PC SIMULATORS - GOOD FUN OR GOOD SENSE ? (3 Sep 1995)
by George Irvin

One day in 1969, when I was a student pilot with proud total of 8 hours' flying time, I returned to my home aerodrome because of worsening weather conditions and, turning cross-wind, I suddenly found myself in thick cloud and quite disorientated. The phrase "follow the horizon, not your instincts," garnered from some standard flying text the day before, suddenly took on a new and urgent meaning. After what seemed an eternity, I emerged straight and level into a patch of blue sky, badly frightened but much the wiser.

Ever since, I have held precision instrument flying to be the worthiest of pilot goals. Still, the only simulator we had in those days was an ancient Link trainer, good perhaps for flying a Hawker Hunter perhaps but of precious little help for steering a C-150 through the murk. In consequence, when I got my IMC rating in 1971, I had practised various VDF letdowns and perhaps two ILS approaches (at Gatwick in those days). And although I was rigorously tested on my ability to perform a partial panel spin recovery under the hood, nobody enquired about my ability to get an aircraft down to minima plus 250 in turbulent cloud. As for holding patterns, only an astrologer would have dared find method in my madness.

Hence, when the first PC-based simulator appeared some years later, I thought it the best thing since sliced bread. I did a piece for Pilot (UK) in 1986, an enthusiastic review of Microsoft's Flight Simulator 2 which I used with a joystick on a Commodore 64. By today's standards the machine was antediluvian with a frame rate of 2-3 per second---a far cry from the seamless performance achieved by the already ageing 486DX33 on which I am typing this piece. Nevertheless, using FS 2 on my Commodore did something for my flying which seemed quite amazing. It enabled me, when not in the air, to sit at home and fly procedures---indeed whole trips-- -for free. It was magical. My biggest investment was in a set of radio charts for the Chicago area and the NOS book of Illinois approach plates from Sporty's.

On rainy winter evenings I would set the cloud base at 3- 400 AGL and fly trips from O'Hare or Midway to Bloomington, Champagne and Danville, all wondrous airports I knew well without ever having been there. With a bit of imagination, ATC could be added with amended clearances, requests to hold, vectors to the ILS and so on. What we wouldn't have given for home simulation when I first started flying in 1969!

Do PC-based simulators really help pilots fly better or are they glorified toys? A PC simulator is not a full instrument trainer; it cannot (yet) help you reach for the right for the right lever or knob, it has no 'feel' and provides no motion. Nevertheless, it can help you stay orientated and keep you current on procedures; ie, a PC simulator is a no more than a basic procedure trainer. So if you decide to buy one, what do you need and what is available?

Obviously, you need a reasonably fast PC (386 or higher) with a games port for the stick and perhaps a sound-card. You may, if you wish, buy a yoke but I see little reason to do so---it simply adds to the clutter and must be unclamped from the desktop when you want to use your PC for other things. You certainly do not need rudder pedals which are generally unrealistic. But you do need a high-quality joystick; I use CH Flightstick which can be ordered from Transair Pilot Shop for UKP 44.95.

What programs are available? (Mac users beware: the rest of this piece is aimed at PC users.) I shall assume that almost everyone has seen MS Flight Simulator 5. The graphics are superb and it is great value for money. An even better program is Airline Transport Pilot (ATP) which has built in ATC, covers the whole of the United States and can be used with high-level jet charts. However, both these programs are essentially "games" rather than procedure trainers. Broadly speaking, a proper procedure trainer will allow you to dial in the windspeed and direction, fly the approach and then look at the plan and profile view of what you did (and what you should have done). Finally, for a sim to be useful on this side of the Atlantic, a European database must be offered.

The first PC procedure trainer on the European market was, I believe, MICRONAV-IC. This came out in the late 1980s and received quite a good review by Alan Bramson in Pilot. One could fly published approaches or cross-country using published VORs and NDBs; these even had realistic idents to help you practice your morse code. The disadvantage was that the graphics were not very good---the early version was black-and-white and so simulated 'night flying' only. The runway was some distant set of white dots pasted onto a centreline bar. The database was limited to the UK, although in principle expandable by the user. I remember there was a German IMC program, too, the name of which escapes me. It had better instrument graphics but no runway---if you were still on the ILS at decision height, it flashed a congratulatory message!

MICRONAV has since been upgraded and can be purchased from RC simulations (tel 44- 117-955-0900) for UKP 34.95. I have not seen the latest version and so cannot really comment on it except to say that if you want to get the feel of PC simulation without spending much, this seems as good a bet as any.

