Transition Training: Stepping up or down to larger or smaller aircraft

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You have been flying one make and model of aircraft for some time now, and you are comfortable with it. You know your machine, and what it will do. When you fly it, you are in your 'comfort zone'.

Defining 'Transition Training'

At some point most pilots get the itch to go faster, farther, higher or carry more, whether their flying is for business or pleasure. When you move from one aircraft to another, this is referred to as transitioning, and the required training is simply called 'transition training'. Depending on your experience level; i.e., flight time, hours/recent experience, ratings and certificates, and the aircraft that you are interested in transitioning to, insurance companies will have more to say about 'stepping up' than the FAA. They will probably demand more training time, as well as perhaps a training facility offering what is called 'type-specific' training, for more sophisticated aircraft. They might also demand an FTD (Flight Training Device) first, followed by training in the airplane. This would also have to be from a 'qualified' CFI, who has the desired experience level in a given make and model of aircraft. Get in touch with your aircraft insurance agent to see what training the insurance will require. I will address this in more depth later in the article.

Stepping up

At the airline level, a Captain or First Officer who is moving to the same 'seat' on a different aircraft is also transitioning. For example, a Captain would transition from the Boeing 737 to the Boeing 757 or the Airbus A320.

For the rest of us in General Aviation, a pilot can transition from a CE 150/152 up to a CE 172 or CE 182. A transition to a CE 182 Skylane would also require a high-performance endorsement, since the CE 182 has more than 200 hp. For a pilot flying a twin like a Baron, to move up to a cabin-class, pressurized twin Cessna, like a CE 340, it would also require transition training. Additionally, in this case, because the CE 340 has an operational service ceiling above FL 250, actually FL 300, a high-altitude endorsement is also required. Even if you never intend to fly it that high, it is required, to act as PIC of this aircraft. Refer to FAR 61.31 (g).

Or Stepping Down

A pilot can similarly transition down, from a larger, more complex aircraft such as an airliner or corporate/military jet, down to a smaller Cessna, Beech Bonanza or Cirrus. This catches many pilots off-guard, as they assume it will be a simple checkout, and important systems training may be overlooked. This is even more important now with ever more sophisticated avionics showing up in many GA airplanes that sometimes rival the avionics found on Boeings. The avionics checkout alone might require several hours, or days.

My own recent experience

I have recently been transitioning from the Cessna 421 up to the Beechcraft King Air, at Flight Safety International, where I am an instructor. Even though I have previous experience flying turbine powered aircraft, it has been a few years. I have become comfortable with the Cessna 421. Now I am once again stepping out of my comfort zone in one aircraft and stepping into another aircraft. I have had to go back and get re-acquainted with turbine procedures I have not used in a few years.

How to approach 'transition training'?

So, how do you approach transition training? Well, for openers, it would be wise to assess your flying skills and get in touch with your CFI to discuss this. You might be current on paper, but that does not mean you are proficient. There is a world of difference.

Here are some points for you to ponder. Most pilots, myself included, can always work on improving their instrument scan. Your IFR and VFR procedural knowledge is another area to review. Granted it is not exciting reading, but you really need to review the AIM yearly, and try to keep up with FAR changes, as well.

I would emphasize the sections dealing with GPS navigation and approaches. If you make a habit of flying by the book, then you are in way ahead of the game here, more so than if you don't fly this way. It is one thing to take time-saving short cuts, and another to 'cut corners', by skipping checklists and minimizing time spent in the run-up before takeoff, for example. That might come back to haunt you when you least expect it. Also, your approach to regular, ongoing 'recurrent training', just like professional pilots, says a lot about your flying.

It is wise to invest in quality training, and foolish to go cheap with this, especially after you have spent, or rather, invested the money to move up to a larger aircraft. For many pilots, the biggest problem in moving up to a bigger, faster airplane is simply staying ahead of the airplane! Recall the old airline joke about how far behind the airplane the new First Officer is, who is not yet used to the speed of the airliner. In a faster airplane, more speed means that you have to think farther ahead in terms of time, not distance, and how many miles per minute you are traveling.

