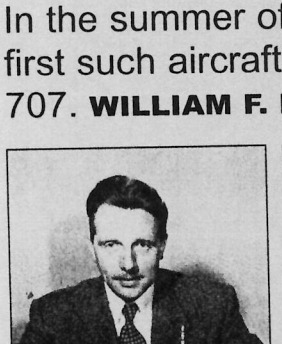
Jim Floyd and the Jetliner

In the summer of 1949 a revolutionary new jet airliner made its maiden flight — the first such aircraft to fly in North America — some five years before Boeing's famous 707. **WILLIAM F. MELLBERG** recounts the history of Canada's C-102 and its designer

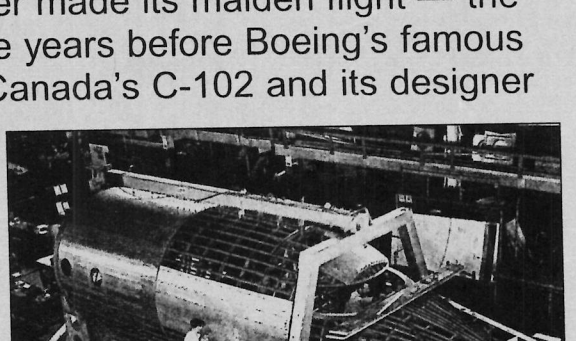


ABOVE **Jetliner designer James C. Floyd with a model of his favourite aircraft in 1947.**
RIGHT **The nose of the C-102's fuselage under construction at Malton in 1948. Although similar in general appearance to Avro's jet-powered Tudor variant, the Ashton, the C-102 was far more technologically advanced.**

STEP INTO THE UPSTAIRS OFFICE OF James C. Floyd's home in Toronto and you will notice an oversized model of a sleek silver jet transport. The same aeroplane appears in a photograph that proudly hangs over Floyd's desk. It bears the handwritten inscription: "To Jim Floyd, with commendation for this very good design", and is signed by Howard Hughes.

Like Howard Hughes, the aeroplane in the photograph remains something of an enigma. "The first impression expressed by most people seeing it for the first time," Floyd notes, "is that it looks like a modern passenger jet. In fact, it was flying over 50 years ago; more than halfway back to the Wright Brothers. And it was the first passenger jet to fly on the North American continent."

Rarely mentioned in aviation history books, this trailblazing aircraft just missed being the world's first passenger jet. It made its inaugural flight on August 10, 1949, two weeks after the de Havilland Comet and five years ahead of the Boeing 707 prototype. It could have been in service as early as 1953, 12 years ahead of the similarly-sized Douglas DC-9. Outside Canada, few people remember this pioneering jet transport, or the remarkable man responsible for its design. Speaking of the latter, Leroy Simpson, a former colleague, said: "Jim Floyd was one of the foremost, and probably least recognised, aircraft designers from the era when one person could really contribute the innovative ideas."



Jim Floyd joined A.V. Roe & Co Ltd in 1930 as an engineering apprentice. By 1940 the 25-year old engineer was working in the company's design office at Chadderton, Lancashire. That same year Jim married Irene, who worked in Avro's tracing department.

LEFT The sole example of the elegant Avro Canada C-102 Jetliner seconds before touchdown in its final livery with yellow trim and white upper fuselage.

The firm was producing the Manchester bomber for Britain's growing air war, but Roy Chadwick, Avro's chief designer, had recently assigned Floyd to a small team developing a four-engined version of the problem-plagued Manchester. The result was the famous Lancaster, of which more than 7,000 were produced, including 430 built in Canada by the wartime Victory Aircraft Ltd at Malton, Ontario (now Toronto's Pearson International Airport).

