

FOREWORD

I was employed as a Jig and Tool Design Draftsman on the *Avro Arrow* from April 1955 until February 1959 when the project was canceled, whereupon I became a High School Teacher in the subjects of Mechanical and Architectural Drafting, Computer Programming, Computer Assisted Design, Machine Shop Practice and Technical Illustration. I retired in 1993 and have since devoted all my energies into this book.

I first started to think of writing the book on the *Avro Arrow* in 1988 when I was recovering from a cancer operation. My first "port of call" for information was to contact Jim Floyd, who referred me to the National Research Council in Ottawa. The Librarian, Mrs Joan Leonardo, turned out to be very enthusiastic, and could not help me enough in my quest for information. Unfortunately, most of the documents held there were of a CLASSIFIED nature, and I had to apply over the next eight years for declassification. I am now happy to say that all that they possess is now declassified, but only at NRC, not at the DND or anywhere else. This process involved some 1500 documents all told.

Through my contact with Mrs Leonardo, she referred me to her husband, Ralph, who at the time was a Curator at the National Aerospace Museum at Rockcliffe Airport, Ottawa. Mr Leonardo then introduced me to their *Avro Arrow* collection, which proved most informative.

I contacted several other persons, who are listed in the Acknowledgments, who were more than helpful in my research, and I am very much indebted to them.

During these past few years, the research and writing of the book has been a "labor of love". I have tried as far as was possible, to use the Company's own words in order to keep authenticity at a maximum.

I hope that the reader will gain as much pleasure and insight as I have done, as he or she reads through this and the successive Chapters.

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January - 1997.

THE AVRO ARROW



A BOOK BY

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INTRODUCTION

It was in 1951, that both the R.C.A.F. and Avro Canada recognised the fact that the CF-100 fighter would have to be replaced at a future date in order to keep pace with the development of long-range bombers in the then Soviet Union.

To this end, the Long Range Projects department at Avro started work on such a replacement using the following references as guides:-

1. Handbook of Instructions for Aircraft Designers. AMC 80-1 1951.
2. U.S.A.F. Model Spec. MIL-1-6252 Oct 18 1950.

Much work had been carried out by such notables as Prof. B M Jones in the UK who was able to show in 1929 that nearly all contemporary aircraft had two or three times the drag due to their design. Prandtl of Germany proposed the concept of boundary layer in 1904, though in the UK literature the term does not appear until 1925. The use of sweepback to reduce drag at supersonic speeds was first proposed by Busemann (a German Aerodynamicist) at the Volta Congress for High Speed Flight in Rome in 1935 and in 1939 Albert Betz of Switzerland, another aerodynamicist, had shown the sweepback could be used to delay the onset of compressibility problems in transonic flight. Dr Alexander Lippisch of Messerschmitt AG in Germany during World War 2, applied all this on delta and swept wing designs in high speed flight. The swept wing clearly demonstrated the delay of drag rise at high supersonic speeds. The British, on May 15th 1946, were the first to capitalize on this research with the DeHavilland 108 "Swallow", and were followed by Sweden with the SAAB J29 in September 1948, the first production swept wing fighter in Western Europe, preceded World Wide only by the Americans and the Russians. The Americans produced such successful designs as the North American F-86 Sabre and the Convair F-102 Delta Dagger, the Russians built the MIG-15 and the British in 1948 had three swept wing designs, the Avro 707, the Hawker P1052 and the Supermarine Type 510/517 and were beginning to realise the properties of a Delta configuration.

Avro therefore used this information as a starting point for the new design, and in June of 1952, issued two brochures, C/104/1 for a single-engined design and C/104/2 for a twin engined one. Both were intended to perform the same task, namely to intercept and destroy any long-range bombers of the highest performance which were likely to be available to an enemy during a five to ten year period. Guided missiles and air-to-air rockets were specified as the main offensive armament, the target tracking, aiming and fire control being automatically computed by airborne electronic equipment working in conjunction with ground signals. The C/104/2 with a two man crew became the basis for the initial new design.

In May of 1953, the R.C.A.F. specification AIR 7-3 was issued to cover the development of such a replacement aircraft, now named the C-105. Avro then undertook to design the aircraft to this specification and after many false starts and design changes due to engine availability, R.C.A.F. demands, aerodynamic problems and material specifications, the R.C.A.F. in 1954 issued an updated specification, AIR 7-4 to cover the new design, the CF-105.

The resulting aircraft, named in 1957, was the Arrow Mk1 using Pratt and Whitney J-75 engines, and five aircraft were built and flown. With the Iroquois engine becoming available, the first Mk2 Arrow was completed in February 1959 and was scheduled to commence flight tests in March of that year, but the entire project was cancelled and terminated on February 20 1959 with all aircraft, tools, drawings and photographs ordered destroyed by the Canadian Government.

The tables of events etc., are taken from the original Avro writings of which the CF-105 "Engineering Chronology" was the result of considerable sifting of the multifarious data relating to the CF-105 project between the time of the inception of a 'High Performance All-Weather Fighter' in 1948, and the concept as it became to RCAF Spec. AIR 7-4.

This 'Chronology' is based on correspondance, meeting minutes, schedules and internal memoranda. It is primarily restricted to engineering fact, recommendation and decision, though it does contain a certain amount of the contractual and fiscal data. It includes test programs, weight progress, drag assumptions and the highlights of the configurations which evolved through the design period.

It is important to remember that during project study years (1948 - 1953), the CF-103 and C-104 were separate entities in so far as design concept. The CF-103 was essentially developed from the CF-100, whereas the C-104 was an entirely new design.

Moreover, these tables are presented so that the reader can progress through all these stages as they happened at the time.

Most of the illustrations in the text, are directly from the originals, but there are several which have had to have been redrawn as they were incapable of being reproduced. In all cases, accuracy to the original has been observed.

This treatise is presented in the form of a report in a similar manner to the way that such information was presented at Avro, in order to give the reader a feeling of "being there".

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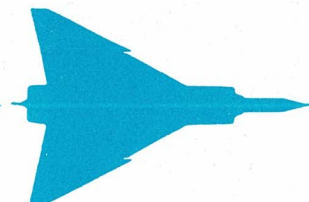
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LEGEND

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