

SIGNIFICANT AVIATOR & AVIATION EVENTS PROFILES

THE FIRST RAAF AIRCRAFT BUILT IN AUSTRALIA – THE AVRO 504K AND THE ALMOST FIRST AUSTRALIAN BUILT ‘AIRLINER’ – THE AA&EC B.1

Two Centenary events for 2022 were the first Australian built aircraft being handed over to the RAAF on 15 June 1922; a two-seater, single-engine A. V. Roe & Co Ltd, Avro 504K and the almost first Australian ‘Airliner’, the six-seat AA&EC B.1, designed and built by the Australian Aircraft & Engineering Co Ltd (AA&EC).

First flown on 18 September 1913, by Fred Raynham and powered by an 80 hp Gnome Lambda seven-cylinder rotary engine, the Avro 504, a development of the earlier Avro 500, was a two-bay all wooden biplane, with a square section fuselage, originally designed for training and private flying.

With the outbreak of WWI, the Avro 504, manufactured by A.V. Roe & Co Ltd and later manufactured under licence by at least 18 contractors, was used as a trainer, fighter and bomber during WWI. It was the most produced aircraft of any kind that served in any military capacity during WWI, with 8,340 produced during the war. Overall, more than 10,000 were built between 1913 and when production ended in 1932. The most significant versions were the Avro 504J (2070 were built) and the Avro 504K (4997 were built).



Avro 504J B3168 – Built by AV Roe & Co Ltd. Image BAE Systems.

In the first few months of WWI, the Avro 504 was used in front-line service by the Royal Flying Corps (RFC) and the Royal Naval Air Service (RNAS) for bombing and reconnaissance duties. An RFC Avro 504, flown by 2nd LT Vincent Waterfall, was the first British aircraft to be shot down by the Germans on 22 August 1914. On 21 November 1914, four RNAS Avro 504s, each carrying 4 x 9 kg bombs, formed a special flight to bomb the Zeppelin works at Friedrichshafen on the shores of Lake Constance. Three of them set out from Belfort in Northern France. While one aircraft was shot down, the raid was successful, with several direct hits on the airship shed and the destruction of the hydrogen plant. The Avro 504 was the first known British aircraft to strafe enemy ground troops. An Avro 504, modified to mount a machine gun, was responsible for the first air-to-air destruction of an opposing aircraft using this weapon.

With a maximum speed of 95 mph at sea level and a rate of climb of 700 ft/min, the Avro 504 soon became obsolete as a frontline aircraft. From Mid 1915 onwards, the Avro 504 was withdrawn from operations in France and it became the standard training aircraft for the RFC and RNAS. Four AFC training squadrons – 5,6,7 & 8 Squadrons AFC were established and based in Britain with Avro 504s as their primary aircraft.

Towards the end of 1917, to cope with engine shortages, modified engine bearers were used to accommodate a range of engines. This model received the designation Avro 504K. Engine choices for the 504K included the 100 hp Gnome Monosoupape, the 80 or 110 hp Le Rhone and the 130 hp Clerget rotary engines.

A batch of 20 Avro 504Ks was purchased by the AFC and allotted to Australia in October 1918. On 29 May 1919, the British Cabinet agreed to give 100 aircraft each to Australia, Canada, New Zealand and South Africa, together with

additional aircraft as replacements for aircraft donated by these countries to the British during WWI. Referred to as the "Imperial Gift," a total of 128 aircraft and related supplies allowed the RAAF to be established in 1921. Aircraft given to Australia included 35 x Avro 504K trainers.

Following the end of WWI, while the Avro 504 continued in RAF & RAAF service as a trainer, large numbers of surplus aircraft were made available for sale, mainly through the Aircraft Disposal Co (Airdisco), both for civil and military use. Military buyers included the Soviet Union and China. More than 300 504Ks were placed on the civil register in Britain. These were used for tuition and pleasure flights. Most had the dual controls removed and the rear cockpit modified to accommodate two passengers.



Nigel Borland Love

Image Australian Aviation Hall of Fame website.

Post WWI, Love, another AFC pilot, Lieutenant Walter John Warneford, and Harold Edgar Broadsmith, former chief designer for A. V. Roe and Co Ltd, secured the Australian agency for the Avro Company. Nigel Love, on his return to Sydney in June 1919, and after inspecting numerous prospective airfield sites, leased a grazing paddock near Cooks River at Mascot. They registered the Australian Aircraft and Engineering Company (AA&EC) in Sydney on 1 October 1919, with capital of £50,000 and Love as the Managing Director. The company began flying operations at Mascot in January 1920 and began assembling Avro 504K aircraft at Mascot in February 1920.

