity, the more confidence you will have as a pilot and the safer you will be. And the safer you are, the happier you and your passengers will be.

In the process of creating checklists, you should constantly be asking why you are checking the things that you do. That is, be sure that you understand the airplane systems. The second chapter emphasizes this and gives brief descriptions of a variety of systems in your airplane. Understanding the systems makes you a safer pilot.

Additional chapters include methods for easily checking your weight and balance before every flight, getting started with the use of GPS equipment, and mastering and remembering the diverse rules and regulations associated with flying. Making use of your computer and personal digital assistant (PDA) is emphasized throughout the book.

Keep the skies safe and enjoy the magic of flying!

Acknowledgments

This book owes its existence in a fundamental way to my wife Anna, who encouraged me one summer day in 1975 to take flying lessons out of Friday Harbor Airport, in between experiments that she and I were carrying out on cell division of fertilized sea urchin eggs at the Friday Harbor Marine Biology Laboratories. She only asked that I do whatever it takes to be extra careful. I thank Avram Goldstein for encouraging me to write this book, Dominique Marais, Suzanne Pfeffer, and Channing Robertson for editing an early draft and offering useful suggestions, and John Mercer and Uta Francke for sharing with me some of their great photographs taken from the cockpit of small planes, which are intermingled with my own throughout the book.



Photo by James Spudich

The serenity of flying in calm conditions between layers is an unforgettable experience

Chapter 1

Create Your Personal Written Checklist

My thirty years of flying have taught me the importance of creating my own charts and checklists to use in flight. How many times have you searched for the written preflight checklist that is supposed to be in your rental plane? With more experience, you also have discovered that such checklists are minimal and not necessarily organized in a fashion that suits you. In the absence of finding it, you may have even been willing to lapse into using the acronym CIGAR and forego the written checklist completely. This may take care of some of the essentials, such as Carb heat and Cowl flaps-Instruments-Gas-Attitude (trim)-Radio, but do not expect to get away with this for very long without getting yourself into a compromising situation.

Flying is a wonderful and personal experience. You owe it to yourself to personalize written information that you have with you while sauntering along the Pacific Coast at sunset, flying to your favorite airport for an evening dinner with a friend, taking a flying weekend fishing trip to Montana, or simply doing pattern work at your home airport.

Chapter 2 deals with additional charts and checklists, but let's

start with creation of your basic personal checklist that will aid you in checking your airplane before takeoff as well as in all phases of flight, including shutdown and tiedown upon reaching your destination.

Create Your Personal Checklist

Create a personal checklist for each airplane that you fly. Each of mine is two-sided and measures 5 x 8.5 inches, which fits neatly into one Jeppesen or ASA 7-ring sheet protector, as do most of the charts and diagrams that I describe in this book. I fly the Piper Dakota a lot, and I use that as an example here (Fig. 1A and B).

Figure 1A has information relevant to before starting through cruise, and Figure 1B deals with descent through shutdown, with extra space used for short field information. Each major block is divided into subgroups (separated by underlines).

Under **BEFORE START**, Figure 1A, the first thing I do is make sure that external preflight is complete. Issues often overlooked are making sure there is no tow bar left in the nosewheel and that the airplane is completely untied. Then I check that all required documents are on board (when did you last check that?), that the avionics master and all relevant switches are off, that the circuit breakers are in, and that lights are as required.

My next subgroup is to check trims, fuel selector, flaps, and carb heat (*notice they are all near one another in the cockpit*). Next I brief my passengers, make sure all seats are locked and seat belts are secure, and make sure the cabin door is locked (a logical subgroup, right?).

ENGINE START is self explanatory.

