

Simulation STIMULATION

After a thrilling day at North Weald Aerodrome working on the BMAA Constitution, David Bremner had a go on Joan Walsh's simulator...

THERE are times when flying has to take a back seat; when it's cold, wet, cloudy or snowy outside, and we have to find indoor pursuits to keep us entertained.

For instructors, of course, there's the problem of paying the bills, especially over the winter, and a couple have found ways to keep the students progressing even when the weather outside prohibits actual flying. There are now three schools that offer flight simulation as part of their training syllabus, and recently I paid a visit to Joan Walsh at Saxon Microlights, based at the historic airfield of North Weald in Essex, to check out her example.

North Weald is huge fun. I parked under the wing of a DC4, Joan's hut is behind a hangar containing a Catalina, and we had to talk over the noise of a Jet Provost being ground run at what sounded like full power.



Simulated Thrusters in formation over Essex

An office has been converted into a passable imitation of the cabin of the Thruster T600 parked outside, with a single very large screen providing the view outside. The controls (including the bungee trim) are accurately modelled and work, and you can even strap in. There's a touch screen on the instructor's side to give control of the simulation.

Joan's background in IT has enabled her to construct a fully accurate model of the T600 using the popular X-Plane software which, unlike all other commercially available packages, models the aerodynamics from first principles. (X-Plane is commonly used for commercial aircraft design – the Virgin Galactic space project and our own e-Go, for example). The result is a model which behaves exactly like the one parked outside.

We sat in and Joan started the engine; she's modelled the local scenery so that students can feel fully at home. We opened the taps and took off. The handling certainly replicates the T600 accurately, and I found it easy enough to maintain control, albeit somewhat too near the stall for Joan's liking.

There are various ways of making a simulator more realistic; the one at Popham uses three screens specially developed for simulators that mimic the sense of 3D; at Ince Blundell, Richard Thornborough uses the Microsoft Flight Sim with its excellent scenery files and a sensor that moves the view to match movements of your head.

At Saxon, they have a single very large screen which is also pretty effective, but whichever method you use, the judgment of height for landing is always going to be tricky – there are just too many visual cues in real life that can't be modelled indoors. The same thing applies to force feedback through the controls; nothing replicates the feedback you get from the real thing.

Nevertheless, there's no question that the simulator can provide very useful familiarization with all sorts of other things; getting an instinctive feel for crosswind drift, how easy it is to get lost during a cross-country exercise, and the changing perspective of the runway in the circuit.

And student Ray, who was completing his cross-country exercise when I turned up, learned some useful exercises and was certainly appreciative of the benefits.

If you want more information, check out the website at www.saxonmicro.co.uk or contact Joan at web@saxonmicro.co.uk, 07885 039502 or 01245 267637. □

BAD WEATHER FLYING – or learning by Let's Pretend

Joan Walsh explains how her unique simulator came into being

The UK microlight licence rules require students to have completed a minimum of 25h flight training, but in reality it takes a lot longer because most students are faced with a number of handicaps, not least of which is the UK weather.

A very important factor in learning any new skill is continuity of practice – little and often is what my old piano teacher used to insist on – but a lot of student pilots just can't get that continuity unless they spend all their holidays in a Mediterranean country.

Many years ago, when home computers were not invented and PC didn't even mean feminist, I ended up working as a test engineer for Link-Miles, a manufacturer of flight simulators for the airline industry.

At the time I was a hobby glider pilot and when home computers reached a good enough standard I decided to write a simulator program which could be used to help train glider pilots. I got it started, but didn't realize how having children would eat into my spare time, so the project was never finished.

Twenty years later, the weather hadn't improved but computers had, so I decided to resurrect the simulator project. Over the next year I got copies of most of the simulator programs on the market for home computers and subjected them to a series of tests such as the ability to configure the simulated aircraft, simulation of the stall, and control interactions such as adverse yaw or slipstream effects. Only one came out OK on the tests that mattered most, and that was X-Plane.

I did some further work on that software and came up with a rough representation of the Thruster TST which was my main workhorse at the time.

One of my tests for the choice of simulation software was the simulator's response to mishandling the controls. Most of the 'game' ones just chased around the sky as if the simulated aircraft was on rails.

Most amusing of all was the Microsoft Flight Simulator version of a Sopwith Camel. I could do a fast taxi with the tail up and steer happily around the perimeter track of the airport without any tendency to ground loop. I found the stall poorly represented and I couldn't spin it no matter how hard I tried. X-Plane was a different kettle of fish, and after a winter's development we had our first prototype of the Saxon Microlight Simulator. Its home was our back bedroom.

Now, after more than 500h development, I have a simulation which performs very much like the school aeroplane, including acceleration rates, stall speeds and attitudes, climb rates and glide rates, roll rates, speeds varying realistically for throttle settings and cockpit weight, trim varying appropriately with fuel burn, and so forth. There's much more to do, but we do now have a practical training tool.

Although it's not as good as real flying, it does have some really great advantages, not least of which is the capability to set up a wide variety of weather conditions. I've used it with weather set to good visibility and flat calm conditions to get new students used to the basic skills; at the other end of the scale, I've used it with great success to introduce students to handling gusty crosswind approaches.

Using scenery based on aerial photos, I have also been able to get them to practice cross-country navigation with realistic weather conditions (including winds varying with altitude and drifting cloud shadows). When they arrive at the destination airfield, they will find the ground features reasonably well simulated.

Where the simulator really wins as a training tool is in its ability to record a student's efforts and replay them for analysis, viewing either from within the cockpit or from the outside.

Best of all, it's possible to hit the 'pause' button just as a student is about to make his favourite mistake, then explain how it arises and discuss corrective action. We can even jump out mid-flight and

go back to the briefing room for a more detailed discussion. I've seen several "eureka moments" during simulator lessons.

I'd like to be able to teach taildragger flying with the simulator, but I'd really need seat-of-the-pants motion cues for that to be worthwhile – a pity really, since I could buy half a dozen real aircraft for the price of a suitable motion system. I'll concentrate on other things... such as having fun!

If you want to see a bit more about the simulator, including a couple of short video clips, then point your web browser at www.SaxonMicro.co.uk. □



Photos What it's like to fly a virtual Thruster: approaching a virtual North Weald or "Are you sure that's the Möhne dam, Skipper?"