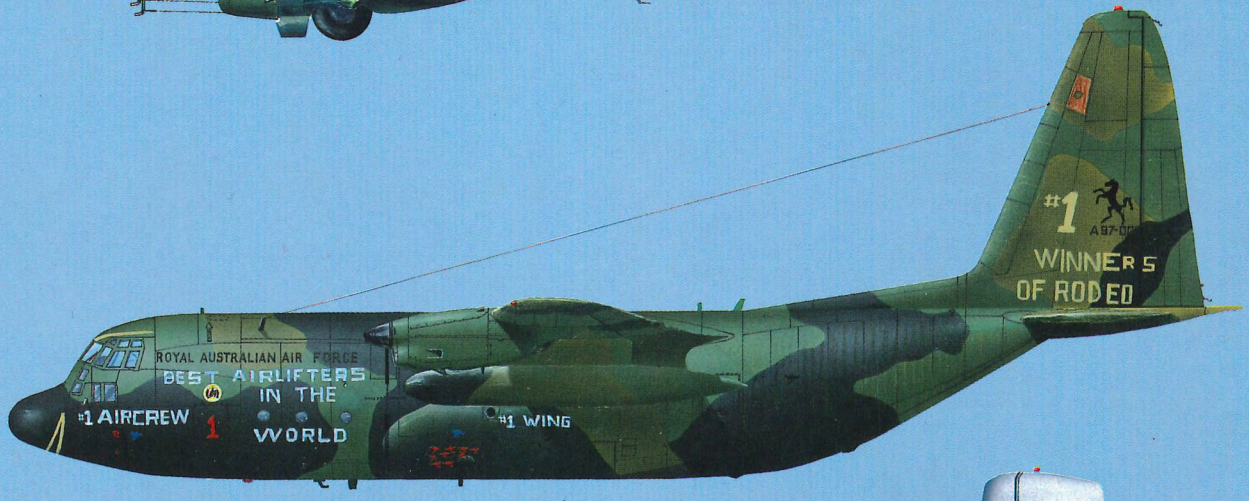
DAKOTA, HERCULES AND CARIBOU

IN AUSTRALIAN SERVICE

by Stewart Wilson







RECOUNTING THE EXCITING EXPLOITS AND ACHIEVEMENTS OF THE THREE TRANSPORT AIRCRAFT WHICH SERVED AUSTRALIA FROM WORLD WAR II TO THE PRESENT

DEDICATION

This book is dedicated to the deeds and exploits, to the sacrifices and achievements of the generation of Australians who proudly served in the RAAF's Dakota, Hercules and Caribou Squadrons.

DAKOTA, HERCULES AND CARIBOU

IN AUSTRALIAN SERVICE

by Stewart Wilson



ACKNOWLEDGEMENTS

The fifth in our 'Australian Airpower Collection' series of books deals with the often forgotten but immensely important transport element of the RAAF and, as has been the case with the previous books and those which will follow, the help of many people has made it possible. Firstly, ongoing thanks are due to the publishers, Jim and Margaret Thorn of Aerospace Publications, whose role in taking on the financial risks in publishing these important documents of Australia's military history cannot be dismissed lightly.

Those whose help in the compilation of this book made the author's task easier to perform include: Bob Piper and David Wilson of the RAAF Historical Section, Dennis Baker of the Hawker de Havilland (Vic) Historical Projects Group, Wng Cdr Bob Mowle (RAAF Richmond), Eric Allen, Neil Cook, Flt Sgt 'Tex' Morton (ARDU), Wng Cdr Pete Kelley and Wnt Off Al Meadows (Central Photographic Establishment), John McKenzie and Wnt Off Dave Gardner (RAAF Museum), Wng Cdr Peter Allen, Neil Mackenzie, Plt Off Wayne Bell (RAAF Richmond Photo Section), Zvi Margulies for his cover artwork and line drawings, the personnel of Nos 36, 37 and 38 Squadrons RAAF and especially Maria Davey, in charge of production of the book. Finally, a special thank you to Flt Sgt Chas Van Hulsentop, whose excellent collection of Caribou information and photographs was made freely available to the author.

