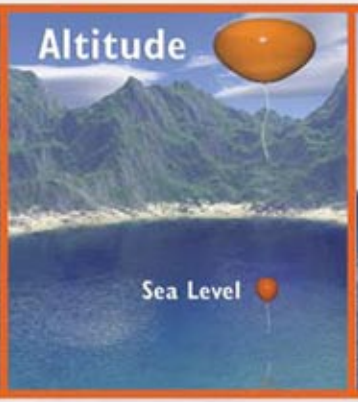
FLIGHT TRAINING:

TAKING THE SHORT APPROACH











Written & Illustrated by David Diamond

Flight Training: Taking the Short Approach
Written and Illustrated by David Diamond
Email: ShortApproach@AirDiamond.com
Internet: AirDiamond.com

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

© 2004 David Diamond
All rights reserved. This book, or any portions thereof, may not
be reproduced in any form without written permission from the publisher.

Published 2004 by Aviation Supplies & Academics, Inc.
Printed in Canada.

07 06 05 04 9 8 7 6 5 4 3 2 1

ISBN 1-56027-556-1
ASA-SHORT-APP

Editors: Jackie Spanitz (Technical); Jennie Trerise (Production)
Cover design: Sandi Harner
Layout design: David Diamond

Library of Congress Cataloging-in-Publication Data

Diamond, David
Flight training : taking the short approach / written and illustrated by David Diamond.
p. cm.
Includes index.
ISBN 1-56027-556-1
1. Airplanes--Piloting. 2. Flight training. I. Title.

TL710.D53 2004
629.132'52'071–dc22

2004022597

1 INTRO 1

Why Fly? 1
Aviation as a career 1
The aviation economy 1
Pilot pay and perks 2
Educational requirements 4
Required experience 4
Career keep-in-minds 4
Aviation for fun 5

The Process of Learning to Fly 6

What to Expect 10
Money matters 10
Time 10
Medical qualifications and considerations 11
Exam requirements 12
Choosing a medical examiner 13
English: It's all you'll ever need 14
Proficiency tests 14
The written test 14
The oral test (checkride part 1) 15
The practical test (checkride part 2) 15
Attitude adjustment 18

2 FIRST THINGS FIRST 19

Student Certificate Limitations 19

Setting Personal Limits 20
Weather limitations 20
The thunder rolls 20
Flying blind 20
Winds a' howlin' 22
Personal personal limits 23

Practical Limitations 23
LAX to JFK by Cessna might not be ideal 23
Terrainasaurus rex 24
Avoiding wet wings 25
Invisible walls 26

Choosing a Flight School, Instructor and Training Airplane 26
Structured programs (part 141 schools) 26
Pay-as-you-go (part 61 schools) 27
Universities 28
Choosing the right program 28
Certified flight instructors: the good, the bad & the ugly 29
The old and the new 29
My right-seat buddies 31
Training area considerations 32
Corn field international 32
Weather matters 33
Training aircraft options 34
Economy cars are huge 34
Tried and true vs. state of the art 35
Groundschool: yes or no? 36
Instrument groundschool 37
Financing your training 38
Estimating monthly expenses 38
Credit card financing 39
Flight school financing 40
Scholarships and grants 40
Paying the piper 40

Security Documentation Requirements for Training 40
Documentation for U.S. Citizens 40
Documentation for Non-U.S. Citizens 41
Do the right thing properly 41

Stuff You're Going to Need 42
Logbook 42
Books 43
Flight computers 43
Sunglasses, wrist watches and other cool pilot things 44
Watching your watch 44
Here comes the sun (glasses) 45
Dress for the occasion 45
Additional stuff we'll leave up to your flight instructor 46

3 DIVING IN 47

The Scary Stuff Up Front 47
Engine failures 47
Best glide 48
Partial power loss 49
Choosing a suitable landing spot 49
Doing what you can as pilot in command 50
Pop! Bang! Off falls a wing 52
Turbulence 52
Bumpy air classified 52
Bumpy air explained 53
Rough air procedures 53
Mid-air collisions 53

