

IN MEMORIAM
William L. Turner
 (1925 - 2000)



W. L. (Bill) Turner, a founding member and Director of the Aerospace Heritage Foundation of Canada (AHFC), died unexpectedly while in hospital in Toronto on Tuesday, June 13, 2000. Bill was a Director of the Canadian Astronomical Society, now the Canadian Aeronautics and Space Institute (CASI). He was also an early member and past Director of the Canadian Aviation Historical Society (CAHS), the U.S. National Space Society, the international Association of Old Crows (military intelligence) and the Air Force Association of Canada. Bill joined the RCAF in 1943, and after one year and three weeks before his parade to receive wings as a "Wireless Navigator" in Mosquito crews, he was transferred into the Canadian Army. Apparently, the RCAF was then overstretched, and to reinforce Canadian losses in Europe, the government automatically transferred 11,000 airmen trainees into the Army. Bill, now in the Army, spent another year in Military Intelligence at Camp Borden and Camp "X" in Whitby. In 1989, he retired from an engineering and marketing management career of 44 years in Canadian aerospace industries. He was widely recognized as one of Canada's pioneers in space programs, and had an unbelievable network of people, not just in North America but the world. After retirement, he spent countless hours as an enthusiastic, dedicated volunteer member of many organizations. He strongly felt the importance and necessity of "passing on the torch", the message. Bill became a meticulous archivist and historian, participating with the Canadian Space Agency and many Canadian/U.S. aerospace associations to present the history of Canada's unique aviation and space contributions to the public. Bill was invited to lecture at educational institutions. He had a special affinity with students of Marc Garneau Collegiate in Toronto, where he loved to speak on aerospace. Within a few sentences, and seeing his smile, students immediately knew that this was not just another talk but the real thing, and for a short time, Canadian aerospace achievements came alive, worthy of pride. Bill probably never intended to influence anyone, yet many he did, young and old, over the years, in his own manner and style. He loved his family, especially his grandchildren, and he treasured his friends. At all times, he was a true Canadian patriot with a realistic, positive outlook on life, with rock-solid values and principles. Truly, Bill Turner will be missed by all whose lives he touched.

Aeronews

Cold Lake Air Base Renamed

JANUS JURAKOWSKI received another honour. The Aerospace Engineering Test Establishment at the Canadian Air Force Base, Cold Lake AB, opened officially with appropriate pomp and ceremony, and was re-named in his honour. And so it should be. For it honoured a professional test pilot who was closely connected with the Avro Arrow and who made the first successful flight in this advanced intercepter. Zurakowski, a resident of the Barry's Bay area and a resort owner, in his usual unassuming way, said he is not quite sure just how it is that the test facility was named after him. Perhaps because there was no better person of professionalism and character that symbolized Canadian aerospace. The Office of Air Force Heritage and History in Winnipeg accordingly recorded this event in its annals and passed this information to *Pre-Flight*.

Aircraft with Feathers?

WELL, MAYBE SORT OF. According to Geoffrey Lilley, a professor emeritus of aeronautics and astronautics at the University of Southampton, England. According to the magazine *Discovery*, Lilley has been intrigued by the silent flight of owls for a long time. As any bird watcher knows, owls fly ever so quietly that their prey do not sense that they are doomed. So Lilley, with true research zeal, decided to look at owl flight patterns. He did this quite systematically, beginning with many videos of owls in flight, taken in a wind tunnel environment. And interestingly, the owls seemed to be cooperative! He then began to study these videos, hoping to acquire a better understanding of owl flight dynamics. This is not to satisfy his curiosity. Lilley hopes that this knowledge will help aero-engineers to design quieter and better aircraft.

What he has found so far, is that serrated feathers on the front edges of owl wings funnel air smoothly over the wings. This reduces the noise of rushing air, easily picked up by highly sensitized prey. Each wing has a scarflike, fringed back edge that prevents the abrupt air-pressure changes and noise, as those produced by an aircraft's rigid wings. So by adding serrations and fringes to aircraft wings, he thinks a quieter plane can be built.

