

Single-Pilot IFR: PAC for Safety! Resource List

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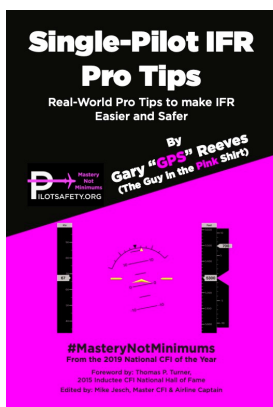
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2019 FAA National CFI of the Year

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Slow down and PAC

Slow down before you go down

Since World War II, P.A.C. or Power, Attitude, Configuration flying has been taught by the military and major airlines. When you fly your airplane the same way at the same power, attitude, and configuration, the performance or speed is consistent or predictable. There are two reasons this is so much safer. One, if you fly the same settings every time, it directly reduces decision fatigue. The second reason is that it will help identify problems and malfunctions during critical phases of flight. For example, if 21”M.P. and 2500rpm with the gear down and flaps at ten always gives you a speed of 100 knots. One time while flying, the same power settings give you 120 knots. That’s a warning sign that the gear or flaps may not be down, and you may have a malfunction.

Using the same power settings every time you do an approach reduces the number of decisions you have to make at the critical end of the flight busy approach segment. This is when decision fatigue is highest, and you are most likely to make mistakes. If you fly some approaches at 130 knots with flaps up, some at 100 knots with flaps 10, some approaches with the gear down at glide path intercept but others with the gear down at the first big descent, you are at higher risk of an accident. When every approach is different, you have to make many more decisions and work harder than you need to.

Now I will recommend something radically different from what most CFI's and "safety" experts teach. Slow down before you go down by lowering your landing gear five miles BEFORE the I.A.F. or when first given Vectors-To-Final. Dropping your gear at glide path intercept or one dot before glide path is by definition an unstable approach. Changing configuration and drag characteristics on final is not stabilized. Let me ask you a question. If you are flying a traffic pattern in a retractable gear airplane, would you wait until short final when you concentrate on the runway and crosswinds to reach over and put the gear handle down? No? Why not? Because dropping your gear during the highest flight workload when fixated on the landing is not the safest choice. This is more true when flying single-pilot IFR when you are at or close to the FAF. Let's look at the workload when intercepting a glide path. If you wait until the glide path to put the gear handle down, this is also typically where you switch radio frequencies and check-in with the tower or begin calls on CTAF. You are primarily focused on maintaining the lateral and vertical path for safety and then splitting your attention to look up for an airport through the clouds, answering calls back to you when you see the airport at 200'.

The F.A.A. Instructor's Handbook calls this "The Multitasking Mistake." Add in distractions, interruptions, and fixation, and you will fly the perfect approach until the propeller digs into the pavement, you hear the crunch of metal, and you realize you just did your first gear up landing! This happens more than you think is possible. People say that you should have kept your hand on the gear until you have gear down light(s). "Safety experts" will criticize you and say that you should have been using a written checklist. This is different for two pilot airline crews because they can divide the workload and use checklists while guaranteeing gear down, a luxury single-pilot IFR doesn't have.

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Stop and answer this question honestly. At the FAF or just outside it, while flying single-pilot, in I.M.C. with rain and light turbulence, while switching radios and tracking vertical and horizontal guidance, making sure you don't go below minimums and, looking up every second or two for the runway at the end of a three-hour flight when you're already suffering from decision fatigue... how often have you pulled out and read and used a written checklist?

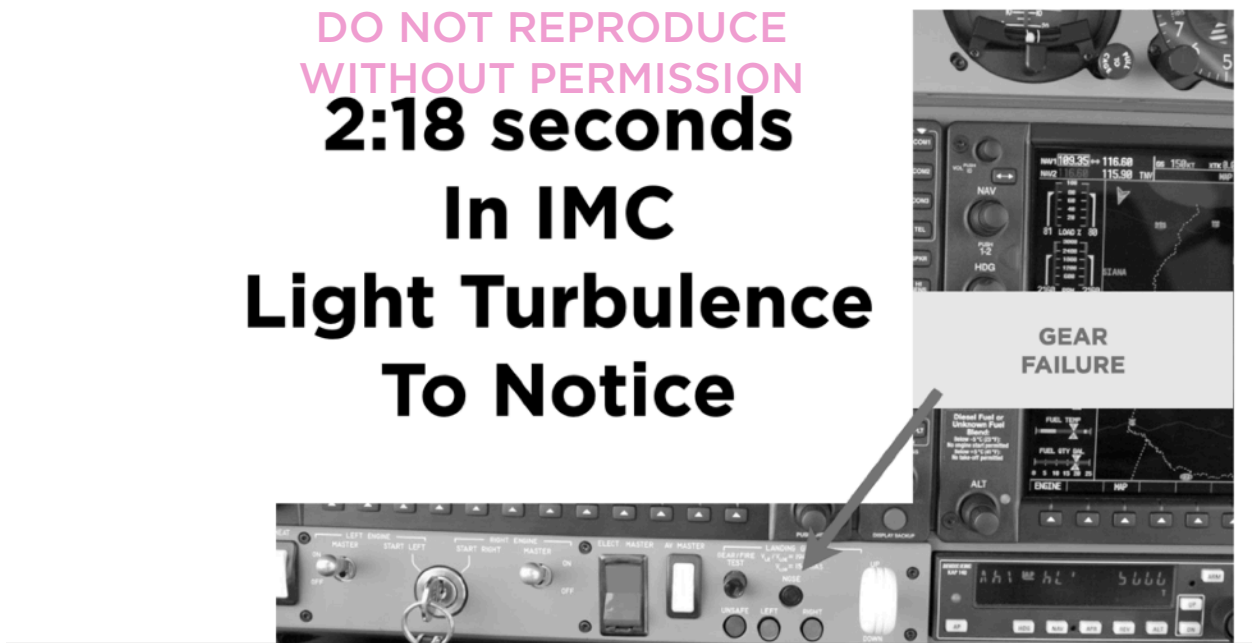
I promise you three things will happen if you slow down, drop your gear, and approach flaps to enter a stabilized configuration before you begin the approach. One you have time to use a written checklist. Two, you will slow the approach down and have more time to make decisions, directly reducing decision fatigue and increasing your safety. Three you will have the time to stop and guarantee the gear worked correctly and is safely down and locked instead of just hoping the handle worked. Check out this example of flying a twin Diamond Star who put the gear down at the glide path intercept.