Mapping the sky 54
Flying blind (or otherwise) into the clouds 55

Popular Ways to Kill Yourself in an Airplane 57
Fuel exhaustion 58
Avoiding fuel exhaustion 58
Weather encounters 59
Avoiding bad weather encounters 59
Distractions 59
Avoiding distractions 60
Flying beyond your capabilities 61
Listen to the little voice 61

The Student as the Teacher 62
The CFI's role (and probable goals) 62
Taking the bull by the yoke 62
Staying focused & enthused 63

Educational Resources 64
Books 64
FAR/AIM 64
Ground study manual 65
Airport reference guides 65
Practical Test Standards (PTS) 67
Oral test prep guides 68
Additional aviation books 68
Training videos 68
Internet sites 69
Aviation websites 69
Internet newsgroups 69
Safety seminars 70
Other pilots 70

Buzzword-Loving Acronym Hell (Or BLAH for short) 70
VFR vs. VMC vs. IFR vs. IMC 70
Bravo! Romeo & Juliet win the Oscar for Last Tango in Quebec! 71
Radio communications 72
Knowing popular airplanes helps 73

4 MEET THE MAJOR PLAYERS 77

Federal Aviation Administration (FAA) 77
The FAA controversy 77
Regulations 78
When good pilots do bad things 78
Publications offered 79
Federal Aviation Regulations (FARs) 79
Aeronautical Information Manual (AIM) 79
Pilot/Controller Glossary 79
Contractions (7340.1) 80
Air Traffic Control (7110.65) 80
Notices to Airmen (NOTAMs) (7930.2) 80
Airworthiness Directives 81
Advisory Circulars 81
National Aeronautical Charting Office (NACO) 81

Air Traffic Control (ATC) 82
Connecting the ATC dots 83
ATC lingo 84
Who's your ATC daddy? 85
Butting heads with ATC 85
Controlled airspace vs. uncontrolled airspace 86
Big brother, big bother...or not? 86
ATC services & responsibilities 87
Flight following 87
Control towers 90
To two for four 93
Meet the voices on the other side of the radio 93

Flight Service Stations (FSS) 94
Services offered 94
Weather pros 94
Flight plans filed, opened and closed 95
Pilot reports (PIREPs) 96
Contact options 96
Speaking FSS 98
FSS vs. ATC: What's the difference? 99
FSS: Use it or lose it! 100

Transportation Security Administration (TSA) 100

5 ABOUT YOUR AIRPLANE 103

You Lift Me Up 103
Getting forceful with evil forces 104

Control Issues 106
The control surface purpose 108
The surface vs. the wind 109
Freeway hand flying 109
Speed highs 110
Speed lows 110
Ailerons 111
Rudder 114
Judging proper rudder use 116
Turning an airplane using only the rudder 117
When you slip you fall 118

Elevator 121
The elevator's partner 123
Flaps 124

Airplane Systems 129
System control 131

The Engine 131
Oil type and quantity 133
Carburetor types 134
Fuel systems 135
Engine settings 137

The Electrical System 138
Flight instruments in the electrical system 139
Electrical equipment 139

The Pitot-Static System 141
Atmospheric pressure changes 142
Instruments in the pitot-static system 143
The altimeter 144
The vertical speed indicator (VSI) 149
The airspeed indicator 151

The Vacuum System 158
Instruments in the vacuum system 159
The attitude indicator 160
The heading indicator (directional gyro) 163
Heading games 164
Common turning angles 164
Determining reciprocal headings 165
Cross-checking cockpit instruments 166
Bank instruments 168
Pitch instruments 168
Airspeed instruments 168

Performance 172
How high? How fast? How far? 172
How high? 173
How fast? 174
How far? 174
Four seats for four people? 175
Maximum gross weight (MGW) 175
Center of gravity (CG) 175
I can't be stalled! I still have gas in the tanks! 176

What's Next 180

6 WEATHER FROM A PILOT'S PERSPECTIVE 181

Weather Matters 181
Fear the reaper 181
Good luck finding answers 182

Aviation Weather Reports (Past & Future) 183
Encoded reports 183
Aviation time references 184
Forecasting weather 185
Forecasts over time 186
Forecasts over distance 186

Weather Resources 187
Your eyes & common sense 187
Must-see-TV 187
Flight service stations 187
Additional weather resources 189