STEWART WILSON
Sydney, 1990

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FRONT COVER: Dakota A65-78 attached to the Aircraft Research and Development Unit (ARDU) as it appeared in mid 1975 (ERRATA – The antenna wire on this illustration has been placed incorrectly. Please see photos for correct placement.)
C-130H Hercules A97-001 of No 37 Sqn returned to Australia resplendent in these markings after competing at 'Airlift Rodeo 1989', an annual event held at Pope AFB, South Carolina. The RAAF detachment at the Rodeo competed against 40 teams from various US and foreign units, winning 'Best C-130 Aircrew', 'Best Allied Team' and the coveted 'Best Overall Wing'. The 'smile' on the nose, the 'eyebrows' above the cockpit windows and the lettering on the fin had been overpainted in dayglo, but this had weathered considerably by the time the aircraft arrived home.
Caribou A4-199 of No 38 Sqn returned from loan to the United Nations and was repainted in RAAF markings, but retained the overall white UN scheme. It appeared in this scheme at the RAAF Diamond Jubilee Air Display at Amberley in April 1981. (Artwork Zvi Margulies)


AUSTRALIAN
ROYAL AIR FORCE
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INTRODUCTION

It's probably true to say that when it comes to air forces, the more 'glamorous' combat types are the aircraft which usually take most of the limelight. Those aircraft supporting the fighters and bombers are often pushed aside a little and not given the recognition they deserve. This fifth book in our 'Australian Airpower Collection' series attempts to restore some of that recognition to the three major transport aircraft to serve with the RAAF over the 50 or so years.

The Douglas DC-3/C-47 Dakota is arguably the most important transport aircraft ever built and a true classic of aviation history. In its prewar airliner role as the DC-3, it made profitable, unsubsidised air services possible for the first time; in World War II it was produced in huge quantities and formed the backbone of the Allies' massive air transport effort. After the war it became the early equipment of most airlines in just about every country in the world as well as a necessary item of equipment in the armed forces of over 100 nations. The fact that several hundred are still in service in both civil and military roles illustrates its remarkable longevity and its equally remarkable versatility and usefulness.

The RAAF has used the Dakota (or DC-3) continuously since 1939 when four examples were requisitioned on charter at the outbreak of war. Subsequently, many more were delivered and over half a century later a handful still fly in RAAF colours. In this book we examine the Dakota's RAAF service as well as that of its predecessor, the Douglas DC-2.

In some ways, the Lockheed C-130 Hercules has become the Dakota of the modern era, operated by the armed forces of more than 50 nations. Originally designed as tactical transport, the Hercules has subsequently been manufactured in countless variants performing a multitude of roles often far removed from that for which it was originally designed. The RAAF was the Hercules' first operator outside its country of origin, using it for both tactical and strategic transport duties since 1958 and achieving an unsurpassed record of nearly 500,000 accident free flying hours since then.

Supplementing the Hercules in RAAF service since 1964 has been the remarkable de Havilland Caribou STOL tactical transport, an aircraft which operates close to the front line, supporting the troops on the ground from short, unprepared strips which would deter any other aircraft of similar size and capability. The Caribou has been tried and tested in a real war – Vietnam – where its qualities proved it to be the perfect aircraft for the jobs it was called upon to perform. The RAAF's Caribou served in Vietnam for more than seven years from the middle of 1964 – the first aircraft sent there were diverted from their delivery flight to Australia – and wrote another great chapter in the history of the RAAF.

In this book the operational careers of all three aircraft in RAAF service are examined, as is their development and procurement. It's an interesting and largely untold story; we hope readers find it so.



A fine portrait of RAAF C-47B Dakota A65-80. This aircraft went to Cambodia in 1971 as part of an Australian foreign aid programme. (CPE)



ne. (CPE)

DOUGLAS
C-47 DAKOTA

DOUGLAS C-47 DAKOTA

Call it what you will, the Douglas DC-3 – or C-47, C-53, C-48, C-49, C-50, C-51, C-52, C-41, C-117, R4D, Skytrain, Skytrooper, Dakota, 'Gooney Bird', depending on the operator, the part of the world, or the era – is by all accounts arguably the most important transport aircraft ever built. Its usefulness, versatility and longevity have for many years been legendary both in military and civilian roles, and as a result a true classic of the relatively short history of aviation has been born.

From the time it first entered commercial service in 1936 until World War II, the DC-3 provided a revolution in air transportation with its ability to fly profitably without subsidy. During the war years – called mainly the C-47 by the USA or Dakota by the British and Commonwealth nations – the aircraft was produced in huge quantities for the air forces of the Allies and became an indispensable part of the war effort. The United States General and later President, Dwight D Eisenhower, listed the Dakota among the four items of equipment most vital to success in Africa and Europe. The others were the jeep, the two-and-a-half ton truck and the bulldozer and it is interesting to note that none of these were originally designed for combat duties.

