

Backyard Clunk

by Garth Wallace

Wayne Scott is unique among collectors of aviation memorabilia. He has a den full of early aviation magazines, rare flying books and interesting photos. The magazines include *Canadian Aviation* back to 1931, *Aircraft* and *Roundel*. The rarest of his books is an American recognition manual of foreign aircraft hastily handwritten and sent to China with the Tiger Squadron.

But the contents of Scott's bookshelves is not what sets him apart as a collector. His real triumph is in his backyard inside a 1948 Fruehof transport truck trailer. The Fort Erie, Ont, resident owns a CF-100 flight and weapons systems simulator.

This is not the latest Microsoft program for desktop fighter jocks. It is the real thing.

Scott's CF-100 simulator is a significant piece of Canadian aviation history. Only 12 were made. They were the first simulators built by the now famous CAE Company of Montreal. In the mid 1950's they were worth about \$1 million each and filled three large rooms with banks of vacuum tube computers, a monster console for the instructor and a full-sized, two-man CF-100 cockpit. Only two of the simulators are known to remain; number one stored at the National Aviation Museum in Ottawa and Scott's, the only Mk.4 version.

To say that Wayne Scott had taken the collection of aviation memorabilia to a higher level with his simulator would only be telling half the story. He has not only restored the CAE CF-100 simulator to be fully functional again, but he has also re-engineered it to operate as a 1990's digital simulator.



In its heyday the CF-100 flight simulator was used to train thousands of aircrew. In this March 1960 photo, F/O's R.H. Carlson (pilot) and T.M. Campbell (navigator) put the simulator through its paces at RCAF Stn Uplands, Ont.



Wayne Scott "flies" his privately owned CF-100 flight simulator.

The restoration process would be familiar to anyone who had worked on old warplanes that arrive on the back of a truck. Dismantle, catalogue, clean, repair and overhaul the existing parts; research, hunt and make replacements for the missing pieces; replace the radioactive dials on the instruments, create long-lost diagrams and schematics for the systems from the real thing; and then painstakingly rebuild. These potentially overwhelming tasks are usually accomplished by extremely talented people who have bags of patience and an unfailing love for what they are doing.

Scott is all of the above and clever to boot. While he was restoring the twin-cockpit portion of the simulator, he hooked each of the functioning pieces to synchronized electro-servos and wrote software to drive them in replication of

the way a CF-100 would have flown. This allowed him to replace the two-rooms worth of vacuum tube computers and the instructor's station with a \$1,500 IBM 286 PC, monitor and keyboard.

What Scott has done with his CF-100 would be easier to grasp if he had been an air force technician, an ex-CAE employee or a career computer expert, but he is none of those. Scott is a pro-fusionist, a medical specialist who operates a patient's blood flow requirements using a heart/lung machine during critical operations.

Except for the CF-100 simulator in his backyard, the 53-year-old private pilot is a typical aviation buff. His dad was a radio communications officer in the RCAF. The younger Scott grew up around post-war Canadian air bases. He wanted to be a fighter pilot, but a need

for corrective lenses disqualified him. He switched his career interest to electronics, first with Northern Telecom and then to some of the early heart pacemaker development in Toronto. But the big city lifestyle didn't fit Scott's other plans. "I wanted to learn to fly and build my own aircraft," the soft spoken Scott said. "Neither was easy while living in an apartment in a big city."

In the mid-60's, Wayne Scott and his wife Jacqueline moved to Fort Erie, a small town across the Niagara River from Buffalo, New York. He took a job with the Buffalo Children's Hospital where he has been the chief profusionist since 1967. Pictures on his walls at home from around the world indicate that Scott has an international reputation in medicine.

Wayne and Jacqueline rebuilt and flew several aircraft including a Champ; a Taylorcraft, an Ercoupe, a Piper Cherokee 150, all while raising two children.

Scott also developed an interest in old aviation books and magazines, especially the ones covering the post WWII military aircraft that were part of his childhood. He had his eye on the CF-100 simulator for 10 years before he bought it. "A collector near Toronto bought it in 1975 when a company named City Surplus went out of business. It filled four tractor trailers, but he only took the cockpit portion," Scott said. "I was there when he was ready to sell it in 1985."

It took Scott five years to research and restore the simulator, learn how to write software and apply it to the CF-100. His den is full of everything that was ever written about the airplane. He did not have the luxury of first-hand communication with technicians who built or maintained the CF-100 simulators, but CAE sent him what information they could and he talked to former air force pilots who flew the airplane and the simulator. Workers from aircraft component maker Fleet Industries in Fort Erie supplied Scott with technical help with the airframe. John Youngquist, president of

Insight Instruments also of Fort Erie, sourced some of the hard-to-get electronics. Scott has also developed a network of other collectors who have been the source of old parts.

In the past five years Scott has rewritten the software a couple of times to make it more accurate to the real thing. The result is a simulator that could challenge the best of pilots.

The CF-100 was designed in the late 1940s by A.V. Roe Canada Ltd to meet the need for an all-weather, long-range, day/night interceptor to counteract the nuclear threat of long-range Russian bombers. The twin-engined jet's maiden flight was on 19 Jan 1950. It was the first jet fighter to be designed and built in Canada. Powered by Orenda engines also made in Toronto, the CF-100 was the first straight-wing aircraft to exceed the speed of sound (in a dive). It was the first Canadian interceptor to be

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equipped with a weapons computer and a ground-zero ejection seat. When RCAF squadrons began receiving their CF-100s, it was arguably the best aircraft interceptor in the world. At the time, the American front-line fighter was the F-86 Sabre, a day, VFR lightweight with a 40-minute range.