This would be boon to the industry, since noise always is a problematic factor. Lilley contends that engine noise abatement has gone as far as it can go. Additional reduction created by aircraft in flight has to come off the airframe. pf

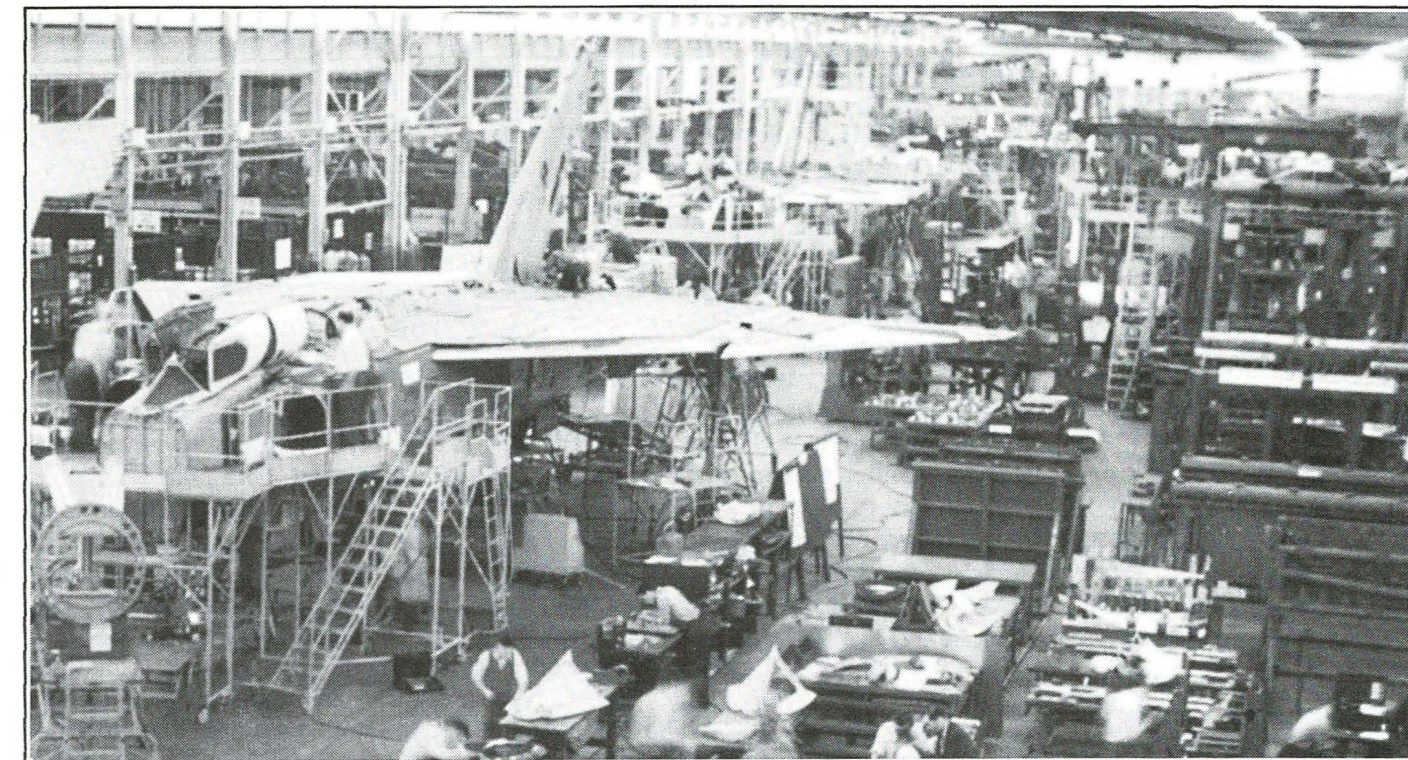
Pre-Flight



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Palmiro Campagna, P. Eng.

Rebuilding the Arrow?