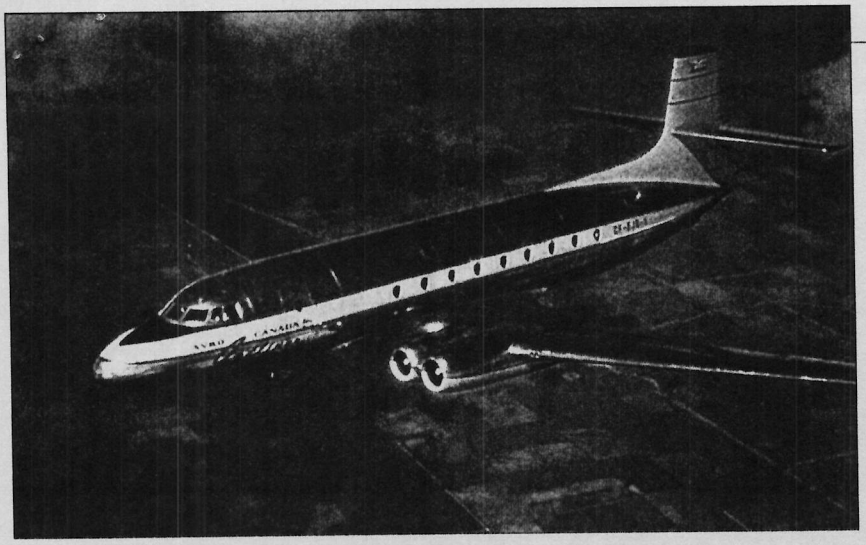
Shortly after the war ended in Europe, Avro managing director Sir Roy Dobson came to Canada to discuss the acquisition of the now idle Victory Aircraft plant by the Hawker Siddeley Group (of which Avro was a member). Sir Roy met the Rt Hon C.D. Howe, Canada's wartime Minister of Munitions and Supply. As Minister of Reconstruction, Howe was anxious to get the country's peacetime economy moving forward, and was especially keen on developing Canada's aviation industry. So a deal was cut, and A.V. Roe Canada Ltd was created on December 1, 1945. Dobson had great faith in his new Canadian enterprise, and assembled a brilliant team of engineers.

Avro Canada takes off

One of the engineers Dobson brought to Malton was Jim Floyd. Soon after his arrival he was appointed "Chief Design Engineer of Transports" for Avro Canada. In the ensuing years Floyd's work would earn him several prestigious honours, including the Wright Brothers Gold Medal (1951), the J.D. McCurdy Award (1958), the Royal Aeronautical Society's George Taylor Gold Medal (1961), and induction into Canada's Aviation Hall of Fame (1993). But throughout his career Floyd always made it a point to share credit for his achievements with his teammates — and he had some truly great ones, brilliant engineers such as Mario Pesando, Jim Chamberlin, Carl Lindow and Fred Matthews. He also worked with skilled test pilots such as Don Rogers, Mike Cooper-Slipper and Jan Zurakowski.

Avro Canada was pursuing two main projects in 1946: the CF-100 all-weather jet fighter for the Royal Canadian Air Force (RCAF), and a revolutionary jet transport for Trans-Canada Air Lines (TCA). Floyd was responsible for the latter. He faced two challenges: breaking new ground with the design of a jet airliner, and pulling together a team of young engineers.

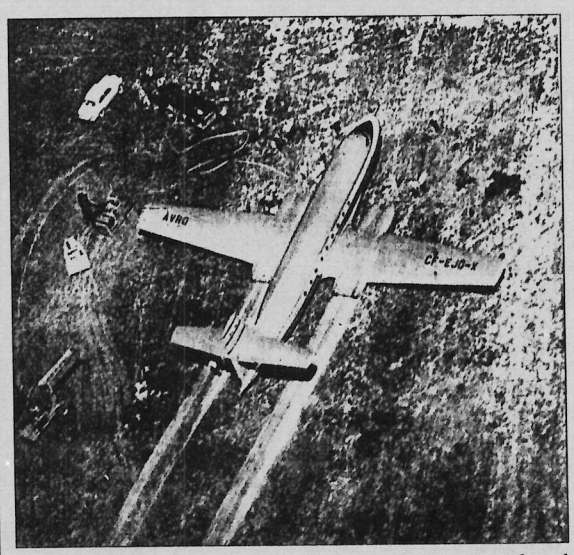
BELOW The Jetliner prototype, CF-EJD-X, on its maiden flight on August 10, 1949, at Malton Airport.



