PCATD

Some History

Back in the dark ages of aviation, a man named Edwin Link thought he had a better idea. He built a box with wings and tail, installed flight instruments and controls, mounted the gizmo on some pneumo/mechanical actuators, and plugged it in. From that time, instrument training has never been the same. A generation of aviators came to loathe the dark, sweaty boxes, but there was no denying the fact that they taught instruments better than airplanes alone. Thousands of military, airline, and general aviation pilots have enjoyed the benefits of simulator training.

Personal computer–based training is making good pilots better.

Today's airline, military, and high-end general aviation simulators are a far cry from Link's bloody blue box, and they are so representative of actual airplanes that it's possible to get a type rating with nothing but simulator time. Less sophisticated than simulators, but still very impressive, are Flight Training Devices (FTDs). These teaching machines are approved for initial and recurrent instrument training. Note: The comments and recommendations made here also apply to FTDs. In the 1970s, desktop simulators were introduced. Less sophisticated than FTDs, they nevertheless were useful and economical instrument trainers, and they're also portable.

Now there's a new kid on the simulator block: the Personal Computer–Based Aviation Training Device (PCATD). The PC revolution has touched just about every aspect of our daily lives. It's almost impossible to graduate from high school or college without good computer skills, and many jobs now require computer literacy. Borrowing from the computer game industry, several software writers have created programs that simulate instrument flight so well that anyone seeking an instrument rating should consider using one during training.

VFR simulation is not as well developed, but there are several ways in which PC-based simulation can make the road to that first pilot certificate easier and more enjoyable. This *Safety Advisor* will tell you what to look for in a PCATD, how to use it most effectively in your training, and how to increase efficiency in your proficiency flying.

Instrument Training Can Be Better

Learning to fly the gauges and keeping up IFR flying skills is tough. New instrument pilots seldom get enough training to be proficient in the IFR system or in real weather. That's why it's critical to use the proper tools at the right time.

Instrument flying is made up of several complex disciplines: instrument scan, aircraft control, orientation, navigation, and communication. Proficiency in all these skills can't be achieved at once. Students are taught the skills one at a time. Throughout their training, the "building blocks" of learning are steadily assembled to create fully qualified instrument pilots. Aircraft are full-task trainers. That means pilots must be proficient in all instrument skills in order to successfully fly aircraft in instrument weather conditions. Full-task instrument weather proficiency is the goal of instrument training, yet some instructors put new IFR students through hours of drill on holding patterns, procedure turns, and instrument approaches in the aircraft in perfect weather conditions. If there are no other alternatives to flying the aircraft, so be it—but this is highly inefficient. As much as 30 percent of every training hour is wasted long before the student is ready to take on the whole system—instrument scan, navigation, communication, and weather.

With the advent of PCATDs, pilots can **learn** the basic procedures and practice them as many times as needed efficiently, safely, and cost effectively in part-task trainers. **Then** they should go out—in the aircraft with an instructor—into the system and into the weather to **apply the new skills in the instrument environment.** New IFR pilots seldom have enough exposure to the real-world environment of IFR flight to be comfortable and proficient. There's more to instrument flying than passing a check ride, and ASF encourages CFIIs to spend as much time as possible with advanced students working in high density traffic and in weather.

An Integrated Training Approach

PCATD simulation works best in an integrated curriculum. That means you have to fly both the simulation and real aircraft in order to get maximum benefit. Each training component has its strengths and weaknesses. Let's take a look at them:

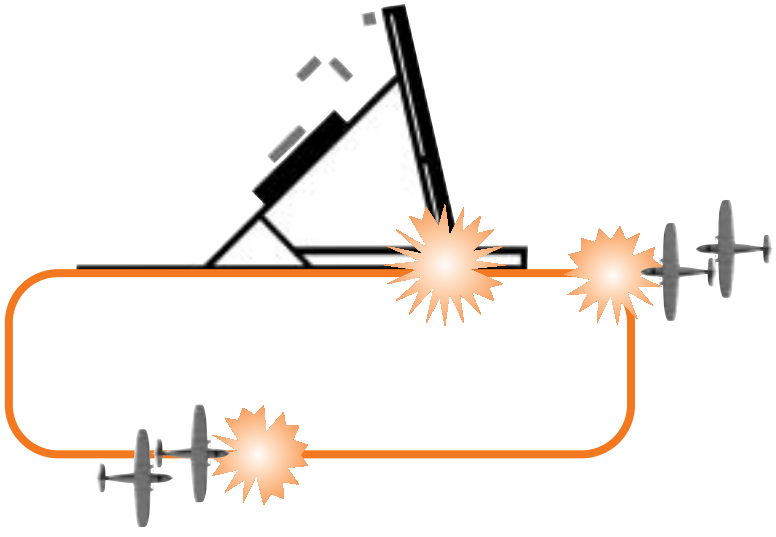
Airplanes

This is as real as it gets—you have to manage the whole transportation system. The airplane is a full-task trainer.

Learning Disadvantages

- Poor environment for teaching.
- Noisy—Even with headsets and intercoms, the average training airplane is not an ideal place for conversation.
- Dynamic—The airplane can't be stopped to discuss the lesson nor can environmental variables, such as weather and traffic, be controlled. It's also difficult to isolate individual pilot tasks.
- Other aircraft and air traffic control have a way of intruding on the lesson—sometimes very rudely.
- Expensive.

Safety tip: Simulated IFR flights may be at higher risk for midair collisions. Much of the instrument procedural practice is done in the vicinity of airports, in good weather, which is statistically where most of the midair collisions occur. Being in radar contact in VFR conditions does not guarantee separation. The instructor may be distracted from collision-avoidance duties while coaching students on IFR procedures. Instrument training puts the focus inside the cockpit on purpose. For more information on collision avoidance, see ASF's *Operations at Nontowered Airports Safety Advisor.*



ELITE 5.3 Beechcraft A36 Bonanza

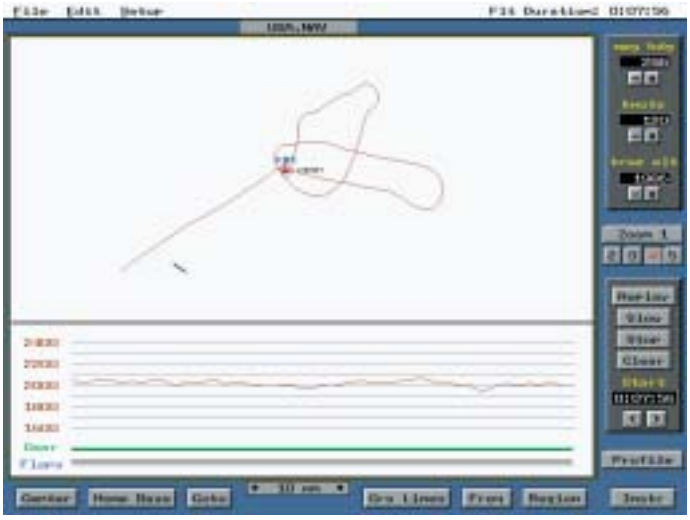
PCATDs

Learning Advantages

- Part-task trainer—Cannot duplicate an entire aircraft but is excellent for learning the basics of instrument flight.

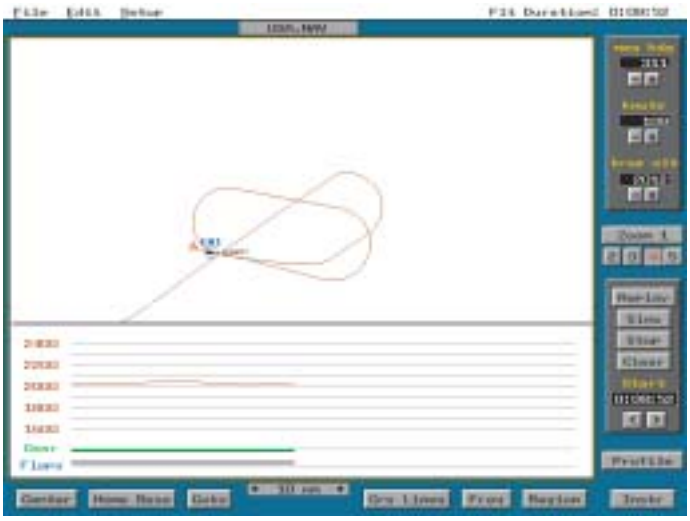
Good Environment for Teaching:

- Quiet—Unless you opt for megabass modules and surround sound.
- Task isolation—Students can concentrate on one aspect of flying at a time. Aircraft control, orientation, navigation, and communication can each be addressed separately, then combined as students progress. The work load can be cranked up when the student is ready to handle it.