Avro built 692 CF-100s between 1950 and 1958. Fifty-three went to Belgium and the rest equipped nine RCAF squadrons at home and four in Europe. The interceptor served its final years as an electronic warfare training aircraft before being retired in 1981.

I had the pleasure of visiting Scott and flying the simulator. It was like a scene from a movie. From the outside, there was nothing to indicate this was home to a 1950's flight and weapons system simulator except a trail of low-tech extension cords leading from the house to behind the garage. Scott led us around to the side door of an old corru-

gated tractor trailer parked in the back yard. We climbed a creaky set of steel steps in the cold, the wet and the dark. Scott cracked the door open to reveal the twin-cockpit simulator. It nearly filled the trailer. In the space remaining ahead of the twin cockpits, Scott had set up a table and chair for the computer and keyboard that drives the simulator. The cockpit instrument lights had been left on and they cast an eerie glow on the outside of the closed canopy.

Scott ran the canopy back and invited us in. It was obvious that this was no toy. Right from the ejection handle warning on the side of the seat down to the rudder pedals, it was a complete 1950s interceptor cockpit. There were panels on three sides of the seat; instruments in front, radios on the right and systems on the left.

I wiggled into the pilot's seat. Scott leaned in and identified all the switches and dials. The instruments were familiar to this light plane pilot except the monster six-inch heading gauge. The needle moved around the flat-faced dial to the appropriate number in no relation to the direction I was going. Scott said the dial could be rotated, but I never had time to do it.

Scott fired up the computer and started the program with the airplane parked on runway 36 at North Bay. The noise of the engines running at idle was piped through speakers hidden in the cockpit.

The plan was to "fly" the simulator from North Bay to Val d'Or and back using non-directional beacons for *en route* navigation and a ground controlled approach for landing. It would be a solo flight without a navigator/ weapons specialist in the rear. Scott promised not to dispatch enemy aircraft through the computer.

The CF-100 controls felt heavy but the airplane accelerated rapidly under full power. The "click" sound of the high pressure tires crossing cold pavement joints increased in frequency. At 100 knots, I pulled back on the control

stick. The CF-100 simulator is a non-motion type so all the sensations of flight must come through the instruments. According to the read-outs, the interceptor rotated slightly and started to climb. I looked down for the gear and flap levers and selected them up. A signature "clunk," the sound of the gear thumping into the wells, came over the speakers. By the time I got back on the instruments, the airplane had over rotated and was climbing at a great rate but with deteriorating airspeed. What followed was the dance of a rusty instrument pilot treating the stick on a high-performance interceptor like he was in a Champion Citabria.

Scott was kind; he didn't dial in any wind drift, turbulence or sarcastic remarks. The CF-100 is a heavy airplane and once its speed builds up, it is very stable. Once I got used to the stability, I took advantage of it. I climbed 1,000 fpm at 300 knots to 5,000 feet, not a practical altitude in real life, but a time-saving one in practice. Level flight produced 300 knots at 85 percent power. The Clunk is thirsty. I burned through the 290-gallon tip tanks during my yo-yo climb.

I turned over Val d'Or without landing and headed back to North Bay. In the descent prior to the approach, Scott invited me to try punching through the sound barrier in a full power dive. He warned me that the airplane developed a vicious tuck through the barrier. He was right and I didn't catch it. I happily watched the airspeed accelerate through the Mach barber pole without thinking of the airframe limitations. At 630 knots, two things happened in quick succession; the wings came off and I hit the ground. This was signalled by everything in the cockpit going dead except me.

Scott reset the computer placing me back on the runway at North Bay with the stroke of a few keys. He explained that a crash in the simulator in its original 1950's configuration created hours of work for the technicians who had to recalibrate each parameter. I did a short flight out to the beacon and back to experience a ground controlled approach

(GCA) and instrument landing. This time I used the CF-100's stability to take some of the work out of it and avoided Mach 1 penetrating dives. Everything went well until I created a self-induced flameout on one side on final. It was caused by finger trouble on the fuel pump switches. I got a relight at 250 feet with Scott's help and continued for landing. The trace on the computer showed a pretzel approach, but hey, a successful one is a good one!

Scott's CF-100 is a hobby. He does not use it to generate revenue, although he is becoming known in the area as someone to call for simulator repairs. He flies it himself and gives familiarization flights in it to air cadets. He is happy to fly it with pilots who have a shared interest and appreciation for what he is doing (summer only; the trailer is not heated).

So what's next for Wayne Scott? The answer to that question is in the second transport truck trailer behind the Scotts' garage. It contains the stripped down remains of an American F-86D Sabre simulator that came from a junkyard near Rochester, NY. Scott really wanted a Canadian Sabre simulator but could not find one.

"The single-cockpit Sabre is much lighter than the two-ton CF-100," Scott explained. "I will get a lot more use from it by being able to trailer it to events." In the meantime, he is on the hunt for a surplus portable classroom and town permission to use it for the "Clunk".

I asked Wayne where he got the time, and energy and knowledge to accomplish the same task that takes a whole company of talented workers at CAE in Montreal. He just shrugged and smiled, "Anyone can do anything they want if they put their mind to it." ☺

(Ed note: Reprinted courtesy of Canadian Flight of which Garth Wallace is the publisher. Wallace is a former civilian flying instructor and corporate pilot with more than 12,000 hours logged.)



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