ABOVE **A colour photograph of the Jetliner, highlighting the type's sleek, futuristic appearance and handsome colour scheme.**

ABOVE **Avro Canada's chief test pilot Don Rogers in the cockpit of the CF-100 prototype in 1950.**
ABOVE RIGHT **The Jetliner on its belly after a forced landing owing to a jammed undercarriage on the C-102's second flight.**

BELOW **The C-102 and CF-100 prototypes at Malton in 1950, shortly before the Jetliner's first flight to New York on April 18.**



Creating the team was the easy part. As Floyd points out: "It was a brand new company, and we weren't inhibited by all the traditions of a big company — seniority, and so on. There's always enthusiasm in a new team. And as time went on, Avro Canada became a Mecca for aviation engineers; there were so many exciting things going on there". (Floyd's team would later create the fabulous CF-105 Arrow.)

The Avro Canada C-102 was designed to carry 50 passengers on medium-range intercity air routes at approximately 450 m.p.h. Simplicity was an inherent part of its design, but that is not to say that Avro Canada's young engineers faced a simple challenge. Jim Floyd puts the task into its proper perspective:

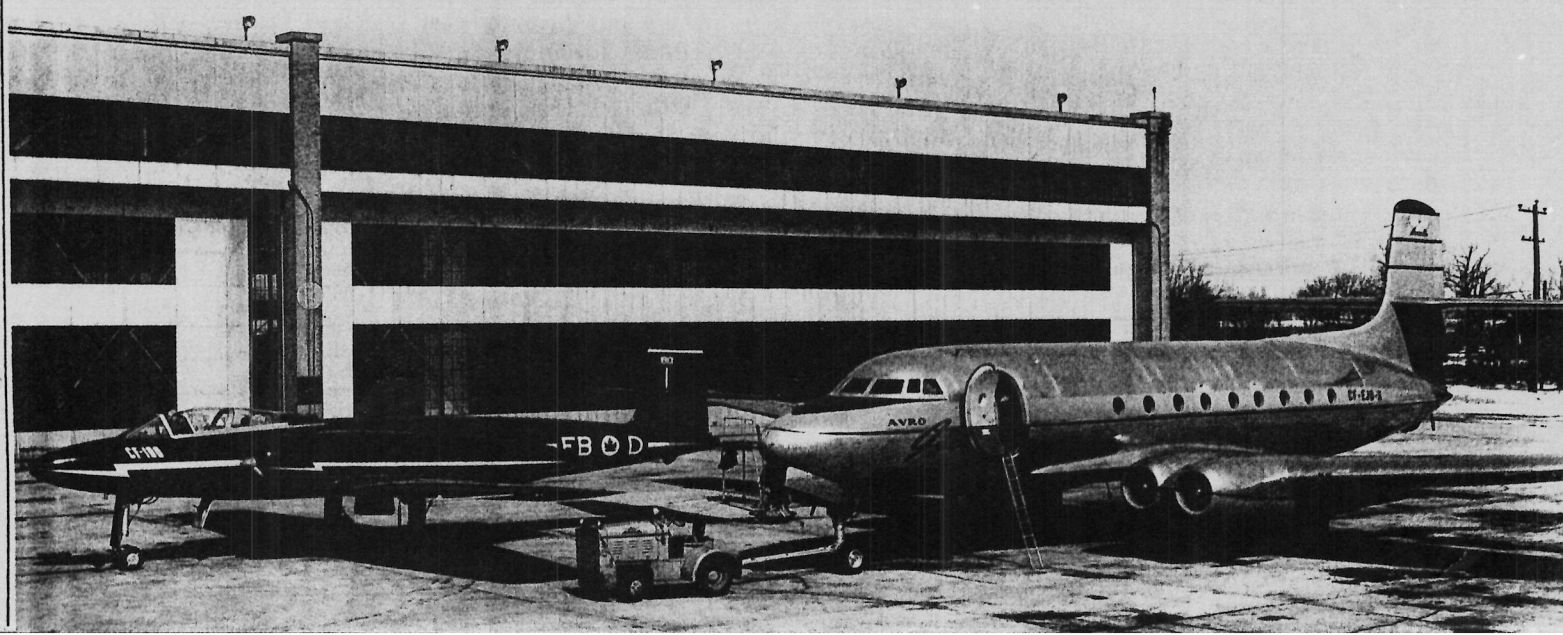
"We were pioneering a new concept in air travel," he observes, "when technology on jet passenger aeroplanes was virtually non-existent. The design was started fewer than six years after the Battle of Britain, when the fastest Allied aircraft were the Spitfire and the Hurricane. Yet this 'huge' aeroplane — for those days — had to cruise at a higher speed than the top speed of those sleek military aeroplanes. At the same time we had to take full advantage of the jet powerplants; designing an aircraft to fly at almost twice the altitude of propeller-driven passenger aeroplanes, which meant developing new techniques in air conditioning and pressurisation, as well as designing the structure to take those very high levels of cabin pressurisation."