Jeppesen FS200 Let's try that holding pattern entry again.

- Ability to pause—PCATDs can be paused at any time for discussion. This is vital in the learning process, to point out relationships and to correct deficiencies on the spot. It also allows the student to stop at any point to request a clarification.
- Track History Recording—all PCATDs, except Microsoft Flight Simulator (at publication time, the latest edition was Flight Simulator 98), have a mapping feature that will record the training session. Useful for teaching orientation, the flight can also be replayed and critiqued.



Jeppesen FS200 That's more like it.

- Safe—PCATDs can simulate some emergencies that are too dangerous or impossible to simulate in airplanes.
- Less-expensive than airplanes, but they are not capable of full-task training, either.

A Curriculum Is Essential for Success

If airplanes and PCATDs are different, it stands to reason that a teaching plan that exploits the strengths of each while minimizing the weaknesses will yield the best training results. A good curriculum recognizes the part-task nature of simulation and uses it to introduce concepts in isolation from other tasks. Once students are proficient in the virtual world of the PCATD, it's time to practice in an airplane. When the airplane skill has been honed, it's back to the PCATD to learn the next skill. **Use the right tool at the right time!**

The integrated approach to instrument instruction is the most efficient and effective way to teach. For example, holding patterns can be very efficiently introduced in the training device. Students can enter the hold and immediately check their entry procedure on the map. It's not uncommon to do four or five

holding-pattern entry procedures at different facilities in a half-hour of PCATD time. On airplane training flights, it's not unusual at busy airports to accumulate a half-hour in taxi time alone. Students can be flying PCATDs a couple of minutes after start-up.

Instructor's Note: A good curriculum is specific as to whether an airplane or a PCATD is used for each lesson. Don't change the order. Many airplane operators reserve simulation for days when the weather's too bad to fly. This keeps that expensive aluminum in the air, but it doesn't give students the superior training they're paying for. Integrated curricula are the mark of professional aviation educators. Students prepped in instrument operations with PCATDs still must demonstrate their skills in airplanes, so that expensive aluminum will be used. It's just used in the best way to provide the best training.

Teaching tip: Teaching instrument scan is critical, and the PCATD excels in this. Use of a laser pointer is an excellent way to highlight a particular instrument to keep the student's attention focused and to prevent fixation. This is less intrusive than using a pointer, which can disrupt the scan.

Note: The AOPA Air Safety Foundation has produced an integrated curriculum for instrument instruction. Written to comply with Federal Aviation Regulations Part 61 and 141 requirements, the curriculum concentrates PCATD time in the early stages of training. "Front loading" instrument training with simulation leaves more time at the end of the program for actual weather and ATC experience—something many instrument students fail to get. One lesson from the ASF curriculum appears below. The entire curriculum is available from the Foundation.

Lesson 4: Unusual Maneuvers

- 1.0 hour ground instruction
- 1.0 hour dual instruction - PCATD

Objective: To improve scan skills, to operate the aircraft at its limits, and to recover from unusual situations.

Preflight Discussion

- 0.8 hour ground instruction
- The instructor will demonstrate the following maneuvers and procedures on the PCATD.