Weather Wrap Up 189

7 FLYING AN AIRPLANE IS EASY 191

Flying an Airplane: 101 191
Preflighting 191
Taxiing 192
Taxi clearances 193
Taxiway road maps 193
Taxi talk 195
Other taxi considerations 195
Takeoffs 196
Airport traffic patterns 196
Entering the pattern 198
Leaving the pattern 200
Traffic pattern altitude 201
Calling your position 202
Landings 203
Starting what when 204
Stalls and maneuvers 206
Slow flight 206
Stalls 207
Steep turns 208
Turns around a point 208
S-turns 209
Rectangular course 210

Navigation 211
Pilotage 211
Dead Reckoning 212

Cumbersome Cockpits 212
Take only what you need

(day and night) 213
Daytime equipment 213
Nighttime equipment 215
Checklists that make sense to you 215
Checklist overkill 216
Checklists a la me 218

Flight Theory in Flight (In Theory) 218
Prioritize the groundschool brain saturation 219
Visualize the forces acting upon your airplane 219
Losing altitude 220
Gaining altitude 220
Losing airspeed 220
Gaining airspeed 220
Predict the outcome of what you do 221
Analyze some turns & descents 222

Common In-Flight Troubles 226
Could straight-and-level be any harder? 226
Flying straight 226
Flying level 227
Mixed up about mixture 229

Common Landing Troubles & Suggestions 230
Shifting runways (airplane not aligned with the runway centerline) 230
Rubber runways (airplane balloons up then plunks down) 230
Landing phase 1: Final approach 231
Landing phase 2: "Over the fence" 232
Landing phase 3: The flare 232
Landing phase 4: Touchdown 233
Crosswinds making you cross 235
Pick your touchdown spot for every landing 236

Things to Never Not Know 237
How much oil is in my airplane? 237
How much fuel is left? 239
If my engine quit, where would I go? 240
Water landings: fact and friction 241
Which airport would I choose if I needed to divert? 241
Where is the nearest bad weather? 244
Where am I on this chart? 244
Whose airspace am I in? 245
Where are the winds coming from right now? 245
Is my current situation an emergency in the making? 246
VFR pilot loses control in low visibility 246
Airplane runs out of fuel during diversion to alternate airport 246
General aviation airplane collides with commercial jet 247

8 GIZMO STOCKPILING 251

Apparel 251
Pilot hero clothing 252

Headsets 252
Feature factors 253
Noise reduction 253
Construction quality 253
Audio quality 253
Comfort 254
Stereo 254
Automatic power-off (ANR only) 255

Fuel Level Checker 255

Flashlights 255
Gadget lights 256

Lap Boards and Organizers 256
Chart clips 258
Easy jettison a must 258

Leatherman 259

Flight Computers 259
Manual options 260
Electronic options 260
E6B 260
Flight planners 261
Miscellaneous electronic tools 262
Digital aviating 262

Cellphones in Flight 264

Handhelds – GPS and Radio 265
GPS 265
GPS as an educator 265
Radio 267
A la carte vs. combo models 267

Flight Simulators 268

9 MOVING ON 269

1

Intro

WHY FLY?

Everyone has different reasons for learning to fly. Actually, that's probably not true. Most of us are drawn to flying because it seems fun. Our long-term aviation goals, however, might differ.

Are you in it for a wild weekend or a killer career?

AVIATION AS A CAREER

When I was a youngster I wanted to fly Concordes for Air France. I'm not sure why I chose Air France—maybe because I saw an Air France pilot one day and thought he looked cool in his uniform. As fate would have it, commercial aviation wasn't in the cards for me. But it might be for you.

"Professional pilot" can mean many things. Flying for the likes of United Airlines or KLM is only one part of the story. Regional or commuter airlines, police and fire departments, freight carriers and big companies (and big egos) with private jets, are also viable options for the professional pilot.

As you might imagine, flying commercially requires advanced ratings beyond your initial private pilot certificate. But more than advanced ratings, flying commercially takes a tremendous commitment. Piloting just isn't one of those careers that people use just to pay the bills:

"Ultimately I see myself working in Fast Food, but for now I just fly 747s transatlantic for Lufthansa while I fine-tune my burger-flipping skills."

It just doesn't work that way.