NIGEL BORLAND LOVE: was born on 16 January 1892 at South Kurrajong, NSW, and enlisted in the Australian Imperial Force in June 1915. Selected to attend the NSW Government's flying school at Richmond, he was Commissioned on 11 January 1917 and embarked for Britain. Promoted to Lieutenant in January 1918, he served with B Flight, 3 Squadron, AFC in France, flying RE8s until June 1918. Returning to England, he was attached as an instructor to No.7 Training Squadron and served with the RAF Ferry Pool.



*Avro 504K being assembled at the Mascot Australian Aircraft and Engineering Company.
Date and origin unknown – Image from glass negative provided by David Vincent.*



Queensland and Northern Territories Aerial Services, Ltd, first aircraft, an Avro 504K, G-

An initial 20 504Ks were assembled from parts shipped from the UK. AA&EC built six of these with Sunbeam Dyack 100 hp six-cylinder-in-line liquid cooled engines. One of these, G-AUBG, which was delivered on 30 January 1921, was the first passenger aircraft purchased by Queensland and Northern Territories Aerial Services, Ltd (Qantas).

Subsequently, an order was placed by the Australian Minister of Defence for six Avro 504K aircraft. These aircraft (serials A3-48 to

A3-53) were built using Australian timbers. The aircraft differed from other 504Ks in that they were fitted with gravity fuel tanks under the wings on the upper mainplanes, and steel tube centre section struts.

On 15 June 1922 the RAAF received the first aircraft that was built in Australia for its use. The Avro 504K trainer, was handed over at Mascot, Sydney, by the Australian Aircraft & Engineering Company after Dame Mary Hughes, the wife of Prime Minister W. M. Hughes, christened it 'Mary' before sending it off on its maiden flight. On completion of the flight, Squadron Leader Frank Barnwell, the designer of the Bristol fighter and other aircraft, formally accepted the aircraft for the RAAF. The following month, a second machine was also ready, and after acceptance trials, both aircraft were flown to Point Cook. The remaining four machines of the order placed with AA&EC were completed progressively over succeeding months, with the last delivered in March 1923.



Avro 504K, A3-48 ready for take-off at Mascot on 15 June 1922
Image from the E.W. Searle Collection – Trove website.

THE AUSTRALIAN AIRCRAFT & ENGINEERING CO LTD (AA&EC) B.1 "AIRLINER"

In 1921 AA&EC, on its own initiative, proceeded with the design and construction of a six-seat commercial aircraft using Australian materials and aimed towards carrying passengers and mail over Australian air routes. Designed by Harry Broadsmith, the AA&EC B.1 drawings, technical data, stress diagrams and calculations were prepared to British Standards and checked and passed by the same Frank Barnwell who accepted the first Australian built Avro 504K approximately 12 months later.

Work commenced on the AA&EC B.1 at Mascot, and after it reached a fairly advanced stage, Nigel Love approached the Minister of Defence, proposing for the Commonwealth government to place contracts with AA&EC to manufacture additional aircraft for the military (at that stage 13 Avro 504Ks were under construction at Mascot for military and civil operators) and for a firm order for the new six-seat commercial airliner "*acclaimed by those who had inspected it to be the answer to Australia's commercial airline requirements.*"

On 20 March 1922, *The Melbourne Herald* reported on the 'All-Australian Aircraft Passenger Carrying Machine Nearly Ready':

"Mr Nigel Love, managing director of the Australian Aircraft and Engineering Company Ltd., Sydney, says that in addition to the manufacture of training machines for the Air Board, his company has in hand the construction of an up-to-date type of large passenger-carrying machine which has been designed to carry six passengers. The construction of this machine is entirely to the design of Mr Broadsmith, the company's engineer. By virtue of its extensive flying experience over the last two and half years, the company has been able to embody numerous features which make the machine particularly suitable to meet all the conditions of the various climates in Australia. SPEED OF 125 MPH. This machine has virtually been completed and is expected to make its test flights toward the end of next month.

As a power unit it has fitted a 400 hp Liberty engine, and its maximum speed will be 125 mph. The engine mounting is attached to the body of machine by four bolts. This feature enables the whole

power unit to be speedily removed from the machine in the event of a mechanical failure or an overhaul being necessary.

'A considerable amount of interest is being displayed in its construction,' said Mr Love, 'because it has been designed wholly in Australia, the material used in its construction is Australian throughout, and is built by Australian workmen. The company is very optimistic regarding the test flights.'