DA 42 Twin Star Approach Speed 120 Kts Drop Gear at GS Intercept

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2:18 seconds
In IMC
Light Turbulence
To Notice



Look close and you'll notice the main gear is lit but not the nose light.



DA 42 Gear Down & Approach Flaps 5 MILES BEFORE IAF

- **Slows Approach Speed from 120 to 100**
- **Power Needed increase 15%**
- **Uses <2 gallons more gas**
- **Guarantees GEAR DOWN**
- **Gives you a STABILIZED APCH**
- **Extra 60 sec to fly the approach**

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Slower is safer!

I know some people don't like this. Some people, because it conflicts with "what they know," become angry. One person, we'll call him Joe "Safety" is the director of safety for a type owners and pilots association. I was hired to speak at the annual convention and shared this view during my presentation. He stood up, went to the back of the room, and started angrily talking to the organizers. As soon as I finished, he took me outside and scolded me. "You can't teach that. We teach to drop the gear at the glide path. These pilots don't have gear-up landings. If you teach them to drop the gear that early, **YOU WILL CAUSE THEM TO STALL/SPIN!**"

The next day he went up on the stage and warned people never to drop the gear early and only use the recommended techniques. The association even apologized for having me as a speaker in their next magazine.

As far as I know, putting your gear down at a lower workload time in flight has never caused an airplane to flip into a stall/spin magically. I did check the NTSB accident reports and find that two of "those pilots" had landed gear up

in the previous twelve months. Why would Joe “Safety” become so upset and be convinced that my method was dangerous? Because I challenged his beliefs and what he knew to be correct. I made the unforgivable mistake of teaching a different opinion.

Now for the other side of the coin. He is an advocate for safety, and nobody knows more about this type of airplane than him. He believes in standardized number(P.A.C.) flying. He’s even a D.P.E. He was taught and has taught for many years to drop the glide path at glide path intercept(primacy). The only danger is he cannot consider a different point of view from someone who’s an “outsider.”

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Primacy in teaching and learning, what is learned first,
often creates a strong and unshakeable impression...

F.A.A. Aviation Instructor’s Handbook

I don’t care if you accept all of my recommendations, some of them, or they get you thinking. By reading this book and others like it, you are the real “safety expert” because you are open to learning and improving. Never stop looking for different opinions and ideas that challenge your beliefs. Hold discussions with other open-minded pilots and look for ways to be better. Try different methods and see if it spurs a change or shows that the process you have now is still better. The most dangerous pilot is the one that stops learning and becomes emotionally attached to what they know to be true.

My favorite thing in teaching is when someone else tells me I'm wrong or that there's a better way, and they are right! It makes me a better instructor and even safer. By sharing their knowledge and outside view, they've done me a huge favor.

Now that you see why lowering your gear before the I.A.F. or at the first Vectors to Final is essential. Slowing the instrument approach down and making sure your landing gear is down before you get busy, the instrument approaches will always be more manageable, making them safer. Now let's take it to the next #MasteryNotMinimums step. Look at the following P.A.C. chart for a Cessna Cardinal. (C177)