If you want to fly commercially, make that decision before you start your flight training or as soon thereafter as possible. It'll make all the difference in how you go about your training and what you need to expect of yourself.

THE AVIATION ECONOMY

Profitable careers in aviation are cyclical in nature, depending largely on the economy. Airlines seem to either have too many pilots or not nearly enough.

If the economy is down, it's not only hard to get airline jobs, it can be hard to keep them. I know of a few pilots that were laid off within their first year with their dream airlines.

It would do you good to spend some time at a local airport or flight school and talk to pilots about the current "aviation economy." Even if you don't find any airline pilots with whom you can shoot the breeze, you can pick the brains of flight instructors who are, in many cases, airline-bound themselves. (More on that later.) One

phenomenon about aviation folk is that you will be hard-pressed to find someone unwilling to drone on about the subject for hours on end. There is just no such thing as a pilot without an opinion on aviation.

PILOT PAY AND PERKS

Pilots can earn respectable livings. This, of course, is dependent on many variables. Larger carriers pay better than smaller ones. Pilots with seniority take home more than rookies. And those at the controls of larger aircraft, carrying more passengers or cargo, tend to be paid accordingly.

New hires typically fly right-seat in smaller airplanes for the first few years, and they earn (salted) peanuts while doing so. Senior pilots flying larger aircraft can make more than $200,000 per year.

The chart below shows some real-world career examples. The figures used are rounded, taken from one of the top three U.S. companies in each of the categories listed. The fact is: by the time you're ready to apply for commercial jobs, the salary situation will have likely changed. So consider this chart more an example of the range of pay available to pilots.

The figures shown are monthly earnings based on an average number of flight hours flown. Regulations prevent career pilots from flying more than 100 hours per month, so these figures assume something less than that. All U.S. major airlines currently guarantee pilots a monthly minimum number of flight hours of between 65 and 85.

A pilot's actual pay is determined on several factors:

- Actual hours flown each month
- Crew position (first officer or captain)

Job Title (Year)	Regional Carrier		Major Airline		Major Cargo	
	Small	Large	Small	Large	Small	Large
First Officer (1st)	1,500	1,500	2,800	2,800	2,200	2,200
First Officer (5th)	2,200	2,500	8,000	12,500	6,600	7,900
First Officer (10th)	2,300	2,500	8,900	13,800	7,200	8,600
First Officer (15th)	2,300	2,500	9,200	14,800	7,400	8,900
First Officer (20th)	2,300	2,500	9,200	14,800	7,400	8,900
Captain (1st)	2,400	4,000	12,000	19,000	8,200	9,800
Captain (5th)	2,700	4,500	12,500	19,500	10,700	12,800
Captain (10th)	3,100	5,200	13,100	20,500	11,200	13,500
Captain (15th)	3,200	5,900	13,400	20,500	11,500	13,700
Captain (20th)	3,200	6,000	13,400	20,500	11,500	13,700
Cool Uniform?	Yes	Yes	Yes	Yes	Yes	Yes

- Aircraft type
- Type of route (international pays more than domestic)
- Seniority
- Time of day (night flights pay better than day flights)
- Special navigation requirements (over-water flights pay better than over-land)

Most airlines put new hires in the right seat (first officer) before they become captains of their own airplanes.

Some airlines employ flight engineers in addition to first officers and captains. A flight engineer is a position that some older aircraft, like the DC-10 and 727 require. Automated systems on newer aircraft have made this position increasingly rare. If an airline still flies one of those older airplanes, they will require flight engineers and might consider this their entry-level position. Flight engineer salaries are usually a bit less than those of first officers.

The greyed cells in the chart depict situations that are unlikely. For example, it's unlikely that anyone would still be the first officer of a small airplane flying for a regional past his 15th year. If by that time you haven't become captain or at least moved up to a larger aircraft, something's terribly wrong. Similarly, it's unlikely that one would still be flying as a first officer at a major airplane past her 15th year.

Promotions in the airlines are based on seniority. When you are hired, you are assigned a seniority number. This number determines when you are due for a promotion. The bad part of this is that good pilots might see morons promoted before them. The good part is that pilots can "see" their futures more clearly. This system makes it possible for a pilot to estimate when he will be moving to the left seat and start enjoying the associated salary bump.