More capable aircraft, new challenges

Whatever aircraft you move up to will be more capable, which will present you with more options for flight planning, and dealing with weather, whether you are a VFR or an IFR pilot.

This is good. If the avionics is state-of-the-art, like WSI, then you will want to spend time learning to use this. Take it one step at a time though, when dealing with weather, starting with VFR, and gradually work up to hard IFR, if you wish. Retired TWA Captain Robert Buck discusses this in his classic book, “Weather Flying”. If you are not familiar with, or have not read this before, you owe it to yourself to pick it up and read it. Add it to your collection. I have. Regardless of your ratings or experience level, Captain Buck offers sage advice on weather and how to deal with it, for all pilots, having flown through it all, himself. He was an active pilot for over 60 years. He recently passed away.

Performance and the POH

When you find an airplane that you are interested in, try to arrange to go up in one, if you can. If it is a newer aircraft perhaps you can find a demo pilot, to see how it flies and handles. If it has a glass panel, that may take some getting used to. One of the first things that you should try to do is to get the POH, if possible, for whatever airplane you are considering transitioning up or down to. Take a look at it, and look through the sections. Become familiar with its procedures, checklists and performance data. It is critically important to understand that performance data is derived from test pilots, in new airplanes, with the goal of obtaining the best performance data, to sell airplanes! Test pilots are obviously highly trained and know how to extract optimum performance from an airplane. We can not expect to duplicate that! What is your skill level, and what is the condition of the airplane you hope to move up to? To be conservative (and realistic), add at least 25% or 30% to the performance data to get a better idea of what you should expect.

As you make the move up or down, you will also have to consider the engine. For this discussion, we will say that you are moving up to a higher performance, complex single. In today’s market this could also include single engine turbo-prop aircraft such as the Pilatus Porter PC-12, the Piper Meridian and the TBM 700. This opens up a whole new world, if you decide to go with turbine aircraft.

Taking proper care of your turbo-charged engine

If you are new to high altitude flying and turbo-charged engines, you will want to spend time getting to know how to take care of your engine. This is essential. It is different up in the flight levels. You can not treat your turbo like a normally aspirated engine, with quick throttle changes. Turbo-chargers are expensive, too. The turbo-charger assembly, including the turbine, the compressor and the connecting shaft will turn at speeds ranging from 50,000 RPM at the low end, to over 100,000 RPM, at cruise. It gets very hot in there and it depends on oil for both lubrication and cooling. Shock cooling is now a major concern. This requires advance planning for descents, and the ‘one inch of manifold-pressure-per-minute-power-reductions’ is a generally accepted rule of thumb for turbo-charged engines. You can not just pull the power back and start down like you might have done before, unless you have to make an emergency descent. The waste-gate operation is either fixed, manually adjusted or automatic. You will want to consult the POH for the airplane you will fly.

You will now find power settings where ‘over square’, such as 30/19 is the rule and not the exception, especially if is a geared engine, such as on the CE 421. In the CE 421, the engine turns faster than the propeller and has a reduction gear box, for better efficiency and developing higher horsepower. Since your engine can now deliver sea level horsepower to a much higher altitude, you will not be losing an inch per 1000’ on climb out as you did before in your normally

aspirated engine. But now you will have to monitor engine temperatures more carefully during climb-out. You might also have cowl flaps, which help to manage engine temperatures, by drawing more air in through the engine compartment for better cooling, and out through the cowl flap, when open, for takeoff and climb.