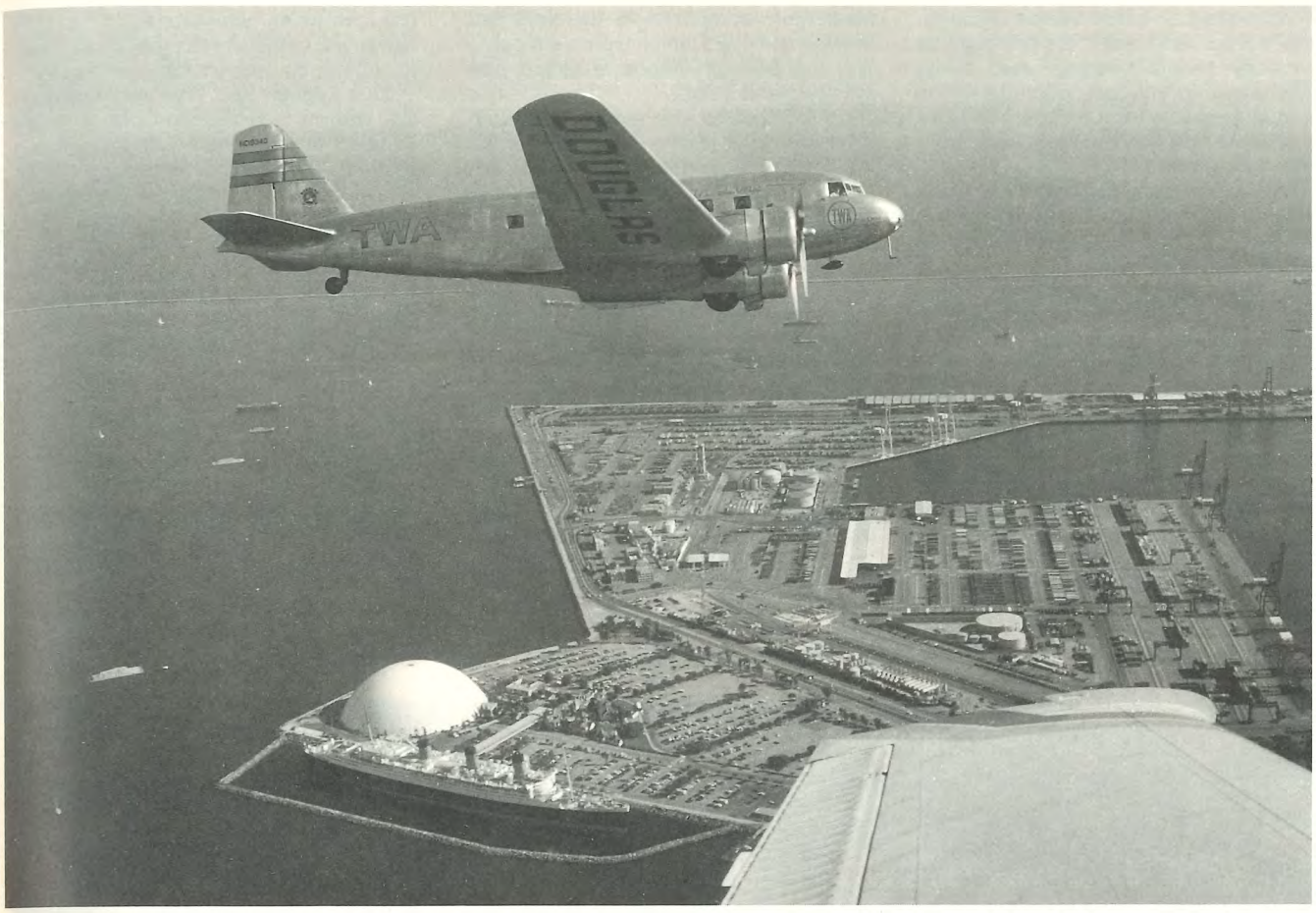
After World War II the Dakota formed the backbone of most of the world's airlines in just about every country with the availability of thousands of ex-military aircraft. Numerous attempts were made by various civil aviation authorities to ground the 'grand old dame' of the air (the first, by the USA as early as 1947) but none were successful. Equally numerous attempts were made by aircraft manufacturers to develop and sell a 'DC-3 replacement' and some, particularly the Fokker F.27 and Hawker Siddeley HS.748, were partially successful. Despite this, the DC-3 lives on, and now well into its sixth decade, many hundreds are still in service around the world with numerous civil operators and the armed forces of some three dozen countries.

The Australian experience was similar to other parts of the world with the DC-3 (and its predecessor, the DC-2) making an impact on airline operations before World War II. In the early days of the war the Royal Australian Air Force had very little transport aircraft capacity. Impressed small aircraft made little difference but four impressed DC-3s and ten DC-2s obtained from the USA's Eastern Airlines via the British Purchasing Commission held the fort until the first of 124 C-47 Dakotas supplied under Lend-Lease arrived in early 1943. These were supplemented in 1943 and 1944 by aircraft loaned to the RAAF by the United States Army Air Force.