I. Steep Turns

A. Full panel
B. Partial panel

II. Unusual Attitudes

A. Bank angles in excess of 30 degrees
B. Nose-low attitudes
  1. Low pitch on AI
  2. Increasing airspeed
  3. VSI indicating high rate of descent
C. Nose-high attitudes
  1. High pitch on AI
  2. Decreasing airspeed
  3. High climb rate on VSI
D. Partial panel
  1. Loss of gyro instruments

III. Recovery Techniques

A. Nose-low attitude
  1. Reduce power
  2. Level wings
  3. Raise pitch
B. Nose-high attitude
  1. Add power
  2. Lower nose
  3. Level wings

Flight Deck IFT Pro Cessna 172

Flight

- 1.0 hour dual instruction - PCATD
- Start flight at 2,000 feet in IFR conditions

I. Steep Turns of 45 Degrees Bank

A. Establish 45-degree-bank turn
B. Rollout on preselected heading

II. Partial-Panel Steep Turns

A. Fail attitude indicator
B. Turn indicator becomes primary for bank
  1. Turn greater than standard rate is steep turn

III. Unusual Attitudes

A. Nose-low attitude is set by instructor
1. Reduce power
2. Roll wings level
3. Raise nose
4. Use AI to establish level flight

B. Inoperative heading indicator and attitude indicator
1. Use altimeter to establish level flight
2. VSI can be used for supporting after recovery established
3. Use ASI to also establish level flight

C. Nose-high attitude is set by instructor
1. Add power
2. Lower nose
3. Level wings
4. Use AI to establish level flight

D. Fail gyro instruments
1. Use altimeter to establish level flight
2. VSI can be used as a supporting instrument after recovery is established
3. Use ASI to also establish level flight

Post-Flight Discussion and Critique

- 0.2 hour ground instruction

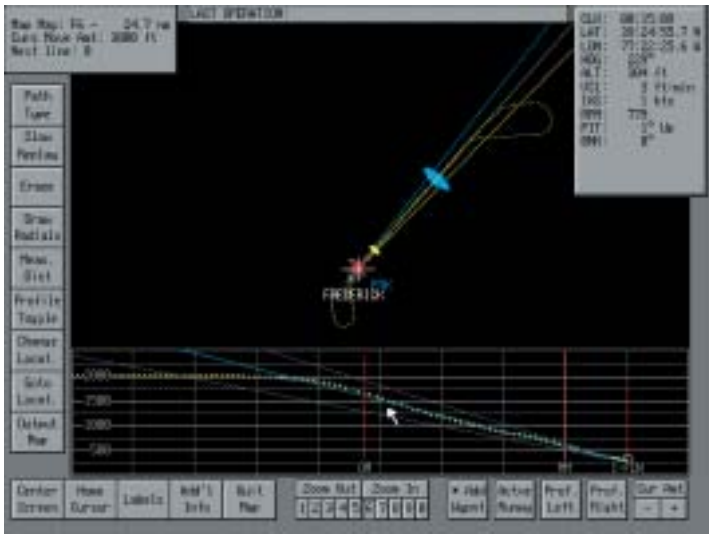
Completion Standards

The student will:
- Maintain altitude +/- 100 feet
- Maintain bank angle +/- 10 degrees
- Recover promptly to level flight from unusual maneuvers

ELITE 5.3 System Failure Options

Credit Where Credit's Due

FAR Parts 61 and 141 allow some time flown on ***approved*** simulators or flight training devices to be credited against pilot experience requirements for the instrument rating. Recently, PCATDs were added to the list of approved devices. Advisory Circular AC61-126, *Qualification and Approval of Personal Computer–Based Aviation Training Devices*, describes how pilots can receive up to 10 hours credit toward the instrument rating. Here are some of the highlights:



Flight Deck IFT Pro ILS Plot

Task Requirements List

Approved PCATDs will be qualified for use in procedural training in the instrument flight tasks listed below. These instrument tasks must be incorporated in an integrated ground and flight instrument training curriculum:

1. Flight by Reference to Instruments
a. Straight-and-level flight
b. Change of airspeed
c. Constant airspeed climbs
d. Constant-rate climbs
e. Constant airspeed descents
f. Constant-rate descents
g. Level turns, including standard-rate turns
h. Climbing turns
i. Descending turns
j. Steep turns