Coincidentally, an article about the request for the subsidy, in Melbourne's *The Herald* on 13 March 1922, appeared on the same page announcing the intended ill-fated round the world flight of Sir Ross Smith, expected to begin on 24 April 1922. Referring to the subsidy requested by AA&EC, *The Herald* article quoted the Minister for Defence, Mr Massy Greene stating that 'as a matter of principle he considered that the Australian manufacture of aircraft should be established and stimulated, and he promised to give consideration to the matter of the subsidy.'

A follow-up article appearing in the Melbourne *The Herald* on 14 March 1922, under the headline "Aeroplanes Being Made in Australia,' reported Nigel Love being in Melbourne, his object being to seek some definite form of Government subsidy for the manufacture of aircraft in Australia:

"Mr Love, on being questioned as to the progress made by his company in connection with the manufacture of aeroplanes, stated that his firm in Sydney had now established a complete and up-to-date factory, fitted with all necessary facilities for the economic production of aircraft from Australian timbers. At the present time they have in hand an order placed by the Air Board, last September for six aeroplanes to be built entirely of Australian Materials. The first of these machines will probably be flown and delivered in the course of about a month. The engines will be the 130 hp Clerget type, which are being supplied by the Air Board.

AUSTRALIAN AIRCRAFT TIMBER. During the last two years, Mr Harry E. Broadsmith F.R.A.E.S., The company's engineer, has carried out most exhaustive investigations concerning the suitability of our Australian grown timbers for the manufacture of aeroplanes, and these investigations have been most satisfactory, showing that we have in Australia adequate supplies of the various grades of timber possessing the necessary mechanical properties for aircraft manufacture.

In addition to the manufacture of training machines for the Air Board, the company has in hand the construction of a modern type of large passenger carrying machine which has been designed to carry six passengers. The company's engineer designed this machine, stated Mr Love, and it is almost completed.

THE CASE FOR HELP. The company considers that it is only fair, and equitable that it should participate in some of the definite forms of assistance rendered by the Government for the advancement of commercial aviation. It might be noted here, said Mr Love that the Defence Department has agreed to subsidise to the extent of £65,500 per annum, companies engaged in the carriage of mails. No provision, however, has yet been made for the assistance and encouragement of Australian manufacturers of aircraft.

From a defence aspect it is virtually essential to our air defence scheme that we should be in a position to manufacture internally. The wastage under war conditions is so enormous that it would be a matter of impossibility to maintain our air strength, with the source of supply 13,000 miles away. The manufacture of aeroplanes involving as it does, highly skilled care in the making and selection of material, cannot be established at short notice, and in view of this fact, manufacture should be encouraged and supported without loss of time.

If the government fails to give assistance to the manufacturer in the face of the precedent already established in subsidising mail routes, it will be neglecting what is probably the most important phase of the industry.

In conclusion Mr Love stated that in pursuance of its economic policy the company has booked orders for the manufacture of about 1000 ice chests for the coming season, this enabling them to keep their woodworking plant in continuous operation and to utilise all scrap timber; thus, considerably reducing the general overhead expenses of the factory."

There were also articles about AA&EC seeking a subsidy for the 'Australian Made Aircraft' in *The Sydney Morning Herald* 3/3/1922, Sydney's *The Sun* 12/3/1922, the *Brisbane Daily Standard* 14/3/1922, Mildura's *Sunraysia Daily* 14/3/1922, Boulder WA's *The Evening News* 22/3/1922 and *The Mail Adelaide* 25/3/1922.

However, there was no response from the Commonwealth government to AA&EC's proposal to build further aircraft, with the Press stating: *"Unless assistance is given to the aeroplane manufacturing industry in Australia, several firms in the industry will probably have to close down"* and *"the Company (AA&EC) will soon be in financial difficulties unless assistance is forthcoming."*

Newspapers reported Love saying the first test flight was expected around the end of April 1922. The prototype subsequently flew successfully on its first official trial flight. In one of the sources (Aeropedia), the following report was attributed to the *Sydney Daily Telegraph*, appearing on or about 14 March 1922, however, an article could not be located when researching this topic:

"Yesterday the new commercial aeroplane built for the Commonwealth Government by the Australian Aircraft & Engineering Company at Mascot was given its first official trial flight with the complement of four passengers, these comprising Nigel Love as pilot, J H Eakins, Chief Inspector of the Aerial Inspection Department, A J H Love, W Martin, foreman of AA&EC, and H Halkman, a representative of the Daily Telegraph. It is the first machine of its kind made in Australia"