Australia's major airlines and smaller charter, freight and specialist operators have flown DC-3s in large numbers since



The one and only Douglas DC-1, photographed two weeks after its first flight in July 1933 and sporting the markings of the launch customer for the whole Douglas Commercial series – TWA. The DC-1 ended its days in Spain, crashing on takeoff from Malaga in December 1940. (McDonnell Douglas)



Restored DC-2 over Long Beach, California in 1989. Underneath can be seen the Queen Mary and the dome housing Howard Hughes' 'Spruce Goose' flying boat. TWA's order for 20 DC-2s in September 1933 was the first of what would turn into thousands for the DC-2 and DC-3. (McDonnell Douglas)

the end of the war, and as was the case in other parts of the world, the aircraft provided the basis of many services well into the 1950s with local services continuing on the DC-3 in many regions for years after that. In 1990 there was still about a dozen DC-3s on the Australian civil register and four were regularly flying in RAAF colours with the Aircraft Research and Development Unit (ARDU) at Edinburgh, South Australia.

The Douglas Heritage

Donald Wills Douglas was the founder of one of America's great aircraft manufacturers, the Douglas Aircraft Company. The son of a New York bank teller, Douglas as a young boy witnessed Orville Wright's early flights, and like young men then and now, became smitten with flying machines at an early age. After leaving school, Douglas found employment with the Glenn L Martin company in Cleveland, Ohio, working as a design assistant before establishing his own concern in March 1920 in the sunnier climate of California.

Douglas Aircraft's first product, a one off, Liberty engined biplane called the Cloudster, took to the air for the first time on 24 February 1921, and the Douglas legend was up and running.

Douglas headed a small design and engineering team including James H 'Dutch' Kindelberger, the man who would later achieve fame with North American Aviation as the person primarily responsible for such classic designs as the T-6 Texan/Harvard, the P-51 Mustang, the B-25 Mitchell and the F-86 Sabre. Later on, another illustrious name in American aviation, Jack Northrop, would become part of the Douglas team before he too established his own company in the late 1930s.

Douglas' first production aircraft was the DT series of single engined torpedo bomber biplanes which first flew in 1921 and served with the US Navy and in Norway and Peru. The major production version, the DT-2, was built in both land and floatplane versions and seven of the about 90 examples manufactured were built under licence in Norway.

The Douglas World Cruiser (DWC) was based on the DT-2 but developed specifically for an around the world flight attempt by the US Army Air Service. With military equipment removed and fuel capacity greatly increased, the four DWCs departed Seattle, Washington in April 1924, the two survivors of the trip returning to Seattle the following September after a journey which took them to Japan, Hong Kong, Indo-China, Siam, Malaya, Burma, India, Persia, Mesopotamia, Turkey, Romania, Hungary, Austria, France, England, Iceland and Greenland.

Further designs emerged from the Douglas factory over the next decade, among those achieving series production being the O-2 series of observation biplanes and their Air Mail 1 derivative, the M series mailplanes and trainers, the Dolphin amphibious monoplane, the O-25/32 and 28 series of observation biplanes and their monoplane successor, the O-43, and the Y1B-7 twin engined high wing bomber of 1930, the first monoplane bomber to enter United States Army Air Corps service, albeit in very limited quantities.

The Douglas Commercials

By the early 1930s the Douglas Aircraft company had expanded sufficiently and produced a wide enough variety of types to consider taking on more advanced

work. Indeed, it could be said that Douglas needed such work, for although its basically simple designs were being purchased in modest quantities, the company was far from prosperous and a shot in the arm was required, both technically and financially.

The opportunity came in 1932 when Boeing began work on its 10 passenger Model 247 twin engined, all metal, cantilever winged monoplane airliner. Sixty 247s had been ordered by United Airlines, and its advanced design features (including retractable undercarriage) made United's main competitors – Trans Continental and Western (TWA) and American Airways (AA) – realise that this aircraft would render their slower and less comfortable fleets obsolete and therefore attract customers away from them.

At that stage the 247 could accurately be described as being very advanced, especially compared to the Ford and Fokker trimotors which were then carrying the bulk of American airline passengers and freight.

To compound the airlines' problem, United's order for the Boeing 247 would tie up production for some time, and unable to get this aircraft into their fleets within an acceptable timescale, TWA and AA were obliged to look elsewhere. In fact at United's insistence, Boeing could not even offer the 247 to other operators until the launch customer's requirements had been met. This seriously inhibited Boeing's ability to sell the aircraft later on, especially since by then Douglas had produced something even better.

It was TWA's Vice President and Chief of Operations, Jack Frye, who first approached Douglas (and the other manufacturers, except Boeing) about a new airliner and thus set in motion the process which has resulted in Douglas being one of the world's major suppliers of commercial aircraft for six decades.

On 2 August 1932, Frye went to Douglas with a specification for a three engined airliner which was bigger and better than the 247. Chief designer Kindelberger and his assistant, A E Raymond (Jack Northrop took care of structural design including the vitally important multi cellular wing structure) responded with a *twin* engined transport capable of carrying 12 passengers in a two abreast configuration. The powerplants were to be 710hp R-1820 Wright Cyclone nine cylinder radials and the aircraft was of all metal, low wing configuration with retractable undercarriage and such (then) advanced features as split trailing edge wing flaps.

