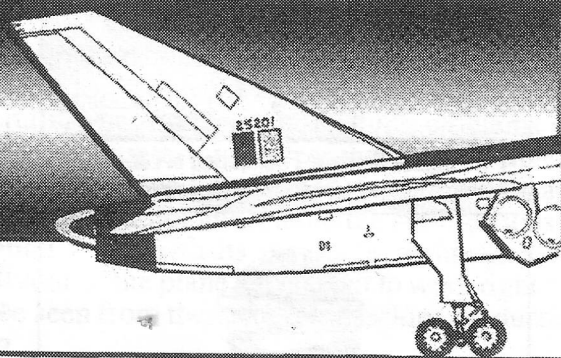


# Pre-Flight

A Publication of the Aerospace Heritage Foundation of Canada  
P.O. Box 246, Etobicoke "D", Etobicoke ON M9A 4X2



Vol. 21, No. 4

July - August 2010



Waterton - Yeager

## CANADA and the U.S.A. A view from the front seat.

by

**William A. Waterton**

At party held at the Dorchester during the winter of 1948/9 I have long since forgotten what was being celebrated. Sir Roy Dobson, one of Avro's and the Group's directors, asked me "Going to Canada to fly that new fighter for us, Bill?"

I replied: "I suppose I'm as big a sucker as the next one."

Dobson laughed. "Big sucker. That's a good one!" He laughed again and moved on.

I went about my business, the Dorchester encounter forgotten, until October, 1949, when I was hurriedly recalled from Egypt to go to Canada to test the fighter built there by the newest of the Group's firms: Avro Canada

Founded 1989

AHFC

Aerospace Heritage Foundation of Canada



Patron William Coyle  
President Frank Harvey  
Secretary Keith McLaren  
Treasurer Al Sablatnig  
Membership Nicholas Doran  
Director Web Michael Brigham  
Director Bill Danieis  
John Hughes  
Tim Patten  
Dave Sotzek



Legal Consultant Jerry Faivish  
Editorial Consultant John Thompson

PRE-FLIGHT Nicholas Doran  
Ted Harasymchuk

**President's mailing address:**  
1951 Rathburn Rd., E.  
Unit 199  
Mississauga ON L4W 2N9  
905-624-4909

*The Aerospace Foundation of Canada (AHFC) is a federally chartered non-for-profit organization. The current emphasis of AHFC is on Avro and Orenda. The Foundation is actively trying to locate former employees of these companies. No part of this newsletter may be reproduced without prior written permission. Opinions expressed in Pre-Flight do not necessarily reflect those of AHFC. Cash donations over \$25.00 and "gifts-in-kind" will be acknowledged by a receipt for income tax purposes. For more information on AHFC and how to support its activities, please write to:*

**Aerospace Heritage  
Foundation of Canada**  
P.O. Box 246, Etobicoke D  
Etobicoke ON M9A4X2  
(416) 410-3350  
[www.ahfc.org](http://www.ahfc.org)

## From the President

Early in June, I had the pleasure to speak about the AVRO Arrow to Mrs. Skully's Grade 10 class at Michael Power-St Joseph High School in Etobicoke. A couple of days prior student, Misha Karpinska presented an essay on the AVRO Arrow to her class which was well received. I sent Jim Floyd a copy of Misha's essay and Jim was very impressed with the amount of research Misha had conducted, so much so Jim sent her more information and congratulations on her effort. It's great to see much interest in the Arrow by the young students.

Frank

## Canada and the U.S.A

### Part 1 continued

There was the inevitable sourness and snarling over my being chosen for the job, but the reason was simply that I was by far the most experienced jet pilot in the Group at the time. I had flown hundreds upon hundreds of hours in jets, single and twin engine, and knew the Rolls-Royce Avons fitted initially in the CF-100, as the Canadian plane was called. An added factor may well have been a political one: to boost national pride by enabling the Group to say that Canada's first completely home produced jet fighter was initially flown by a Canadian born pilot. Avro Canada's own chief test pilot, Don Rogers, was an exceptionally fine flyer, but he then lacked experimental and jet experience.