February 20, 2000 marked 41 years since the date of the cancellation of the Avro Arrow program. The debate as to whether the decision was valid or insane still rages and is quite often used as an example for modern programs facing a similar fate. Lately, though, there has been a move afoot to rebuild and actually fly the Arrow once again. In this age of men having walked on the moon and laptop computers achieving phenomenal power, many are likely to say rebuilding the Arrow should be possible, without realizing the technical complexities involved. The real question is whether it is indeed feasible. From an emotional perspective, rebuilding the Arrow makes good copy. Newspapers and magazines across

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FROM THE PRESIDENT

I thank all members who entrusted me with their proxy. At the AGM, we said goodbye to five AHFC Directors. BILL TURNER, Director of Archives/Education, who passed away June 13th. Details on page 4 of *PF*. ROSS DeGRANDIS, assistant to the treasurer, tendered his resignation due to work commitments. KEMP WATSON, originator of our website. BERYL FAIRCHILD, secretary. We welcome three new Directors. GLEN BEAUCHAMP, who has agreed to act as Secretary. Glen is part of the Lancaster team and is an accomplished photographer. DITA VADRON has volunteered her marketing and communication talents. KEITH McCLARRY, aviation background and also a member of TAM. On June 16th, the Board of Directors passed a motion which removed the concept of AHFC building an Arrow replica, and committed AHFC to closer cooperation with the Toronto Aerospace Museum, such as shared projects and loan of AHFC artifacts.



Arrow, cont'd.

the country have carried the story. Emotion aside though, issues need to be addressed by anyone considering joining in such an endeavour. Over the years, a number of pieces of the Arrow have been unearthed. One plan was to use these to reconstruct the entire aircraft. This idea seems to have been abandoned and for good reason. First and foremost is the fact that not all the necessary parts are available. Secondly, refurbishing 41-year-old parts, many of which were uniquely designed, would prove an impossible challenge without the necessary tooling, all of which was destroyed when the project was cancelled. Reassembling them into an airworthy supersonic fighter makes the task that much more improbable. Even if a warehouse of brand new parts was discovered, each would have to be inspected to the original drawings and most would need to undergo testing to ensure integrity.

The latest concept now is to rebuild the Arrow using modern materials and the latest in cadcam computer design techniques. Supporting this plan is the contention that a number of the original drawings exist.

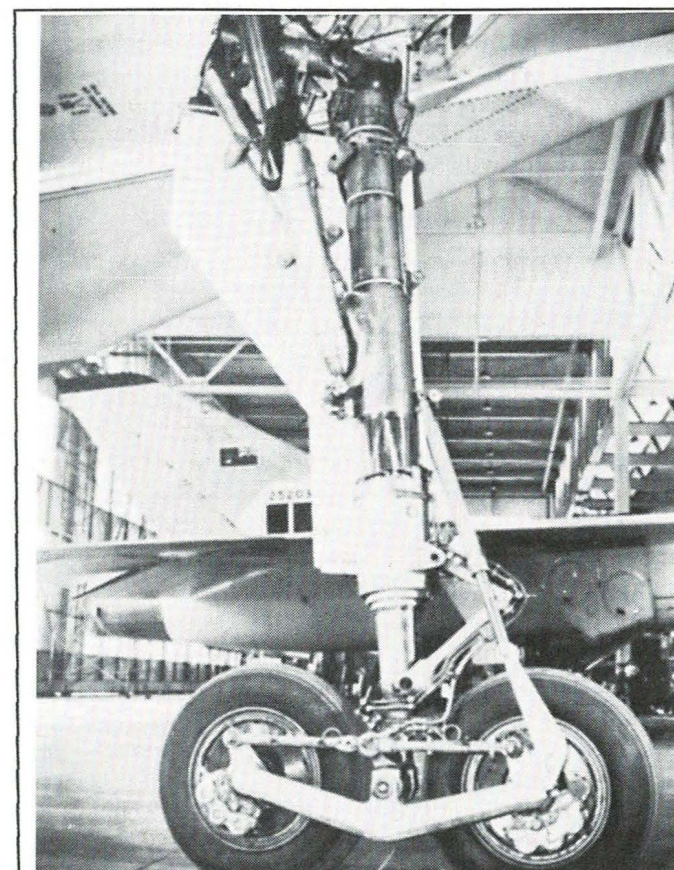
There is one significant problem here, which is not being recognized. It would not matter if all the original drawings existed. Those drawings were developed based on engineering calculations and computations and thousands of hours of testing, for the characteristics of the existing materials of the day. Changing those original materials and replacing them with modern ones would obviate all those original drawings. Everything would have to be recalculated and re-tested from scratch. Centre of gravity, weight, drag and thermal coefficients and load and stress factors would all change, to name a few. It took over a thousand of the world's top engineers, technicians and technologists to design and prepare the original parts and drawings. If it were such a simple task using today's computing power, the major aircraft builders would not be spending hundreds of millions of dollars in aircraft development. The fact is re-designing from scratch is not a simple task and never has been.