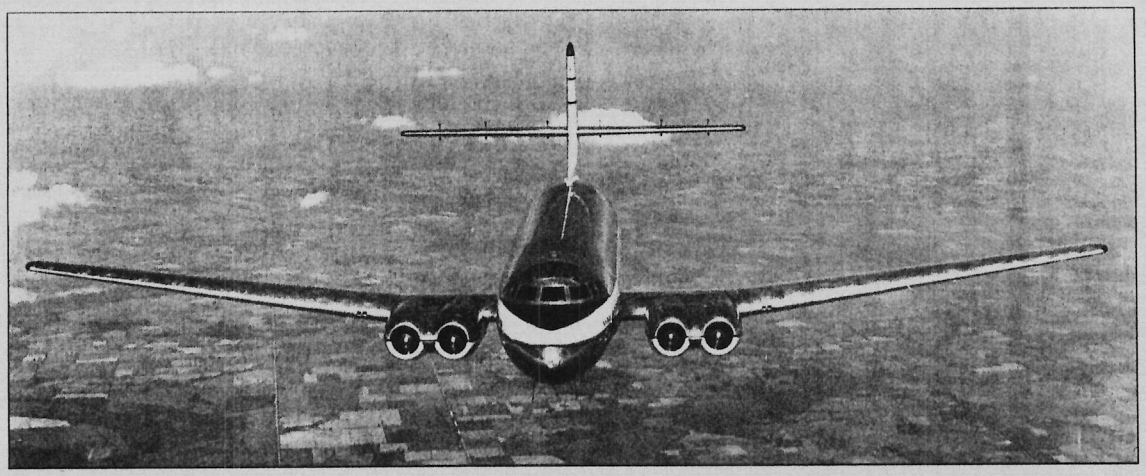
The C-102 was designed to a higher specification than TCA required, increasing the speed, range and seating capacity. But in spring 1947 bad news arrived from Rolls-Royce in England. The specified AJ65 engine (later named the Avon) was on the military secrets list and would not be available for civilian use for some time. The manufacturer suggested replacing the twin AJ65s with four Derwent 5s, offering more thrust than two AJ65s but which would burn more fuel. Consequently, the C-102's fuel capacity would have to be increased, and engine nacelles and undercarriage redesigned. However, four engines would provide greater reliability, and the Derwent was a proven design with an established performance record.

The C-102's engines were mounted in twin pods beneath each wing, resulting in a short and simple undercarriage. The rakish windscreen gave the aircraft a futuristic appearance and excellent pilots' visibility.