2. Abnormal and Emergency Procedures
a. Timed turns
b. Compass turns
c. Instrument failures
d. Procedures for turbulence

3. Radio Navigation Procedures
a. VOR navigation
b. NDB navigation
c. Localizer and ILS navigation
d. VOR holding pattern
e. NDB holding pattern
f. Localizer holding pattern
g. Intersection holding pattern
h. Use of RNAV, including GPS
i. Use of DME

4. Instrument Approach Procedures
- a. Precision approaches
- b. Nonprecision approaches
- c. ILS back course approach
- d. Missed approach

5. Communications Procedures
- a. Air traffic control clearances
  - i. Departure clearances
  - ii. En route clearances
  - iii. Arrival clearances
- b. Radio advisories and warnings
  - i. ATIS and CTAF
  - ii. Sigmets, airmets, notams, FSS communications and flight-plan changes.

6. Cross-country Procedures
- a. Departure
- b. En route
- c. Arrival

Hardware Requirements

Approved PCATDs require extensive physical controls as follows:

1. A physical, self-centering displacement yoke or control stick that allows continuous adjustment of pitch and bank.
2. Physical, self-centering rudder pedals that allow continuous adjustment of yaw.
3. A physical throttle lever or power lever that allows continuous movement from idle to full power settings.
4. Physical controls for the following items, as applicable to the aircraft or family of aircraft replicated:
   - a. Flaps
   - b. Propellers
   - c. Mixtures
   - d. Pitch trim
   - e. Communication and navigation radios
   - f. Clock or timer
   - g. Gear handle
   - h. Transponder
   - i. Altimeter
   - j. Microphone with push-to-talk switch
   - k. Carburetor heat
   - l. Cowl flaps

Any PCATD time used for credit toward a certificate or rating must be flown with an authorized instructor. The AOPA Air Safety Foundation agrees with this requirement. Flight instructors greatly enhance the simulation experience. Remember that the purpose for using the PCATD is to learn procedure. It is critical to learn it properly from the beginning. Unlearning is difficult and time consuming. This does not mean you cannot practice on your own—it just doesn't count toward the instrument flight time required for a rating.

Dedicated regulation readers will note that under FAR Part 61, up to 20 hours of approved device time may be credited toward the instrument rating. Students of recent aviation history will recall that thousands of pilots have trained on desktop simulators over the past 30 years, so why the disparity? The FAA has little experience with PCATDs and wants to test the concept before granting full credit.

AC 61-126 provides for, and ASF encourages, user feedback to the agency. This way, the FAA can monitor PCATD training and adjust the credit accordingly. ASF is also interested in this information. We encourage readers to forward their PCATD training experiences—good or bad—to us by mail or through our Web site. You'll find "E" and "snail" mail addresses for us on page 10.

Jeppesen FS200 Beechcraft A36 Bonanza

Recent Flight Experience

PCATDS MAY NOT be used to meet the IFR recency-of-experience requirements, even though other types of simulation are allowable. **Reg Reminder: 61.57 revised – To fly as pilot in command under IFR, the pilot must fly and log six approaches within six months, including holding procedures and the interception and tracking of courses using navigation systems. If unable to meet this requirement within the prescribed time or within six calendar months after the prescribed time the pilot must take an instru-**

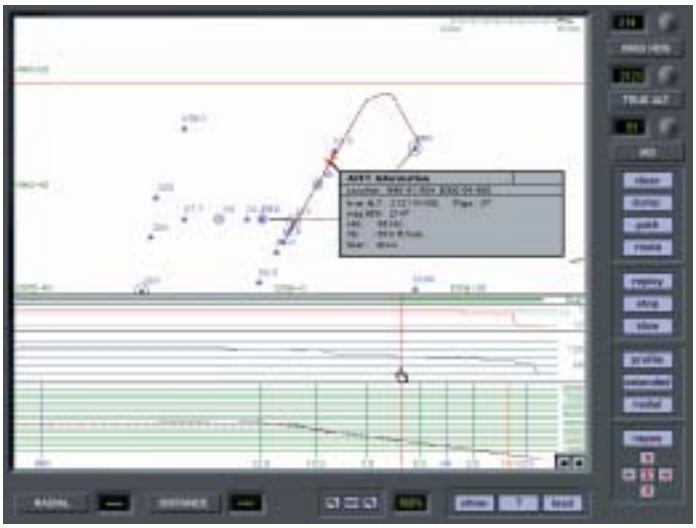
ment proficiency check with an authorized instructor.