BEFORE TAXI includes getting the ATIS and setting the altimeter and directional gyro (DG). While I **TAXI** and I'm sure that I'm clear of crowded areas, I check my brakes, make sure my

PIPER DAKOTA PA-28-236/G			
BEFORE START		TAXI	
Preflight (Documents)	complete	Brakes	check
Avion Mstr/ All Switches	off	MC, AI, DG, TC, VSI	check
Circuit Breakers	in	Takeoff Briefing	complete
<u>Lights (check)</u>	<u>as reqd</u>	BEFORE TAKEOFF	
Trims	set for T/O	<u>Flight Controls</u>	<u>correct</u>
Fuel Selector (check)	fullest tank	Mixture	rich
Flaps	up	Throttle	2000 rpm
<u>Carb Heat</u>	<u>off</u>	*Magnetos (175dp,50Δ)	check
Passenger Brief	complete	*Prop (RPM,OilP,ManP)	cycle 3x
Seats	locked	*Carb Heat (100dp)	check, cold
Seatbelts	secure	*Engine Gauges	check
Cabin Door	locked	*Ammeter & Alternator	check
ENGINE START		*Vacuum (4-6")/Alt Stat	check both
Mixture/Prop	full forward	<u>Throttle</u>	<u>900 rpm</u>
Throttle (cold/pump 1x)	1/4 " open	Fuel Selector, Aux Pump	fullest, on
Carb Heat	cold	Trim	aft neutral
<u>Primer</u>	<u>5c/2h/lock</u>	Transponder	Alt, 1200
Aux Fuel Pump	on	<u>Annunciator Panel</u>	<u>set</u>
Propeller Area	clear	Flight Instruments	set, check
Battery Master	on	Primer	in, locked
Alternator Switch	on	Lights	as reqd
Beacon lights	on	Doors, Windows, Belts	secure
Starter	engage	Autopilot	off
<u>Throttle</u>	<u>900 rpm</u>	Time Off	note
Engine Instruments	check	NORMAL TAKEOFF Best Glide 85	
Oil Press	green	Flaps	up
Aux Fuel Pump	off	Rotate	65 KIAS
BEFORE TAXI		Climb Out	80 KIAS
Mixture	lean	500' (MP, RPM)	25, 2400
Transponder 1200	standby	1000' (Fuel Pump,Ldg Lt)	both off
Radio Master	on	CRUISE 140 KIAS	
Avionics	set / check	Cruise Power	24, 2400
ATIS	copy	Landing Lights	off
Altimeter	set	Mixture	lean
DG	set	Gauges	check
Flight Instruments	check	CRUISE CLIMB 100 KIAS	
Fuel Selector	fullest tank	Power	25/ 2400
		Mixture	rich/ as reqd

Fig. 1A. Checklist for All Phases of Flight — front side
 (Not to be used without verification of information from official sources)

4 Piloting with Confidence - Charts, Checklists, Systems & Cockpit Tips

magnetic compass (MC), directional gyro (DG), and turn coordinator (TC) are moving appropriately, and that my attitude indicator (AI) is not moving and my vertical speed indicator (VSI) is at zero.

I am now at the run-up area and ready for **BEFORE TAKEOFF**. The first thing I check is flight controls. I check full range of motion of the yoke and make sure that the various movements of the yoke are properly reflected in the movements of the aileron and elevator. This check is especially critical after maintenance, either 100-hour or annual maintenance, because cables may have been reattached incorrectly or simply not reconnected at all.

The next subgroup has all the checks using the throttle at 2000 rpm. These are checking the magnetos, cycling the props, and checking the carb heat, engine gauges, ammeter and alternator, vacuum, and alternate static port. The throttle is then reset to idle at 900 rpm.

The next subgroup is fuel, trim, mixture, transponder, and annunciator panel (yes, *all in the same general location in the cockpit*).

The final subgroup before takeoff is to check flight instruments, primer, lights, doors, windows, seat belts, autopilot, and noting the time of takeoff.

NORMAL TAKEOFF (best glide for the plane is noted here, considering its importance) is self explanatory, as is **CRUISE** and **CRUISE CLIMB**. But one point to remember is to check your floating compass when aligned on the runway for takeoff. This is an excellent time to check that it is giving the appropriate reading.

Now I'm ready for the second side of the checklist (flip side of the 7-ring sheet protector) (Fig. 1B). Note across the top important information about the airplane (useable fuel 72 gal, 4.9 hr fuel with 45' reserve, 235 HP@2400 RPM, 6 cylinder air-cooled engine).