Design cruise speed was 190mph (305km/h) – some 30mph (48km/h) faster than the 247 and the 12 passengers



The old and the new. A DC-2 shares the ramp with a Douglas airliner of the current generation, an MD-87.

could be carried over a range of 1,000 miles (1,609km). Important to the specification was TWA's requirement that the aircraft should be able to takeoff from any aerodrome used by the airline with full load and with one engine inoperative, thus the original request for three engines. The aircraft's maximum takeoff weight was 17,500lb (7,938kg).

TWA accepted the Douglas proposal and design work on what would be called the Douglas Commercial No 1 (DC-1) began in September 1932. The first Boeing 247 flew in February 1933 and five months later, on 1 July, the DC-1 took to the air for the first time from Douglas' home at Clover Field, Santa Monica, California.

Registered X233Y, the DC-1's first flight had its moments, the aircraft losing power in the climb and forcing pilot Carl Cover to return after only 12 minutes' flying. The problem was found to be in the carburettor floats, causing fuel starvation.

Only one DC-1 was built, the aircraft being used for test flying during the remainder of 1933, activities including the fitting of 700hp Pratt & Whitney R-1690 Hornet engines in November (the Cyclones were reinstalled three months later) and extensive engine out performance testing to satisfy not only the authorities but also the manufacturer, the customer and the pilots. The DC-1 represented a radical departure for 1933 and with a length of 60ft 0in (18.28m) and a wing span of 85ft 0in (25.91m) it was also the largest twin engined aircraft built in the USA to that time.

TWA's 'single engined takeoff' capability was proven in September 1933 when ballasted up to 18,000lb (8,165lb), the DC-1 departed Arizona's Wimslow Airport (the highest in the airline's network), pilot Eddie Allen cut one engine immediately after lift off, climbed to 8,000 feet and then cruised to Albuquerque on one engine. The DC-1 arrived there 15 minutes before a scheduled TWA Ford Trimotor flight which had departed Wimslow before the DC-1!

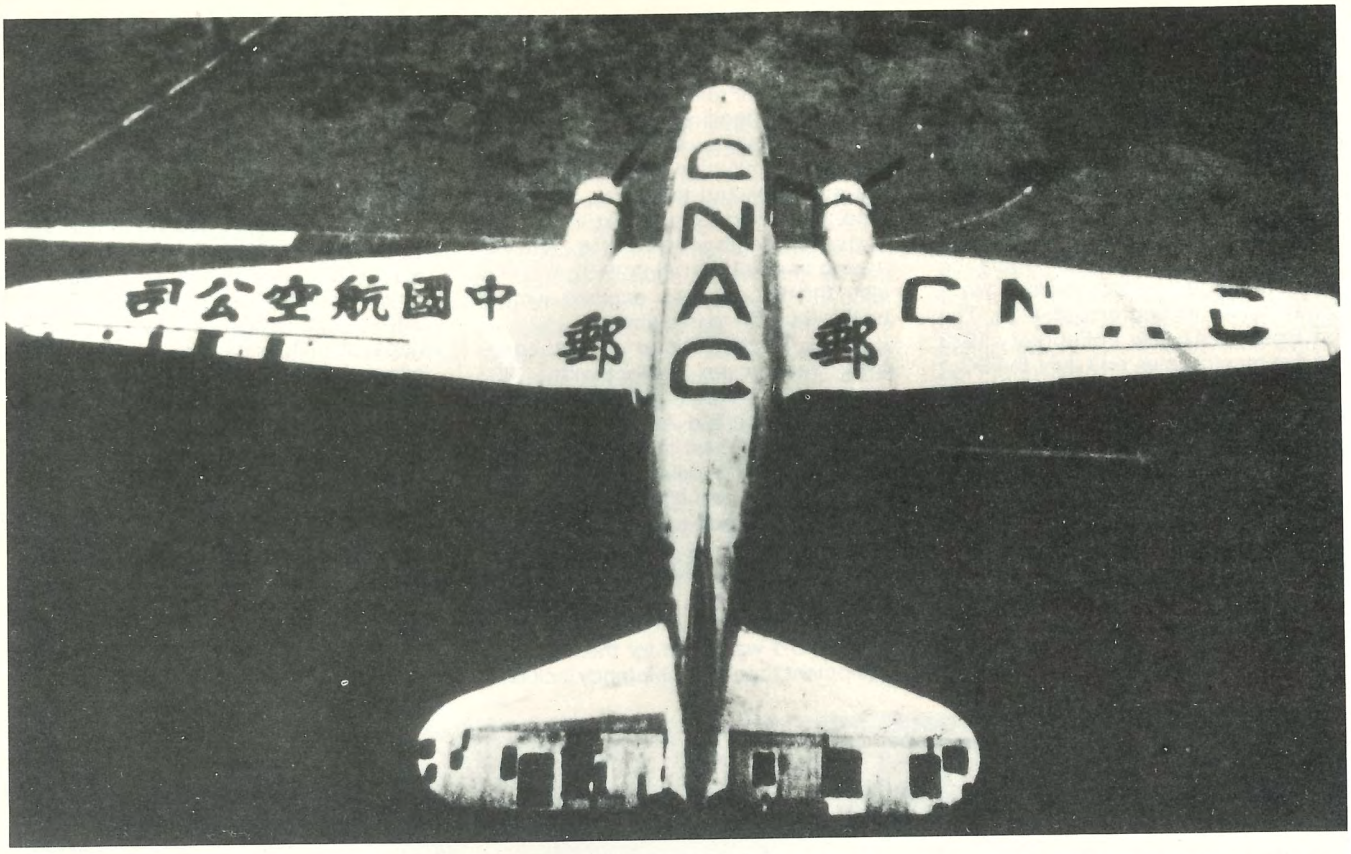
The DC-1 was used for the testing of equipment then in their infancy including de-icing boots on the wing leading edges and propellers, night flying equipment, new navigational aids and a new Sperry autopilot linked to a radio compass.