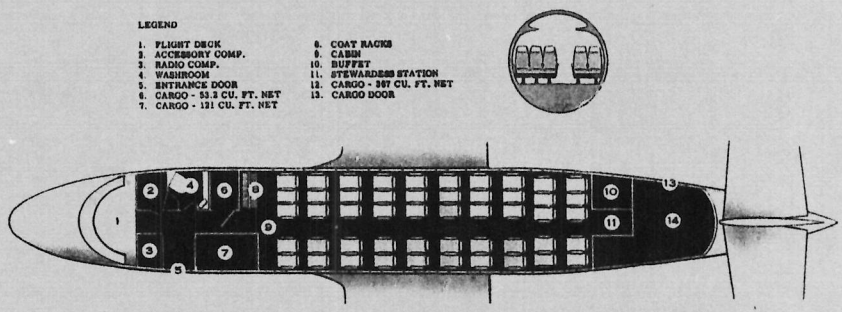
Floyd points out that the C-102 was designed during a time he describes as "BC" — before computers. Slide rules, logarithm tables and simple calculating machines were the Avro engineers' tools. "But the major tool — maybe I should call it the major ingredient — was enthusiasm. The aeroplane was designed, built and flown on the unlimited enthusiasm of a young and talented team with a complete disregard for the words 'difficult' or 'impossible'".

Unfortunately, the switch from two to four engines was accompanied by a growing list of differences between Avro and TCA. According to Floyd, the carrier was adding some "truly





LEFT An unusual head-on picture of the Jetliner illustrating the aircraft's 98ft 1in span and distinctive mid-set tailplane arrangement.



BELOW An Avro Canada Jetliner brochure diagram of the aircraft's 50-passenger cabin configuration. A 40-seat layout with two rows of two seats was also available.

outrageous clauses" to the letter of intent it had signed on April 9, 1946. One year later, Sir Roy Dobson was back in Malton to review the situation. Despite the problems with TCA, he decided to continue work on the C-102. There were no other immediate customers in sight, but the Avro team reasoned that, once their aeroplane was flying, TCA would come around and other carriers would follow. That assessment was to prove over-optimistic. For whatever reasons, TCA was no longer willing to become the first airline in North America to introduce jet transports.

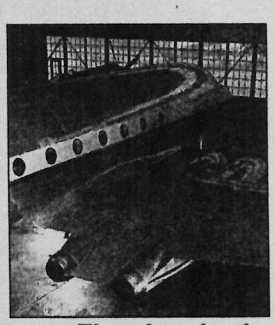
The Jetliner's first flight

The C-102 took off for its maiden flight on August 10, 1949, with the name "Jetliner" emblazoned in red script on its nose. At the controls was Avro's chief test pilot, Jimmy Orrell. Because of his experience, Orrell had been brought over from England for the initial hops. Avro Canada's chief test pilot, Don Rogers, was in the right-hand seat, and Bill Baker was the flight engineer. The hour-long test went better than anyone had expected, and after landing Orrell called it "a piece of cake". Rogers added: "It handled like a feather. You wouldn't believe how well she behaved".

All across Canada and the USA the Jetliner's maiden flight made the front pages the following day. Its soon became a household name. As Murray Willer, Avro's former manager of sales and service, noted at the Jetliner 40th anniversary dinner in 1989: "Avro actually took steps to copyright the word 'Jetliner'. However, to protect a copyright it's necessary to produce the product in quantity and to sell it. And so the right to retain the word was lost by Avro. But it was adopted by the public and by all the manufacturers of jet-powered passenger aeroplanes. It became a generic term."

The Jetliner's exploits continued to make the headlines in the ensuing weeks and months, including one early bit of bad publicity. Six days after its first flight, a stuck undercarriage forced a belly landing. Naturally, that incident made the news, but only minor damage was sustained and the aeroplane was soon back in the air. It was the only serious mishap during the C-102's seven-year flying career.

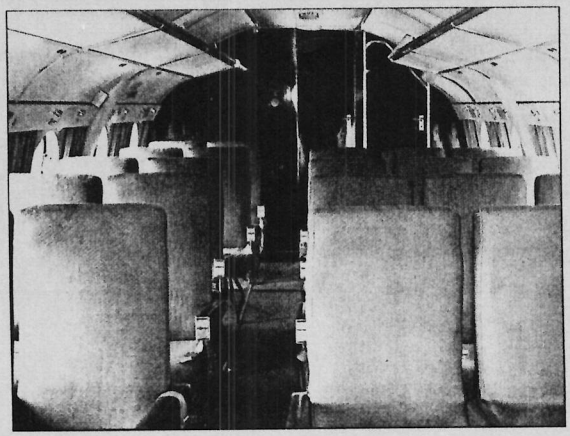
Avro Canada's new Jetliner shattered records nearly every time it flew. On November 22, 1949, with Don Rogers as captain, Mike Cooper-Slipper as copilot, Bill Baker as flight engineer and Mario Pesando and Jim Floyd as observers, the aeroplane passed the 500 m.p.h. mark. The first "jetmail" was carried on the Jetliner's first trip into New York, on April 18, 1950, when it became the first jet transport to