And so I flew back to Canada in December 1949, the country I had left eleven years before, and had not visited since I ferried a Boston out of Montreal to Prestwick in 1943. At Toronto's Malton aerodrome I was met by Don Rogers and Edgar Atkin, at the time Avro Canada's chief engineer. Avro's vast plant is on the north side of the aerodrome, and there I was introduced to the general manager and other senior executives. Within an hour I was in the hangar looking over my new charge. Around the new aeroplane were crowded Royal Canadian Air Force (R.C.A.F.) officers and civilians of important mien. I recognized one of the latter as a fellow ex-cadet of the Royal Military College of Canada. We greeted each other, and I said, "What do you do for a living these days, Bud?" "Oh, I'm the Deputy Minister." I looked puzzled. "Of Defence," he added. I had indeed been away a long time!

I liked the new plane although she was by no means ready for me, despite the frantic cables to Egypt and the hurry to get me across the Atlantic. She was a big plane; her twin engines close into the fuselage exactly as I had wanted Gloster's to do with the Meteor. With her black paint, white markings and tall, stalky undercarriage, the CF-100 had a decidedly Germanic appearance.

I spent a busy day acquainting myself with the Avro setup and the people with whom I would be working. The Canadians were a refreshing bunch. By English standards they were inclined to be brash, crude and showy but what a spirit of bustling enthusiasm they showed. They wanted to get things done. While the CF-100 was being prepared for flight, I busied myself learning all I could about her structure, controls, electrics, hydraulics, fuel system, pneumatics, and so on. I studied wind tunnel reports, calculations of expected performance and aerodynamic behaviour. Some pilots, like car drivers, never much bother to learn what goes on under the bonnet. I always bothered: and to that I attribute being alive today.



I formed a deep respect for Avro Canada's aerodynamicist. Unlike some others of the breed, he would tell me what I could expect from the plane and was invariably right. He had had a great deal of wind tunnel work carried out both at Farnborough and at the Cornell University tunnel at Buffalo, N.Y. Everything had been tunnel tested: even the wingtip tanks. Such thoroughness was an eye-opener, and gave me great peace of mind.

I flew a great deal with Avro's two pilots in Lancasters, Mitchells and Ansons, to learn the aerodrome layout, the surrounding countryside and the locale of other airfields in the province. I ground ran the CF-100's engines, worked her hydraulics, and called for one or two changes in cockpit layout. To my delight and again in direct contrast to past experience the alterations were made expeditiously and without argument. I liaised amiably with the civil airport's flying control staff and the R.C.A.F. personnel involved in the project.

The atmosphere was tense, not only at Avro, but throughout the country. Most of the money financing the fighter came from public funds, and since the North American taxpayers are quick to raise hell, the enterprise had become the centre of a bitter political squabble. Canada had built fighters before, but she hadn't designed and built them, and many people felt that she should stick to the old policy of building proven planes under British and American licence. But none of the existing designs quite filled Canada's particular requirements: extremely long range, a good takeoff and high rate of climb. The British had the latter, but not the range. The Americans lacked climb performance, and required huge, costly aerodromes not currently available or immediately practicable in Canada with its limited population of some fourteen millions. The Royal Canadian Air Force wanted their own, specifically designed, aircraft. Further, they were anxious to build up their own aircraft industry in order to make themselves independent, in part, of Britain and America.

As is so often the case in Canada, however, a large section of the population lacked confidence in their country's ability and, of course, certain British and American manufacturers did not want to see their Canadian market disappear.

If the Canadian Jetliner, North America's first jet airliner, and the world's second (it was just pipped by the Comet) and the CF-100 flopped, the R.C.A.F. and the Government would have a lot of answering to do. In no small measure the future of the Canadian aircraft industry rested upon the fighter I was about to fly. Small wonder, then, the state of nerves around Avro and in Ottawa.

I had no personal doubts about the CF-100's success. She looked right and seemed right. There would certainly be troubles, but teething problems are common to all aircraft. It was clear that I would have to "sell" the plane as well as fly her, for the critics and weak of faith would not understand the ramifications of experimental work with its inevitable setbacks. Even those in favour of the plane expected it to work right off, as could be seen from their sausage machine production set-up.

There was pressure to get the aircraft in the air before the end of 1949, but it could not be done. Faces dropped, and morale was low. When I saw the aircraft at the beginning of December I doubted whether she'd be ready in four months. But this was Toronto, not Gloucestershire, and on the evening of January 17, 1950, I commenced taxiing trials.

The CF-100 had foot-operated brakes unlike the hand operated British type but I'd had experience with them in German and American planes. I found those in Avro's plane too light to be operated by clumsy feet, and had the pedal built up and operation made heavier to avoid over-braking. There was wild excitement as the CF-100 moved along under her own power for the first time. She was fitted with nose wheel steering, and I found it over-sensitive and wrongly geared, causing the plane to wander. I disconnected it from the cockpit control. The plane then ran smoothly and true, and handled admirably. Although the main wheels were relatively close together, the excellent Dunlop plate brakes turned the aircraft adequately, and with practice this turning could be appreciably helped by the use of the engines. Despite the snow on the runway, the CF-100 was at least the equal of the Meteor in ground handling, and that was good enough for me.

