Simulators or Not?©

Gary Palmer April 9, 2023

To sim or not to sim, that may sound like a simple question but has been debated across forums and tends to be a polarizing topic. Unfortunately, polarization can sometimes diminish the facts or potential upsides/downsides of a specific issue. This article provides education on the different types of sims and to which scenarios they are well suited. It may help to understand that all Sims are not created equal, nor are they viewed equally in the eyes of the FAA. So first a tour of Sim types and then a short discussion of benefits and applicability.

We start by recognizing that all sims fall into one of two types, those approved for flight training by the FAA and those which are not. What that means is you are allowed to log flight time in FAA-approved sims. There are limits and constraints which are specific to each sim and these are spelled in the "certification" statement for each sim. If you are logging time in a sim, it is recommended you take a copy or picture of the sim certification to justify the applicability for time logged.

A sim consists of computer software and physical components (e.g.: throttles, flight controls, rudder pedals, etc). The FAA certification is for a complete sim; both hardware and software. Most of the sim software is available for home use but the home use is not FAA-approved typically because of the hardware. The same software coupled with the appropriate hardware can be FAA approved. The FAA publishes a list of approved sims at: https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs800/afs810/media/FAA_Approved_Airplane_ATDs.pdf and runs a National Simulator Program at https://www.faa.gov/about/initiatives/nsp.

Within the FAA approval, there are different levels of a simulator. These are Basic or Advanced Approved Aviation Training Devices (BATD or AATD).

Anything NOT in the explicit list of approved training devices is, by exclusion, not approved. Does that mean a non-approved sim is useless? ABSOLUTELY NOT! The debates about sims center around how and not if they are useful.

How Sims Can Be Used

How can a sim be used to help pilots if not logging time? That gets into a discussion for students and their instructors because the instructor will (or should) guide the use of a sim. In general, a sim can be used for any of these (and possibly more):

1) Checklist management

A simulated cockpit is a great environment to learn where switches and controls are located. The ability to follow a checklist and know what to look at and what you are looking for should not be understated. A checklist in a simulator provides the opportunity to say, think, do, and question as you learn important steps to safe flight.

2) Operational flows

This has also been called procedural flows but the words all mean you are following a "flow" versus the checklist. The checklist is appropriate for backup, but some activities should be memorized, and if done as a flow that memory task just got easier. For example, the checklist says to turn on the navigation light then adjust the throttle to idle, then the strobe, and finally the mix; that is just a bad order. It it much easier to group the lights and turn on the nav and strobe and then adjust the throttle and mix. This is a flow based on function. Another is based on where the different controls are located. If the nav and strobe switches are at opposite sides of the panel, it might be easier to do one light, then the throttle and mix, and then the other light. Operational flows are very useful in emergencies because you follow a pattern and can check the checklist later when time is available.

3) Flight control movement

When any change is made to any control, there is typically another change necessary. For example, turning is typically initiated with a bank, but without entering the debate of how planes turn, there is almost always an associated rudder input. Adding power increases a left turn tendency and pitches the nose up so control inputs are needed to counter that effect. The sim is a great classroom where you can experience too much or too little correction and see how the plane behaves. Often the overall "feel" of the sim is not identical to an actual airplane, but the relationships are.

4) Airport and airspace familiarity

Take off and land at airports where you plan to fly and get yourself familiar with them, so much benefit in that! Flying between airports allows you to get familiar with the assorted airspace requirements between them. Your "first time" at an airport will be in the sim, and not the surprise during the flight.

5) Radio communications practice

There is a tool you can add to most sims called Pilot Edge which ties your sim into a real Air Traffic Control system. You make actual radio calls and usually talk to real controllers. They will help you learn as you fly but

creates a non-stress environment where you listen and practice as if it was real.

Which Sim is Best

Not an easy question. There are two sim products (software) available today that are probably competing for the number one spot. They are the Microsoft Flight Simulator (MFS) and X-Plane (XP). Both provide a very good basis for any flight simulator. You then add the controls, pedals, and throttles; there are more hardware options if you want.

MFS focused on a lot of graphic details and many users agree that the on-screen graphics are the best in MFS. That said, the realism is quite close, it is like a flying camera. The other side is the fidelity to flight conditions. MFS does a reasonable job of creating realism. Remember that some of the "reality" effects are based on the other hardware like the control yolk or joystick.

XP focused on the reality of flight conditions. The general opinion is that XP does a better job relating the fidelity of a flight experience. This would translate to a higher rating on the flight control movement realism. "Like flying a real plane". The other side is that the airports are very accurate (other than often very few other planes on the ramp). Other graphics are simpler which also allows the software quickly update the screen.

Conclusion

I laid out a few areas where sims can be used while providing a very high-level difference between the two most popular software products. The hardware spans a large spectrum and cost but can be very simple to start and parts can be added as you continue your flights. Sims will benefit a flight student and any experienced pilot, remember the airlines require sim training every 6 months for all pilots.

Your instructor may have ideas on how to incorporate a sim into your training. If you are open to it and have the resources, then discuss how you will benefit and utilize a sim. If you have an amazing sim setup, please send me a picture and I'll post it on this website!