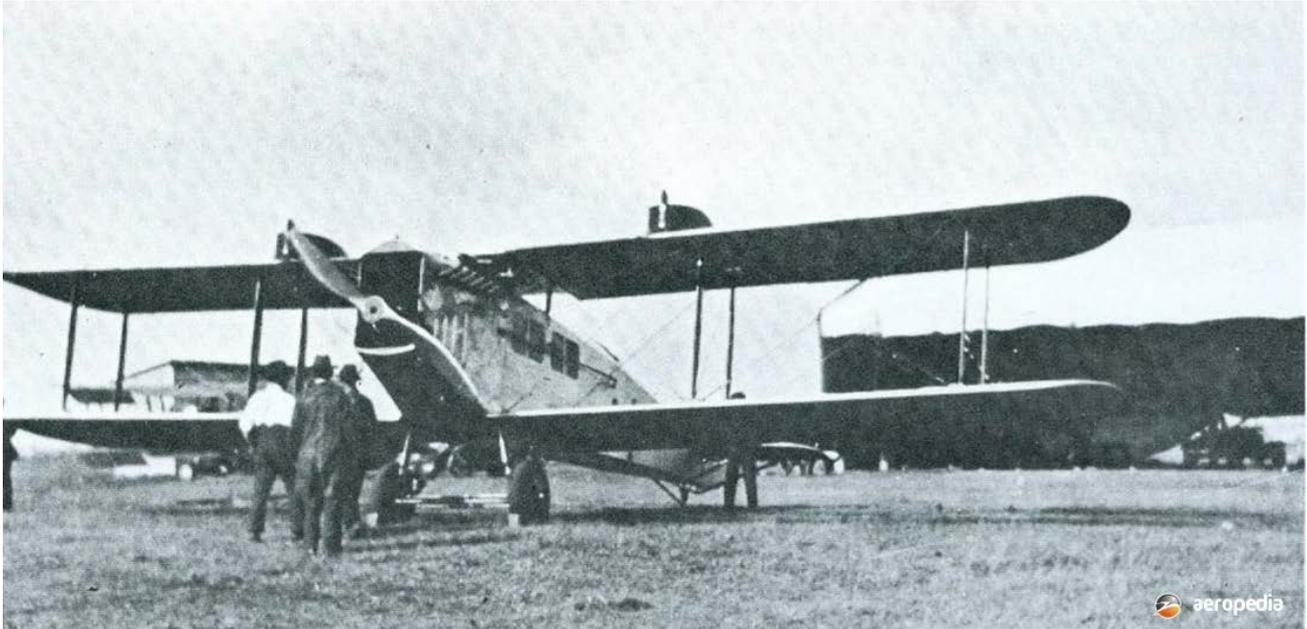
The Initial tests were made with a 400 hp Liberty twelve-cylinder VEE liquid-cooled engine, but a Rolls Royce Eagle IX 300 hp liquid-cooled V12 engine had been ordered for installation, it being said the performance would be considerably improved. Subject to further acceptance tests, the Civil Aviation Board indicated it would buy the aircraft for £6,000 after installation of the Rolls Royce Eagle engine.

The Civil Aviation Authority's holding back payment of the purchase price for the prototype until the Rolls Royce engine was installed and other setbacks resulted in AA&EC going into voluntary liquidation in March 1923. Most employees then left the Company. Broadsmith alone designed the engine mountings, made the necessary parts and carried out the Rolls Royce Eagle Engine installation. The B.1 never flew again. It was grounded and stored in a hangar at Mascot, where it literally rotted. Only the engine was salvaged, being used for some years as an emergency powerplant at a Sydney Bank.

Soon after AA&EC went into voluntary liquidation, the Commonwealth government announced its intention to establish its own Government-owned aircraft factory in Melbourne. After AA&EC's lease expired in 1923, the Government compulsorily acquired the AA&EC facility/airport at Mascot, nowadays known as the Sydney Kingsford Smith Airport, and is said to have paid a nominal price for the B.1. In an article in the November 1959 *Aircraft* magazine, writer Norman Ellison described the fate of the B.1 as *"One of the ugliest stories of early Australian air history..."*

In 1924, Love married Phyllis Eloise, daughter of George Arthur Davey, managing director of Edwin Davey and Sons, flour millers. He joined the firm, becoming sales manager, and in 1928 bought the Lidcombe Bakery. In January 1935 he registered N.B. Love Pty Ltd and built a flour mill at Enfield. His only return to aviation was as an RAAF Wing Commander, throughout WWII, commanding No. 2 wing of the Air Training Corps for boys aged 16-18.

Ironically, on 18 June 2019, in the Centennial Year of the founding of Sydney Airport by Nigel Love, the airport's main administrative building was renamed in his honour as "The Nigel Love Building."



*The Harry Broadsmith designed AA&EC B.1, the first 'airliner' designed and built in Australia.
Pictured at Mascot Airport in 1924. Image Aeropedia website.*

SOURCES:

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