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Cessna Cardinal

<i>***For Training Use Only - Use manufacturer's POH and fly with a CFI to find your airplane's values in VMC before using IMC***</i>				
PAC Worksheet*				
Adjust for weight, OAT, DA changes as needed				
Before IAF or on VTF				
Power	Attitude	Configuration Gear/Flaps	Vertical Speed	Airspeed
21" / 2500RPM	▲2° = Level	Gear ▼ / Flaps 10	0	100
Precision Descent				
Power	Attitude	Configuration Gear/Flaps	Vertical Speed	Airspeed
15" / 2500RPM	▼3°	Gear ▼ / Flaps 10	-600	100
Non Precision Approach				
Power	Attitude	Configuration Gear/Flaps	Vertical Speed	Airspeed
12" / 2500RPM	▼3°	Gear ▼ / Flaps 10	-800	100
Go-Around				
Power	Attitude	Configuration Gear/Flaps	Vertical Speed	Airspeed
Full	▲5-7°	Gear Up / Flaps 10	500	80
Full	▲5-7°	Gear Up / Flaps 0	600	80

If you start every approach on vectors or outside the I.A.F. with the gear down and flaps at 10° and set the power to 21" with the prop at 2500rpm, your airspeed will be 100 knots. Intercepting the glide path reduce the power to 15" that will result in a -600fpm descent. A good rule of thumb is to reduce power 1" for every 100 feet per minute you want to descend. In a fixed-pitch propeller like a Cessna 172, use 100rpm for -100fpm descent. In that example, reduce the power from 2150rpm to 1650rpm. Either model will give you the perfect descent to stay on the glide path without increasing your speed. Remember that your power setting will change depending on temperature, density, altitude, and weight. That's all you need to know to fly a stabilized approach and be a #MasteryNotMinimums.

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How do you determine your P.A.C. numbers? Go up with an instructor or safety pilot on a VMC day and practice some different power settings until you get some that give you one constant speed while level and descending at the various rates you need. For most single-engine planes, I like 90-110 knots. For most faster twins and turboprops, I want 120 knots. Remember to make sure you fly fast enough to allow your autopilot to function clean but slow enough to give you time to think. After you have some trial numbers, call up A.T.C. and ask for some VFR practice approaches to fine-tune your results. Please do not practice instrument approaches with 1200 in your transponder and not asking A.T.C. first at non-towered airports.

When practicing instrument approaches, the A.I.M. strongly recommends in 4-3-21 that you get permission from A.T.C. with a unique transponder code for VFR practice approaches at non-towered airports. Although most pilots and instructors have never heard of this rule, it is crucial for everyone's safety and avoiding conflict with IFR traffic. I was almost killed in a mid-air while executing a published missed approach on an IFR clearance when a local pilot flying the ILS VFR and not talking to Ft Worth Center forced me to take rapid evasive action. I've been held on the ground and denied an IFR departure and

once held for almost forty-five minutes above a high cloud overcast. A.T.C. cannot give a departure or approach clearance if a local pilot or instructor squawking 1200 and not communicating blocks the course. Again people get angry and say that the A.I.M. is not a rule and they don't have to follow a published safety recommendation when VFR. All I want to ask is why you would deliberately ignore a published recommendation that improves safety just because you can?

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AIM 4-3-21. Practice Instrument Approaches

a. Various air traffic incidents have indicated the necessity for adoption of measures to achieve more organized and controlled operations where practice instrument approaches are conducted. Practice instrument approaches are considered to be instrument approaches made by either a VFR aircraft not on an IFR flight plan or an aircraft on an IFR flight plan. ***To achieve this and thereby enhance air safety***, it is Air Traffic's policy to provide for separation of operations at locations where approach control facilities are located...

c. At airports without a tower, ***pilots wishing to make practice instrument approaches should notify the facility*** having control jurisdiction of the desired approach as indicated on the approach chart.

Now that you have your numbers practice flying them every time on every approach. What happens when A.T.C. tells me in a Piper Meridian or Turbo C210 to make the best forward speed with at least 150 knots until final because there is a jet behind me. Go back and read the chapter: Telling A.T.C. no. In actual I.M.C., I always tell them... wait for it... "unable. My approach speed is 120 knots. If you need to take me off the approach and let the jet land first, I'm happy to help." Remember, if you have to tell A.T.C. no for safety, always

give them an option. I'm not doing it to be a jerk. I know that safety comes from consistently doing the approach the same way at the same speeds. Listen to A.T.C. and hear how often the airline pilots with a three-pilot crew(captain, first officer, and Auto) tell A.T.C. unable. Jerking your gear back up, flying faster, forcing rapid decisions, and then going missed or having a gear-up landing because you were rushed increases A.T.C. workload and makes things worse, not better. "A pro pilot should be able to do the approach at any airspeed." Maybe, but a #MasteryNotMinimums Pro pilot understands why a stabilized approach at a slower airspeed is usually safer. Remember, though. There are always exceptions to every rule, especially mine!

To summarize, flying the same P.A.C. with the gear down early with the flaps set to approach before you begin the approach is safer. Methods like this are recommended by the F.A.A. Chapter three of the Aviation Instructor's Handbook suggests that taking time (slowing down) and developing routines with standardized procedures are two key ways to reduce errors. It's always better to guarantee your gear is down early than to call your insurance company and write the deductible check or explain to the F.A.A. and family members how someone got hurt because you wanted to fly the approach faster.



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