TWA took the DC-1 into its fleet in February 1934 (following the presentation of a $US125,000 cheque to Douglas) and immediately proved its superiority over any other airliner flying in the USA or anywhere else. Within days of entering service the DC-1 set a new US coast to coast commercial record (with two stops) of 13 hours and four minutes and followed that with eight new world records and 11 US records for speed and endurance. The point was rapidly being proven, and although only a single DC-1 was built, its successors were manufactured in rather larger quantities.

The DC-1 ended its days in Spain, travelling there in 1938 for use in the Spanish Civil War following a period of ownership by Howard Hughes. In December 1940 it crashed on takeoff from Malaga.



The interior of the DC-2 provided comfortable seating for 14 passengers. Note what the well dressed traveller was wearing in 1934 and the steam train type overhead baggage racks.



The rugged strength of the DC-2 and -3's structure is one of the reasons the aircraft has survived for more than 50 years. This is the famous 'DC two-and-a-half', a Chinese DC-3 which had its battle damaged starboard wing temporarily replaced with the wing from a DC-2 in 1941. The aircraft was successfully flown out, repaired, and returned to service.



Several DC-3s carried the registration number NC3000, usually while in the service of the manufacturer. This is one of the former C-47s converted to civilian DC-3C standards by Douglas after the war. (McDonnell Douglas)

One Into Two

If the DC-1 can be regarded as a kind of 'technology demonstrator', the DC-2 was the production expression of that technology. Delighted with the performance and passenger comfort offered by that aircraft, TWA in September 1933 ordered 20 examples of an improved model, to be designated the DC-2. This aircraft was similar to the original in most areas, major differences including the a 24 inch (61cm) longer fuselage which allowed an increase in passenger accommodation to 14 in seven rows. The initial powerplant was the 710hp R-1820-F3 variant of the Wright Cyclone driving two position propellers. Hamilton Standard fully feathering propellers were fitted to later aircraft.