The taxiing trials on 18101 (as the first CF-100 was numbered) went off better than those of any prototype I handled. I beat up the runways, down wind, into wind, and across wind, at increasing speeds, stopping only for examination of the brakes or to allow an airliner to take-off or land. Then I tested control effectiveness at near take-off speeds. I could position the nose where I wished, and the elevators were O.K. The rudder was satisfactory, and pressure on the stick told me the ailerons were responding.

The brake plates glowed red in the gathering dusk, due to stopping from high speed. The rudder was satisfactory, and pressure on the stick told me the ailerons were responding. The brake plates glowed red in the gathering dusk, due to stopping from high speed. After only one sortie of fifty-five minutes I was satisfied most unusual for me. There were some minor adjustments to be made, and a thorough inspection was needed, for I had deliberately bounced the plane over rough ground to "shake things up". But all in all 18101 seemed, an excellent job of work.

**January 19** was cold and bright, the wind blowing almost straight down the runway: ideal conditions for a maiden flight. The hangar was an agitated, nervous, excited, confident confusion of activity as final inspections and checks were made. The chief inspector told me the plane would be ready after lunch, by which time a party of R.C.A.F. and Government bigwigs would have arrived from Ottawa. The presence of V.I.P.'s meant photographers and newspapermen, a damned nuisance, for that involved answering questions and posing for pictures the last thing I wanted to do when I was feeling a bit twitchy, wondering if I'd remembered everything, and knowing that despite satisfactory ground trials the plane's performance in the air was still an enigmatic question mark.

Since I had not been informed officially of the coming of the V.I.P.'s, I felt that I was at liberty to dodge both them and their attendant journalists. As an Air Force transport hove in sight, I climbed into an Anson and flew off for a last minute check of runway and wind conditions. By the time I landed it was too late to lunch in the senior staff canteen where the visitors were, and I grabbed a snack in the airport coffee shop. I gathered that the Minister of Defence and the Air Force Chief of Staff wanted to know where Waterton was, and were baffled and narked to learn that he was up in the Anson. By the time they finished lunch I was already in the cockpit of the CF-100, ready to start-up.

The entire airport staff's came out to watch the event, and the road past the airfield was blocked by parked cars. After a double cockpit check, an engine run-up and a brake holding power test, 18101 was ready for her debut. I was carrying half fuel, the plane was light, and in the low temperature the Avon engines behaved superbly. Acceleration was tremendous, and in less than 500 yards we lifted cleanly from the runway. I throttled back, and at 140 knots climbed to 500 feet.

I gently braked the wheels and pressed the up button to raise the undercarriage. But, as on all my first flights in prototypes, part of the machinery had gone wrong the button did not want to be pressed home. I tried again, more firmly. It still resisted. I shrugged, and decided to leave the wheels down and fly slowly.

On that type of undercarriage installation an electrical ground lock was fitted. When the weight of the plane was on its legs, to prevent the pilot accidentally raising the undercarriage, a switch was fitted which required forty pounds to work as against a three to five pound pressure when the plane was airborne. When the aircraft took to the air, this safety switch should have been automatically released.

To override the switch was to ignore that something was wrong. This, I knew, had been done on another aeroplane, resulting in a belly landing. So I left things as they were.

I flew 18101 for forty minutes at up to 5,000 feet and 180 knots, testing airbrakes, flaps, controls, turning, and getting the "feel" of the aircraft's general flying qualities. There was nothing to worry about: she seemed a sound design.

An R.C.A.F. Mitchell took photographs and a film. When I had used two-thirds of my fuel I came in on a straight approach. The plane was as steady as a rock, and touched down at about 100 miles an hour within the first 150 yards of runway. We stopped with smooth ease within 600 yards of the start of the runway. For a first flight I was well satisfied. The CF-100 proved pleasant to fly, and take-off and landing were easy.

After I had shut down there were photographs and talk. The brass, sweating it out on the ground, is always rather pathetic at such times: looking at you with spaniel-eyes, pleading to be told the best, terrified they'll hear the worst. For once I was able to be cautiously optimistic.