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Arrow, cont'd from p. 2

Engines represent the next big dilemma. It has been suggested that modern engines would be used. One has only to look back at the real Arrow to understand the cost and engineering impact on design with respect to altering the engine types from the originals. With different engines and new materials, the result could be made to look like an Arrow but it would not be an Arrow.

What would it cost to build an aircraft from scratch for a one of prototype? The word astronomical comes to mind. According to audit from 1959, the original research and development on the airframe and engines was just over \$200 million dollars. One can well imagine what would be required today. Remember that this is a supersonic aircraft, not a 1950s roadster.



Complex, double-swivel main landing gear.

Assuming the money was available, who would redo the design and testing? Volunteers? An individual considering involving himself in such a project must ask if volunteers with the requisite aeronautical background had been recruited for the team. How many specialists would it take? How many hours would be required? Who are the skilled artisans that would actually do the work of manufacture and assembly? There has been mention that students would be allowed to donate their time and talent for the cause. Who

"... the result could be made to look like an Arrow but it would not be an Arrow."

would supervise them? What safety measures would have to be put into effect? Again, if building a supersonic fighter was a simple task that one could complete with volunteer assistance, why has Canada not begun rebuilding modern fighters for the world? Why again do the aircraft giants in the United States and elsewhere form consortia to get the job done?

Rebuilding a flyable 77 foot long supersonic aircraft requires a lot of specialized tooling for final and sub-assembly, not to mention the floor workspace. Who will provide this workspace? The original Arrow required specialized wind tunnel testing. Where would this be done today?

In such a scheme, funding is obviously an issue. There could likely come a point in time when the decision would need to be made to cut losses and not proceed. Has such a time been stipulated? What would happen to any accumulated funding to that point? Is there a backup plan? Finally, the aircraft would require flight certification. Proof would be needed that the aircraft was built to all pertinent standards in order to satisfy Transport Canada requirements. Configuration control of the thousands of drawings needed to recreate the design would be required. In the end, the aircraft would not be the Arrow and what would be the consequence if it crashed on initial flight? Who would shoulder the responsibility?

Rebuilding a supersonic aircraft that looks like the Arrow is definitely possible, but anyone considering joining in such a venture should consider the points raised here as a minimum. And don't forget that a pilot would need to be trained also.

Bon chance!

Note:

Palmiro Campagna is an engineer by profession and works for the Department of National Defence in Ottawa. He has written two editions of "Storms of Controversy: the secret Arrow files revealed." Both editions have exploded the myth that design flaws, cost overruns, or obsolescence had triggered the demise of the Arrow. He has put in countless hours of research through now-declassified files, resulting in his books, which can be purchased and read by anyone. PRE-FLIGHT extends its thanks for his thoughts and comments on the highly complex, well-nigh impossible endeavour of attempting to duplicate a flying Arrow. The Toronto Aerospace Museum has started to build a full-scale external model of the Arrow, which when completed, will give viewers an idea of the heft of this Canadian interceptor.