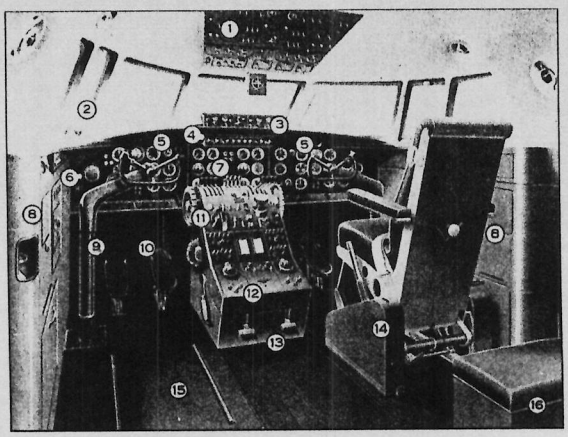


ABOVE The wing chord was increased between the engine nacelles, each housing one of four Rolls-Royce Derwent 5 turbojets, capable of 3,600lb static thrust.

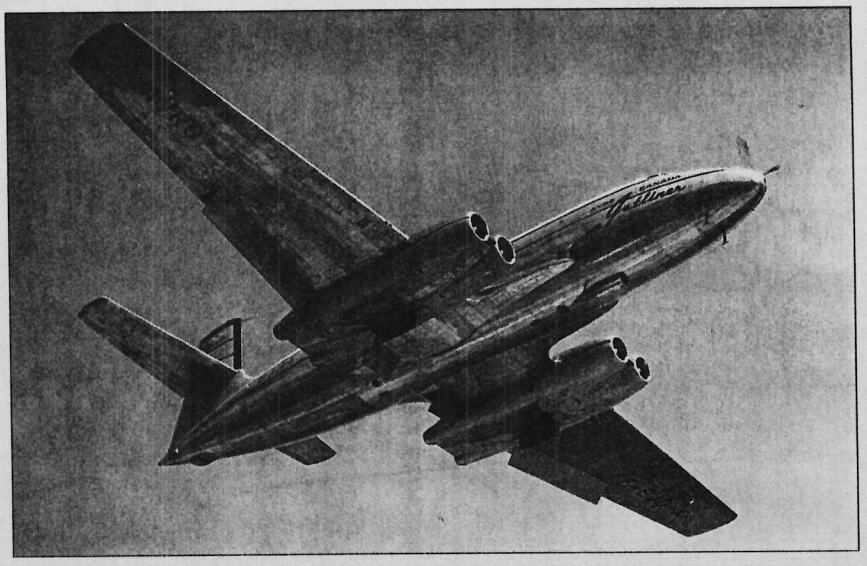
BELOW LEFT The stylish interior of the Jetliner's passenger cabin in its 50-seat configuration.

The Jetliner was designed, built and flown on the unlimited enthusiasm of a young and talented team with a complete disregard for the words 'difficult' or 'impossible'





The C-102's flight deck
(1) ceiling switch panel (2) direct-vision window (3) radio compasses control panel (4) fuel system panel (5) flying instruments panel (6) nosewheel steering (7) engine instruments panel (8) ancillary control panels (9) control column (10) rudder pedals (11) auto-pilot panel (12) radio controls (13) gust lock and parking brake (14) first officer's seat (15) captain's seat (16) observer's seat



ABOVE **The Jetliner from below with flaps and main undercarriage doors in the down position. During its career, CF-EJD-X flew approximately 425hr.**

ABOVE **The reclusive Howard Hughes was an avid supporter of the C-102, and willingly posed for Don Rogers's camera during the Jetliner's 1952 trip to California.**
BELOW RIGHT **A Don Rogers photograph of the Jetliner at Hughes's grass strip airfield at Culver City in 1952.**

fly within the USA. On January 10, 1951, the Jetliner flew a triangular route from Toronto to Chicago to New York and back to Toronto. Along the way it flew at twice the speed and twice the altitude of any existing piston-engined airliner. As one New York newspaper observed: "This should give our nation a healthful kick in its placidity!"