Despite the fact that PCATDs are not allowed for recurrency, they are a great way to brush up on the basics. However, once a pilot is instrument rated, ASF strongly encourages an instrument proficiency check in light aircraft, preferably in the weather, with an experienced instructor on a regular basis. Full-task visual simulation is recommended for pilots flying multiengine equipment.

Instructor's Note: Taking the time to carefully plan each PCATD session will make training time more efficient. There is much you can and should do before your student arrives. Of course, you will brief your students in advance so they'll know what will be covered in the session, and there's a feature common to all PCATDs that makes a good training system even better.

All PCATDs will allow you to pre-program and store flight scenarios or situations. The parameters for these "mini lessons" can include location, weather, approach, or task. Once saved, the scenario is easily accessed. Everyone gets stale flying the same approaches around the local airport, so challenge your advanced students. PCATD technology makes it possible to explore the most complex approaches even if they're thousands of miles away. The ASF simulation lab stores a number of illustrative training exercises. Usually complex approaches with multiple step-down fixes are chosen, often to airports in mountainous terrain. Weather is set to vary slightly above and below approach minimums, so students won't know until they reach the missed approach point whether they'll have to miss the approach. Now throw in an equipment failure or two, and you have a situation that will task any instrument pilot. ASF has asked manufacturers to map high terrain around some formidable mountain airports. This makes the consequences of straying off the approach or busting a minimum altitude obvious.

ELITE 5.3 Weather Settings



ELITE 5.3 GPS approach plot

PCATDs in the Home

The full approved PCATD suite is beyond the reach of many pilots for personal use because many of these devices were aimed at the flight-school market. However, all the programs can work and work well with less ambitious and costly physical controls. It just can't be logged for IFR certificate credit. Some pilots will have to compete with other family members for computer access. Others may encounter some resentment of computer "flying," but apart from that, there's no reason why pilots shouldn't fly at home. If you set out a formal plan and follow a curriculum, even for recurrency, most onlookers will be impressed with your discipline and may begin to take an interest in the skill required.

Fly at Home Tips

- Find a quiet time and place to fly. You don't have to devote an entire evening. Remember, many more procedures can be practiced in one hour using a PCATD than in any airplane in several hours. Forty-five minutes to an hour is plenty of time. Beyond that, you may start to lose concentration.
- Commit to regular PCATD practice. It's better to fly two short sessions per week than one marathon session per month.

A quote from Vince Lombardi, the great football coach, is appropriate here: "Perfect practice makes perfect." In other words, practicing a procedure wrong is worse than no practice at all.

That leads us to the next point:

- If possible, have an instructor in attendance in the beginning. An instructor managing the session adds elements of realism. CFIs can act as controllers, fail instruments and equipment for emergency practice, and critique student performance. Although you may not be able to practice with an instructor all the time, at least have a CFI provide the initial training on each maneuver. That way, you'll be doing it right from the start.
- Concentrate on difficult areas. Save the fun stuff for the real airplane. It may be satisfying to fly a perfect ILS approach, but if you're rusty on nonprecision approaches with procedure turns, that's what you should practice. As you become more proficient, dial in wind and turbulence to make the flight more interesting.
- Fly unfamiliar approach procedures. You'll get more out of flying an approach you've never seen before than practicing the ILS to your home field. When you're accomplished with standard procedures, try your hand at more complex transition routes, SIDs, and STARS.

  Many pilots like to preview the approaches they'll fly on cross-country trips. A session on the PCATD can make the approach to unfamiliar territory a piece of cake. GPS approach simulations are beginning to show up on PCATDs. This is a great place to begin the transition to the new navigation system.

Teaching Tip: Use the reposition function to rapidly move aircraft to initial approach fixes or approaching other high-work-load areas once the pilot has learned to keep up.

Teaching Tip: The PCATD is a great place to teach pilots how to scan IFR approach charts quickly for critical information.