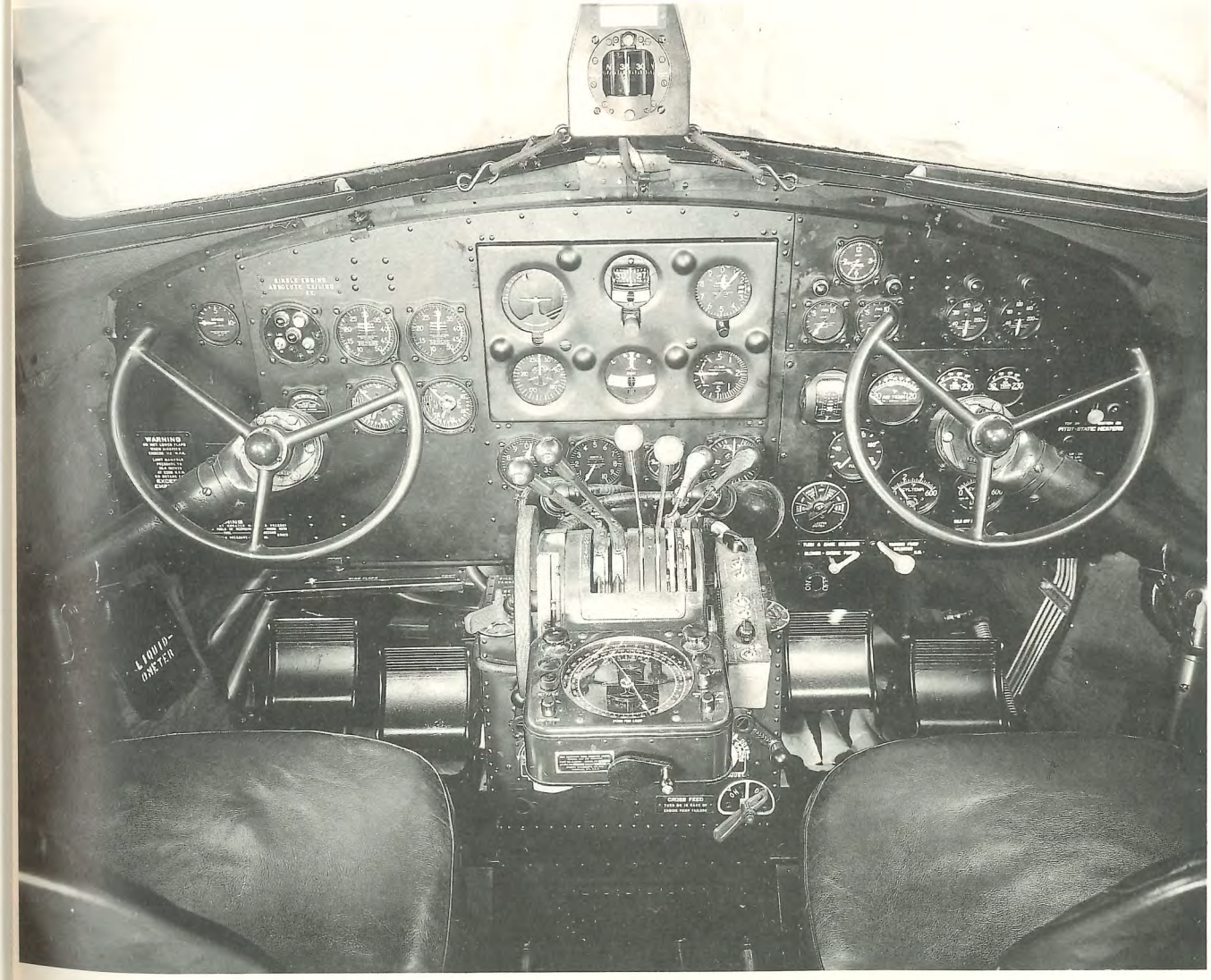
A new rudder and wheel brakes were also fitted, the initial maximum takeoff weight was 18,000lb (8,165kg) and the aircraft was capable of carrying its load over a distance of 1,060 miles (1,705km) at a cruising speed of 190mph (305km/h). Fuel capacity was 510 US gal (1,930 l) and a combination of strengthened undercarriage, fuselage and centre structures plus the fitting of 750hp Cyclones with feathering propellers allowed progressive increases in maximum weight to ultimately 19,000lb (8,618kg) in later aircraft.

TWA increased its order for the DC-2 by a further 20 aircraft in November 1933, and by the time the aircraft recorded its maiden flight on 11 May 1934, 75 examples were on order. Before 1934 was over, all the major United States domestic airlines bar one – TWA, Eastern, American Airlines (out of the old American Airways), Pan American and General Airlines – had the DC-2 either in service or on order.

The odd one out was of course United, which was for the moment stuck with its Boeing 247s, all of which were quickly converted to the latest 247D specification with improved engines and interiors when the DC-2 came on the scene. But the 247's intrinsic disadvantages, notably its cabin split by the wing spar, its ability to carry only ten passengers and its minimal landing docility due to a lack of flaps, continued to work against it. The result was that Boeing was left with an airliner it couldn't sell (just 75 were built) and United had to struggle on with the uncompetitive 247 until it too succumbed to the Douglas onslaught and ordered DC-3s in 1936.

TWA introduced the DC-2 into service on the first day of August 1934 and by the end of that month had taken delivery of all 20 of its initial order. Needless to say, the airline's Ford Trimotors were immediately put to pasture!

A significant number of the 198 DC-2s ultimately built – the final example was delivered to the United States Army Air Corps in late 1939 – were delivered to export customers, the most important



A typical DC-3 cockpit showing the now unusual layout of primary engine instruments in front of the pilot, secondary instruments on the copilot's panel and flight instruments in the centre.

being Holland's KLM. Also in Holland, the Fokker company obtained a licence to manufacture the type but in the event it only assembled DC-2s for KLM and other European operators including Swissair.

Czechoslovakia's CLS, Spain's LAPE and Italy's ALI also bought DC-2s, Lufthansa had one for evaluation (following a visit to the USA by Ernst Udet and his examination of the DC-1) and Poland's LOT purchased two powered by 690hp Bristol Pegasus engines. In addition, a couple of corporate DC-2s were sold in the USA, the example flown by Standard Oil featuring Pratt & Whitney Hornet engines. Notable absentees from this list are British operators, who in the mid 1930s were still buying mainly British aircraft rapidly becoming obsolete when compared to the Douglas Commercials.