Six days later, the undercarriage lock fault rectified, I was able to fly 18101 again. The trouble had been a simple, climatic one. The shock-absorbing undercarriage legs were British developed and, unknown to the makers, were contracting slightly in the cold.

Consequently, when the plane's weight came off the wheels in flight, the legs did not "stretch" as much as they should have done there was insufficient "stretch" to release the electrically triggered safety switch. When modifications were made the undercarriage gave no further trouble.

On my second flight in the aircraft, I got down to exploring her low speed and stalling characteristics. Nothing to worry about there. But on her third flight we ran into trouble. Quite simply, I "bent" the aeroplane.

Sir Roy Dobson was visiting Canada and wanted to see what the plane would do. I did a mild beat-up. Nothing elaborate: just high and low speed flying, with rolls and tight turns.

Previously I had reached 430 knots at 12,000 feet beyond the point at which a Meteor ran into compressibility trouble. There was no sign of compressibility but the elevator trim control started to seize-up. It seemed there was distortion somewhere in the back end, and it put an end to ideas of going any faster until investigations were made.

When I landed after the beat-up we discovered that the wing-root fairings were torn and twisted. This was disturbing, for it meant that the wings were bending and twisting far more than they should have done.



And this was happening during only mild manoeuvres—a fraction of the treatment an operational fighter would have to put up with.

Careful examination of the plane revealed that the centre section cutout under, the engines, was "soft". When I flew her again I was permitted only gentle manoeuvres while the stress office scratched its head and wondered how to cure the aircraft's depressing defect. During February I made only four flights in the CF-100.

In March, on my eighth flight, I was accompanied by the CF-100's project designer, young John Frost, ex-de Havilland's, and very much the keen English public schoolboy type. Here was another delightful contrast to England, where I was never able to find a designer with spare time enough to fly in his own creation. Frost also came with me to Ottawa to show off the plane to the Governor General, Viscount Alexander, of Tunis and the visiting Prince Bernhardt of the Netherlands. The display was a tremendous success despite my "bending" the plane for a second time—even though it had been reinforced.

When I was not carrying Avro or Canadian Air Force pilots in the rear cockpit, I was often accompanied by Frank Spink, a ground engineer who watched over the CF-100 like a nursing mother. He was made my "flight engineer" when I first arrived at Avro—although I pointed out that such an appointment was unnecessary for a lighter and that I would prefer to fly solo. As it transpired, I found Spink most helpful and useful for compiling notes during performance trials



*William Waterton and Guests*

He was broken-hearted when I refused to allow him to accompany me during the CF-100's initial flights, but I could see no point in risking two necks in the untried plane. Before my time at Avro was over, we flew together a lot, and the arrangement worked well.

Putting right the cause of the CF-100's "bending" progressed slowly, for the firm did not want to take risks. Other firms did not mind taking chances with their pilots, for although they could lose all the time in the world on modifications, they expected the flyers to make up for it at the end of the line. The pilot who takes reckless chances and gets away with it is hailed by the chairborne as a helluva "press on" fellow. But when something goes wrong, and he breaks his neck, the same people will call him all the stupid clots under the sun. The sensible pilot insists that things be checked and double-checked and as a result many faults are often found on the ground which could be more than a little embarrassing if discovered in the air.

When she was back in the air, the CF-100 gave every promise of a fine top performance. Rates of climb, level speeds and Mach numbers seemed to be above expectations: Without elaborate tests and equipment, our figures had to await confirmation, but the plane would fly rings round an escorting Vampire, despite the best efforts of that aircraft. The CF-100's qualities showed during a trip to Washington in May. At between 25,000 to 30,000 feet, although well below continuous cruising power, the average speed worked out at 575 m.p.h.—virtually the top speed of the Meteor at its best height, which was considerably lower. From sitting stationary on the runway, the CF-100 reached 40,000 feet in two-thirds of a Meteor's best time, and set up an inter-city record of better than 638 m.p.h. between Toronto and Montreal.

Speeds of 660 m.p.h. have been quoted for her, with a 2,000 mile range, and calculations revealed that I had achieved more than .9 of the speed of sound. Later, a strengthened CF-100 with modified controls exceeded the speed of sound in a steep dive at height.

The purpose of the flight to Washington was to show the plane to the Americans. They had evinced great interest in her, and the Canadians, no less than anyone else, were interested in getting their hands on U.S. dollars.