Which One Should I Buy?

We list the major manufacturers of PCATDs on page 10. All of these programs simulate instrument flight. They all come with an extensive database of airports and navigation facilities, and all feature random instrument failure modes and weather scenarios. All have an integral map that shows the flight in horizontal and vertical formats and will provide excellent training for instrument pilots.

As with many things, the more you spend, the more features you get. Ideally pilots should try before they buy. Most manufacturers of PCATDs demonstrate their products at major general aviation trade shows such as AOPA Expo. ASF maintains a PCATD center at AOPA headquarters in Frederick, Maryland. Here we explore the ways in which this new technology can make flying easier, safer, and more enjoyable. Visitors to AOPA are welcome, schedule permitting, to try their hand at the PCATDs currently in use. Please call 301/695-2170 in advance to determine availability.

ELITE 5.3 Map of US Airports

What sort of computer do I need?
PCATD programs are impressive, especially when you realize they will run on modest hardware. Hardware requirements for each program are listed in the appendix. If you do any personal Windows computing, your hardware decision will most likely be made with respect to other than simulation needs. All of the programs are evolving, though. Panel displays are more "photorealistic," and that means more computer power and storage needs. Generally, the faster the computer, the smoother the simulation will fly. The recommended hardware for each program is listed on page 10.

What about VFR simulation?
We've come a long way in the simulation business, but VFR is more difficult to simulate than IFR. Microsoft Flight Simulator, in its present form, can't be approved for instrument training credit, but it makes an effective and interesting VFR trainer. Pilots can give "intro" rides to prospective passengers to show them a little of what it's like to fly an airplane, and students can benefit from flying this simulation, as well. The program provides outside and inside views of the airplane that are very useful in explaining how the airplane is controlled. Some premier flight schools are using the program to introduce basic concepts to pre-solo students. Naturally this is not loggable flight time, but the concept is promising and the software evolution is continuing rapidly.

VFR Simulation Tips

- For a first-timer's introduction to flying, choose an outside view of the airplane in flight. Explain how the flight controls are used to maneuver the airplane about the three axes.

Microsoft Flight Simulator Cessna 182 on approach (spot plane view)

- When the intro pilot has seen the airplane from the outside, switch to instrument-panel view and show how the airplane attitude relates to outside references.

Microsoft Flight Simulator C182 on approach (cockpit view)

Microsoft Flight Simulator Flight School Page

- The latest Microsoft program includes a series of built-in flight lessons. These can be very beneficial for beginning students. Practice with the PCATD can prepare student pilots for their airplane flight lessons.

Teaching Tip: Caution—advise a new student that the bulk of their attention should be devoted OUTSIDE the aircraft. With a PCATD, it is natural to focus on flight instruments. The PCATD should be used to explain basic attitude references and teach procedure. Once the student is proficient in basics—use the aircraft, and remember to scan!

A Look to the Future

Computers and PCATDs will be an important part of general aviation from now on. The technology will continue to evolve, and simulation will be more representative of actual aircraft. Displays, particularly outside the aircraft, will be better, making the PCATD even more useful for VFR instruction, and more ATC functions will be added. Most of these improvements should involve upgrades to existing software. ASF will continue to work with PCATDs, and we'll report on this exciting technology on our Web site (www.aopa.org/asf). Remember, though, that PCATD practice is a means to an end. There's nothing in the world like flying a real aircraft, and this technology is designed to help you develop that skill to a much higher level. That leads to Safe Pilots and Safe Skies.

PCATD Manufacturers and Minimum Hardware Requirements

Manufacturers and minimum hardware requirements prices are subject to change and do not include computer hardware.