What about the newer 'upmarket' PC sims, the sort that the FAA has tested for possible certification? Today, there are in effect only two high-level PC-based procedure trainers worth considering: IFT-Pro and Elite. The former is an American product which now comes with a European database; the latter was developed in Switzerland and later was widely marketed in the United States. At UKP 240, IFT-Pro is cheaper than Elite by at least 100 pounds. Its main selling point is sheer versatility. Panel and performance parameters can be configured to simulate a range of standard and high-performance singles from a standard C-

152 trainer right up to a Piper Malibu. You can set up your radio stack the way you have it on your own aircraft. The cloud base, visibility and winds are all controllable and you can simulate day, dusk or night. Fuel, engine and electrical systems must be managed, and instruments can be set to fail (or fail unpredictably) thus enabling partial panel skills to be practised. Once you have flown an approach or from A to B (there is even an autopilot to help with the later), call up the map display and examine and replay the plan and profile views of what you have done. On the basic version, all functions are mouse-controlled, something which Windows users will find intuitively pleasing and which eliminates remembering what key to press to lower the flaps, undercarriage and so on. If trim is awkward with a mouse, you can trim from a flightstick or yoke.

And of course, for a bit more money, mouse-driven controls can be supplemented and/or replaced by a control panel complete with levers and knobs to fly the aircraft and set up the nav and comm frequencies. If you have pots of money----let's face it, instrument-rated GA pilots as a group are not poor---you might want to go for Elite. The basic unit will cost you SFR 1000/-. If you go for a jet with separate power and nav/com consoles, you could end up spending more than 10 times that much. Elite is quite simply the Rolls Royce (Mercedes, Cadillac or whatever) of PC simulators. On a fast computer with an SVGA monitor, the panel is stunningly realistic and the control response dynamicsare remarkable. The simulation of a high-performance aircraft will tax the skills of the best professional.

Although Elite is somewhat less flexible than IFT-Pro (you can't reshuffle the panel), it is the only PC-based simulator offering singles and twins---right up to an MD-80 with a flight director. Separate modules are offered for a C-172, Arrow, Mooney, Trinidad and Seneca III. The Mooney, for example, comes with an HSI, RMI KFC150 autopilot and flight director. Like IFT-Pro, you can add a nav/com console. And going one step better, Elite now offers a power console with separate power, pitch, mixture and carb heat levers and full trim---or two of each if you opt for the twin. In the latter case, you will need to add Elite's custom rudder-pedals for simulating engine-out approaches. Just as with IFT-Pro, day or night flight can be selected, weather parameters can all be set (including a randomised cloud base to force the occasional unplanned missed approach). You can add your own private airstrip; even the runway approach lighting configuration can be changed should you insist on having a Calvert system. Elite is not listed in the Transair catalogue, but Initiative Computing at Zurich airport can be reached by phoning 00-41-1-861-0561.

A decade ago when PC simulators were still in their infancy and relatively cheap, spending 20 or 30 pounds could easily be justified since that was the costs of an hour's flying. These days, a top-of-the range simulator with all the frills is not cheap. Is it worth it?--- particularly as no matter how good the program, it cannot match the realism of the real thing, or for that matter even of a two-axis Frasca. My own answer to that question is a qualified 'yes'. The qualification is this: if you

don't fly an MD-80 or even a twin, don't buy all the frills. That way, your bank account (not to say your conscience) can probably survive the outlay. Remember that a PC-sim is only a home procedure trainer; it is not a substitute for the real thing. But properly used, it is a very important complement to instrument flying.

The FAA (in contrast to the CAA and other JAA member agencies) has done considerable research on Elite with a view to its possible certification as an approved simulator (supervised by a CFII). Although the initial verdict reached three years ago was negative, a recent university study of a large sample concluded that there was no significant difference in the rate of improved instrument proficiency achieved by students using Elite and those using a well-known 'approved' desk-top simulator. At present, the FAA is reconsidering the matter.

Line pilots train flying unfamiliar approaches on multimillion dollar rigs before setting off to do it for real. GA pilots who fly IFR don't have that luxury, but many if not most have PCs. A no-frills dedicated simulator program costs half as much as a backup vacuum system, and far more GA accidents arise from poor flying in weather than from vacuum pump failures. Unless you fly enough to keep your instrument proficiency spot on, there is little excuse for not thinking seriously about a PC simulator.

I have a simple rule about flying unfamiliar or difficult procedures. The night before I get out the charts and plates, set myself up wherever the STAR begins and flying the full procedure at least once. Equally, at least once a month, I try to do some holding pattern entries with different wind settings. As you read this, some of you will recently have been into Toussus-le-Noble with its fiendishly Gallic STAR and endless 'retro' SID into the back of beyond. I don't fly into Toussus often. When I last did the weather was horrible and the De Gaulle and Orly controllers were preoccupied with a babbling tailback of heavy metal drivers, so I was left largely to my own devices. Frankly, I don't know whether it was only the hand of God or having flown the STAR on my PC sim that got me there in one piece, but the boost in confidence of 'knowing' a procedure can make a considerable difference. In "hardball IFR", as they say in the States, just one simple mistake can ruin your whole day!