When we arrived at Washington, the Americans were, I thought, rather offhand to the Canadian Air Force chiefs. My blood boiled to see the way they were treated as second rate poor relations, and the Canadians unfortunately lacked that air of down-the-nose patronage with which the seediest, down-at-heel Englishman can successfully squelch that type of ostentatious boor.

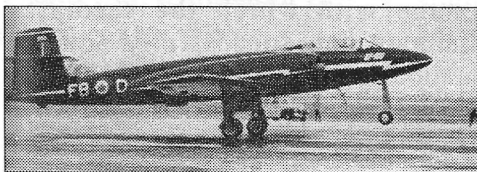
There was a slight setback at the beginning of the display when a starting trolley fused and I couldn't start one engine. This was put right, and I aligned the plane along the runway one the Americans did not use for jets because they considered it too short. But the CF-100 did not need a long take-off, and made them duck as it screamed over their heads to start a performance with which no American plane of its class could hope to compete. After the beat-up one or two U.S.A.F. Generals were needlessly patronizing, although the lower ranking officers were charming, evincing a great interest in the plane as did Admiral Cassidy and the U.S. Navy flyers present.

By the late spring of 1950 I had established the CF-100's pattern of behaviour and performance, and about the same time a novel and exciting scheme began to take shape. The idea was to fly the CF-100 across the North Atlantic direct to England for the Farnborough Air Show.

The principal alterations necessary were the fitting of long-range fuel tanks to the wingtips, and the installation of more comprehensive radio equipment, and since this work was already scheduled it would not be wasted. Sir Roy Dobson was keen on the idea, as were Avro Canada and a section of the R.C.A.F.

I estimated that by flying from Newfoundland or Labrador, and taking advantage of winds, I should be in London in about three-and-a-half hours, averaging more than 600 m.p.h. On calculations, the CF-100, with internal and tip tanks, could cover 2,500 miles in still air. The prevailing wind would add a further 300 miles to her range, so there was no technical difficulty against a trip that would earn the fighter worldwide publicity.

I went into the plan carefully. The firm speeded up the tip-tanks. I discussed safety equipment with the R.C.A.F., and Trans-Canada Airlines were most helpful in deciding upon the best radio and routing. We went into the question of spares and facilities, and I talked with Shell about laying down a supply of fuel in Newfoundland. Names of R.C.A.F. navigators were put forward, and the project became well advanced. I returned to England for a fortnight to make arrangements at that end, and to check the route. In this Trans-Canada Airlines were again very helpful, and I made the crossing, virtually as a member of their aircrew. In this Trans-Canada Airlines. were again very helpful, and I made the crossing, virtually as a member of their aircrew. Back in Canada it needed only the installation of the fuel system.



In this Trans-Canada Airlines. were again very helpful, and I made the crossing, virtually as a member of their aircrew. Back in Canada it needed only the installation of the fuel system. But it was not to be.

Ottawa was still starry-eyed at the possibility of selling the CF-100 to the Americans, and there was talk of the U.S.A.F. testing the aircraft at their own tactical establishment in Florida. If this was to be, radar and armament work would have to be carried out before the plane flew to the States. So the trans-Atlantic flight fell through. The Americans didn't buy, yet the flight to Farnborough, apart from increasing Canada's aeronautical prestige, would surely have sold planes for them, too. Instead, a Canberra later made the trip. The CF-100 would have made the crossing a greater sensation, for she could show her heels to the Canberra.

End of Part 1  
Canada and the U.S.A

## Members Matter

In this and next issue of *PreFlight* we are paying tribute to William Waterton, a Canadian, the first pilot to test fly the CF-100 during its early stages. We hope you enjoy the tribute.

A special thanks to all members who have ordered tickets for the Canadian Air and Space Museum Lottery. All stubs for ticket orders have been mailed out. For those members still contemplating ordering tickets please do so as soon as possible as it takes time to process your orders. Send your cheque and request to the AHFC mailing address of *PreFlight*.

I have been informed by your President, Frank Harvey, the Aerospace Heritage Foundation of Canada will collaborate with the Aerospace Industries Association of Canada (AIAOC) to revive the James C. Floyd Award. Everything will progress as soon as Jim Floyd has had a chance to review the qualification of the candidates and agrees with the criteria that has been established. Frank plans to travel to Ottawa and meet with Maryse Harvey, MBA Vice President, Public Affairs, AIAOC. We will keep you up-to-date as information becomes available.

Our Annual General Meeting has come and gone but not without some complications. I am glad to see all serving board members from last year decided to stay on the board and your membership secretary will again serve as your representative on the board of the Canadian Air and Space Museum.