Aviation Teachware Technologies' *ELITE* Personal Simulator™ v5.3
800/557-7590
Software starting at $349
Complete PCATDs starting at $2,895
Single-engine
Add-on multi-engine; Add-on jet

Windows 98, 95 or MS-DOS
- IBM-compatible; Pentium 166 or higher
- 32 MB of RAM recommended (16 MB minimum)
- VESA compatible graphic adapter card that can display 16-bit colors in a 1024x768 dpi resolution
- 16 MB of free space on hard disk
- 17-inch monitor or larger
- Second monitor supported on Windows 98 if available (requires P233 MHz)
- One serial port

Macintosh:
- PowerPC 603e, 68040 (180 MHz) or higher
- 32 MB of memory
- 16-bit color display in 1024 x 768 resolution
- 17-inch monitor or larger
- Second monitor supported if available
- Modem or printer port available
- System 7.1 or higher with mouse

Flight Deck's Instrument Flight Trainer Pro v6.1
800/955-4359 $299.95
http://www.tsquare.com/flightdeck

- IBM compatible; min. 486DX100 or Pentium 120 or higher:
- 16 MB of RAM
- Open game port
- Video card (2MB ram) PCI or local bus
- 20 MB of free space on hard drive
- VESA
- 17-inch monitor preferred
- Windows 3.1, 95, or 98

Jeppeson's FS200 v5.1
800/621-5377 $800
(Does not include yoke or rudder pedals.)

- IBM compatible; Pentium 100 or higher
- 16 MB of RAM
- Open serial port
- SVGA video card with 2 MB of RAM
- 5 MB of free space on hard drive
- Windows 3.1, 95, or 98
- 17-inch monitor

Microsoft Flight Simulator 98
425/882-8080 $50.00
www.microsoft.com/games/fsim

- Multimedia PC with 486DX/66 (Pentium recommended)
- Windows 95 or Windows NT Workstation 4.0 or later
- 8 MB of memory for Windows 95 (16 MB recommended)
- 12 MB for Windows NT Workstation (16 MB recommended)
- 100 MB of available hard disk space
- Microsoft Mouse. Joystick or flight yoke (recommended)
- Sound card with speakers or headphones required for audio
- Double-speed CD-ROM drive

ASA's On Top
800/ASA-2-FLY $395
www.ASA2Fly.com\ASA

MS-DOS:
- IBM-compatible; 486 DX100 MHz or Pentium
- 8 MB of RAM
- 16 MB of free space on hard disk
- Sound Card
- 17-inch monitor
- One serial port
- Windows 95

PCATD Console Manufacturers

Precision Flight Controls
11500 Sunrise Gold Circle, Suite D
Rancho Cordova, CA 95742
916/638-1310

NT Systems, Inc.
493 Ballard Drive
Melbourne, FL 32935
407/254-6484

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Safe Pilots. Safe Skies.

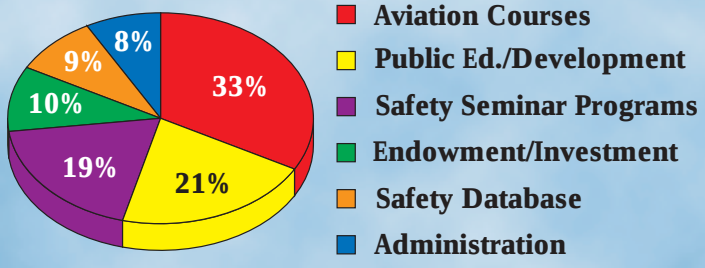
AOPA Air Safety Foundation

Chartered in 1950, the AOPA Air Safety Foundation is the nation's largest nonprofit organization providing aviation safety education and programs to the general aviation community.

The mission of the Foundation is to save lives and promote accident prevention through pilot education. To serve the nation's 622,000 general aviation pilots, the Foundation:

- Maintains a national aviation safety database that contains NTSB reports on general aviation accidents since 1982.
- Performs accident-trend research to focus Foundation resources on the principal causes of accidents.
- Produces and disseminates aviation education and training videos, pamphlets, books, and newsletters to increase safety awareness.
- Conducts specialized aviation training courses for students and instructors.
- Provides free public-service aviation safety seminars.

Where the money goes—
Gifts to the Foundation qualify for the federal charitable deduction and take many forms, including cash, appreciated stock, insurance, pledges, real estate, and personal property.



All pilots who contribute $50 or more each year will receive the *Safety Advisor* series on an annual basis. Contact ASF to take advantage of this latest opportunity in safety education and awareness.

An annual report is readily available by writing or calling the Foundation at:

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