Climb and Descent Profiles

Climb and descent 'profiles' become more important now, and it is important to plan your climb and descent carefully. You will have to pay close attention to engine temperatures, especially in hot weather, and at high elevation airports. Think 'density altitude'. This is especially true on a tightly cowled engine, where the oil temperatures will creep right up to the red-line if you are not careful. Be aware of this during a prolonged taxi or run-up, or if the takeoff is delayed at a busy airport. If you are departing IFR, and there are Instrument Departure Procedures, you will need to consult your POH to see what the required climb performance is, what adjustments will have to be made, if any, to meet the required performance, and what your limitations are.

Configuration changes

Ok, now let's talk about configuration changes. Welcome to the world of retractable gear. When to lower the gear and configure is always a subject for a hangar flying discussion. If you are stepping up to retractable aircraft, you are now joining a new group of pilots. There are those pilots that have and those that will, land 'gear up'. Granted, sometimes the gear extension system may not work, for some reason. But, there are alternative means of extending the gear. However, if you are new to retractable gear aircraft, you want to avoid joining this 'club'. You will need to spend some time learning new techniques, for the approach and landing, and for the go-around, as well. This will help you deal with distractions at a critical time, so you won't forget to lower or raise the gear. If you do forget, you will be reminded when you get that loud horn as you reduce power or extend landing flaps on short final. It happens. I have seen this in the simulator more than a few times. Especially if you fly single-pilot, there is no one to back you up or remind you. Sometimes on a visual approach, you might delay gear extension, if you are keeping your speed up for some reason. I try to always recheck the gear at 500' on final, with a quick glance. At this point, the airplane should be in the landing configuration, on speed, on glide slope, and flying a stabilized approach. If not, consider going around. For all of this, let me offer a simple, but valuable tip; take it slow when you are new to an airplane. I have watched far too many pilots in simulator training fly too fast, and then get behind the airplane. This is especially true when on the approach, and then they get in trouble when things go wrong.

If you are VFR, then you want to extend the gear before entering the downwind leg. That way there are no distractions, and you won't forget. If there is a problem, you want to find out about it then, not while turning base leg. My own method for dealing with this, when I fly single-pilot, is to hold my hand on the gear handle after moving it to the gear down position, and holding it there while the gear is being extended, until I see three green lights. This only takes a few seconds, but if there is a problem, then I will see it right away. If you are IFR, in IMC, and if flying an ILS, lower the gear at Glideslope intercept. Think gear down, go down. This will result in a stabilized approach. Also, if you use approach flaps, extend them either at gear extension (to offset the nose down pitch) or perhaps when joining the localizer. Again, refer to your POH. If you are flying a non-precision approach, lower the gear at the Final Approach Fix (FAF). Again, gear down, go down. Then, when you reach MDA, you will have to add power again to maintain

MDA in your configuration. Know what these numbers are for your airplane so you can set them right away. You will not have a lot of time for fine tuning, unless you have an auto-pilot.

Insurance considerations

There are also important insurance considerations here. These are often the deciding factor. As was mentioned earlier, you might have the appropriate certificates, ratings, endorsements and flight time in your logbooks. So the FAA is satisfied. But remember, the FAA only sets a minimum standard. You do want to exceed that, don't you? Interestingly, some pilots pay little heed to this. Unfortunately, their egos get in the way.

But to get insurance, you will have to meet the insurance requirements, which are far more stringent than the FAA's. Insurance companies review the accident record and consider your experience, and set the premium accordingly. This is where many pilots will choose training at a professional facility instead of going with a local instructor, to meet insurance mandated training requirements. Most local CFI's are not qualified to deliver this level of advanced training, unless they have significant experience and 'time in-type', and have been approved by the insurance company. Even after having received training (FTD or simulator based) from a professional training organization, the pilot will then likely be required to receive additional training in the airplane, from an insurance 'approved' CFI, who has experience in make and model, before he can then fly 'solo'. Quite a process, yes, and this is similar to the process followed by the airlines, but we are all better for it. Just consider and compare the safety records. The insurance companies have to write the check when things go awry, and they try to prevent that by insisting on regular, quality training from an experienced, well qualified instructor.

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