A visit to Miami in January 1951 produced a letter of intent from National Airlines to buy four Jetliners, with options on six more. United showed serious interest too, as did American Airlines, and National's order would no doubt have forced Eastern Air Lines to follow suit. As soon as any one carrier put the Jetliner into service, its competitors would be forced to do likewise. Apart from these airlines, the USAF also made known its interest in buying 20 for use as high-altitude navigational trainers.

Despite this rosy picture, dark clouds were gathering on Avro's horizon. With success in sight, and Jetliner production seemingly just months away, C.D. Howe ordered an abrupt halt to the programme. The Korean War had broken out, and Howe wanted the company to focus all of its resources on the production of the CF-100 Canuck for the RCAF. With 720 warplanes on order, he did not want Avro sidetracked by a peacetime project. It was a depressing turn of events.

The Howard Hughes affair

In the middle of this gloomy situation, Howard Hughes unexpectedly entered the picture. The Hughes Aircraft Company was working on the installation of its MG2 rocket fire control system in the CF-100, and a suggestion was made to use the Jetliner as a test aircraft. Its speed was comparable to that of the Canuck, and there was plenty of room for test equipment and engineering personnel. The Canadian government approved this use of the Jetliner as it was in support of the CF-100 programme.

However, when the aeroplane landed at the Hughes airfield in Culver City, California, in April 1952, Howard Hughes took an immediate interest in the Jetliner as an airliner. He owned Trans World Airlines (TWA) at the time, and his enthusiasm for the Jetliner was unrestrained. He spent hours discussing its design in great detail with Jim Floyd, and tried to persuade Avro to build a fleet of 30 Jetliners for TWA. He even tried to circumvent the Canadian government's ban on its development by putting forward a proposal to have Convair produce the aeroplanes in San Diego. While Convair was willing to go along with the scheme, the US Government, citing the Korean War effort, would not allow it. As Jim Floyd points out, the Jetliner was one of the few things that Howard Hughes was unable to buy.

The Jetliner returned to Malton in September 1952. Authorised to be flown only as an observation and photographic platform for CF-100 flight tests, it flew for the last time on November 23, 1956. Seventeen days later Jim Floyd received a terse memo ordering its destruction. Sadly, Canada's great lead in civil aviation was cut apart on a hangar floor. Its nose section, now on display at the National Aviation Museum in Ottawa, is all that remains of a once-proud aeroplane.

Fifty years after the Jetliner's first flight, scores of former "Avroites" gathered in Toronto to renew old friendships and talk about what "could have been". Although many of them later worked on other aerospace projects (Jim Floyd, for instance, became a consultant on Concorde), every one of them cited the Jetliner as his or her most memorable professional experience. Why?

"Because the Jetliner represented so many firsts," Jim Floyd explained. "It was the first jet transport designed, built, and flown in North America. It was the first dedicated regional jet to fly anywhere in the world. And it represented the greatest increase in speed, on this continent, of any passenger transport before or since. It paved the way for all the jetliners that followed."

■ **The author would like to thank Jim Floyd, Don Rogers, Mike Cooper-Slipper, Fred Matthews, Bob Bradford, and Leroy Simpson for their invaluable assistance**

Jetliner Reunion

The author is scheduled to address the "Jetliner 55th Anniversary Reunion" on Saturday, August 7, 2004, at the Holiday Inn Select at Toronto Airport, 970 Dixon Road, Toronto, Ontario; for details tel 001 416 675 7611