If you're serious about flying for a particular airline, one trick is to get hired on with that airline as a flight attendant during your flight training. Your work schedule will likely be flexible enough to accommodate your flight training and the big bonus is that some airlines will honor your seniority as a flight attendant when you transition to pilot. Another benefit is a guaranteed interview for a pilot position when you're ready. There are usually many pilots vying for commercial positions and interviews can be tough to get. If those benefits aren't enough, you'll be immersed in the very environment you plan to be working in later. You'll learn the ropes, and make some connections which can only help you later on. Some airlines also have mentoring programs in which a more senior pilot will advise an aspiring pilot throughout her training.

It's interesting to note the difference in starting salaries between the airline and the cargo carrier. This is likely because most new pilots would rather fly in the glamour of the friendly skies than in an airplane that's part of the tightest ship in the shipping business. But it's also because most cargo flights take place at night, and pilots usually get paid more for night flights.

Benefits wise, career pilots have it made. Flying on your company airline or even another airline is typically free, as long as an open seat is available. Passes for friends and family members are also common and either cheap or free. But the best part of commercial aviation might be the work schedule. Many commercial pilots work less than 15 days per month!

Traditional "job" benefits are available to pilots:

- Family medical/dental insurance plans
- Sick leave
- Profit sharing and 401k plans

A few extras are also part of the package:

Flight Training: Taking the Short Approach by David Diamond provides all the information needed to make the decision to learn to fly and earn a pilot's license, streamlining the flight training process with a friendly, comprehensive orientation to aviation. With an easy conversational style and sense of humor that draws readers in, David Diamond speaks to you, student-pilot to student-pilot. This fresh approach is unique among aviation books and helps readers feel they are learning from a mentor/friend rather than an instructor. This book is your Flight Training 101 and you will find yourself turning time and time again to David Diamond's guidance and recommendations.



This ideal handbook for student pilots covers such topics as why people fly and the process of learning to fly—including money matters, time commitments, school and instructor options, and the tests involved. The author tackles and dispels common fears people have about learning to fly and takes you through an orientation of the airplane's controls and instrumentation, and the maneuvers you will be flying throughout training. The author is also the illustrator, providing some of the most engaging, descriptive, and exciting 3D illustrations found in any aviation book.

The result: you will enter your flight training program completely prepared, wasting no time or money at the airport or in the airplane. You will be "Taking the Short Approach" to flight training and you'll be glad you did.



David Diamond is a private pilot ... not a flight instructor. He has no interest in flying for any reason besides the enjoyment of it. Diamond was also a founding member of the 80s rock group, Berlin, and it was during the band's first tour he experienced flight in a small airplane for the first time. Now a professional writer and 3D illustrator, Diamond wrote this book to fill a need he found during his own flight training: a book that spoke honestly about flying, the training required, and the human aspects that challenge the student pilot.

Aviation Supplies & Academics, Inc. • Newcastle, Washington

"I have read numerous books on the subject of flight instruction, and this is clearly the best that is on the market in every respect. This is the first publication to provide the prospective or current student pilot a true 'real world' perspective of what learning to fly is really all about.... The intuitive approach to the overall framework of the book... combined with the crystal clear explanations of at times difficult concepts, and literally the best illustrations and diagrams I have ever seen, serves to set this work apart from all others ... this book will set a new standard in the field."

—Dr. Kenny Reed, Flight Instructor, L-39 type rating

"David Diamond has not just the Write stuff, but he's a foremost expert at 3D illustration—a powerful and rare combination when it comes to aviation instruction."

—Thomas Haines, Executive Editor, AOPA

"I'm a good pilot and I thought I had good instruction. But this book contains a lot of stuff I simply hadn't learned! This is the way it ought to have been taught all along. Makes me wish I didn't have this day job, so I could fly more often!"

—Roger O'Donnell, keyboardist for The Cure

"...Long on invaluable insight for the person seriously considering learning to fly... a fresh, thoughtful and complete view into the challenges and rewards on the path to becoming a pilot.... The value of* The Short Approach *will continue for the new pilot as a favorite reference and resource for years to come. I would loved to have had this book when I was deciding to become a pilot."

—Don Thompson, retired Delta Air Lines pilot