KLM's involvement with the DC-2 provided invaluable publicity for the type in the 1934 MacRobertson England to Australia Air Race. PH-AJU 'Uiver' finished second overall in the race behind the purpose built de Havilland DH.88 Comet racer and first in the transport section ahead of a Boeing 247.

The DC-2 carried three passengers and 90,000 letters on its journey and went a long way towards proving the capability of air transport in the minds of the public. The success helped Douglas achieve many of its export orders for the DC-2, including from Australian operator Holyman's Airways, which received its first example in April 1936. Three months later Holyman's and several other operators merged to form Australian National Airways (ANA), that airline ultimately operating eight DC-2s.

Not surprisingly, the United States military showed an early interest in the DC-2, five (as RD2-1s) being supplied to the Navy in 1934-35, of which two went to the Marines. The first model for the USAAC was a single example dubbed the XC-32 delivered in 1936, followed in 1937 by 11 C-33s with a cargo door and enlarged vertical tail surfaces. Two C-34s with standard DC-2 tails were also built, and in 1937 a C-33 was modified to C-38 standards by fitting improved undercarriage, brakes and tailplane along with the dorsal fin characteristic of the DC-3. The new production equivalent was the C-39, 35 of which were built.

Enter The Three

The chain of events which ultimately led to the development of the DC-3 came from two different but connected directions, the first a need to improve some areas of the DC-2's flight characteristics, the second an American Airlines requirement for a new sleeper transport to replace the late 1920s vintage Curtiss Condor biplanes the airline then had in service. The Condor was a roomy aircraft capable of accommodating up to 18 seated or 12 sleeper passengers, and the idea was to combine the Condor's space with the DC-2's modern features and performance.

The DC-2 did exhibit some flight characteristics which were less than ideal including a tendency to suffer propeller and fin icing problems. It was directionally unstable with the standard fin and rudder, nose heavy, and not easy to land despite the wing flaps. In addition, its aileron and rudder controls were very heavy and despite previous demonstrations, single engined performance was marginal. From an airline's point of view, more than 14 seats quickly became desirable as the 1930s progressed, as



The interior of a typical pre war DC-3 showing the standard 21 seat interior, three abreast at a generous (by modern standards) seat pitch

did the ability to operate from New York to Chicago non stop against the prevailing winds, something the DC-2 could not normally do.

In May 1934, American Airlines' new president, C R Smith, and his engineering vice-president, William Littlewood, sat down and discussed the possibilities of a luxury sleeper transport based on an enlarged version of the DC-2. At this stage Douglas was not involved, but Smith and Littlewood did know that Wright would soon have available a new version of their R-1820 engine (the 'G' series) offering 1,000 horsepower for takeoff.

Their requirement was for an aircraft with a fuselage wide enough to accommodate berths on each side of the cabin for use on transcontinental sleeper services, increased range and a greater payload than the DC-2. A telephone call from Smith to Donald Douglas outlining his needs and proposals got things going, but at first Douglas was reluctant to interfere with the DC-2, which was selling well. Smith pushed the point, sweetening the proposition with the strong suggestion that the airline might order 20 of the new type, ten in sleeper configuration with 16 berths and the remainder as dayplanes with 21 passenger seats.

On 10 May 1935, Douglas submitted its plans for the 'Douglas Sleeper Transport' (DST) to American Airlines; on 8 July, the airline ordered 10 DSTs at a price of $US79,500 each. Soon afterwards, this was amended to eight DSTs and 12 DC-3s. The legend was up and running.

It should be noted that the DST and DC-3 were simply variants of the same aircraft, the former designation applying to aircraft equipped with sleeper berths and the latter to dayplanes with normal seating. Although the first seven aircraft were completed as DSTs (identifiable by the 'slit' windows in the upper fuselage above the normal cabin windows) total DST production amounted to only 50 aircraft, and the overall concept of the sleeper airliner was one of the few failures in the DC-3's career.



Interior shot of a DST showing one of the eight two berth sleeping compartments. The concept of the sleeper airliner was not as successful as had been hoped, and only 50 DC-3s were built as DSTs.

DC-3 Described

The first Douglas DST DC-3 (X14988) flew for the first time from Clover Field on 17 December 1935 in the hands of Carl Cover. Revealed on that day was an airliner with obvious similarities to its predecessor but numerous differences both major and minor. Commonality with the DC-2 was considerably less than the 85 per cent originally envisaged.



Chicago and Southern's DC-3 NC25626 was delivered in April 1940 and like many of that era was built with a starboard side passenger door.

The most obvious change was the larger fuselage with its rounded sides. The overall length of the DC-3 was 30 inches (76cm) greater than the DC-2 at 64ft 6in (19.6m) while the cabin was 26 inches (66cm) wider at 92in (2.33m) and three inches (76mm) higher at 78 inches (1.98m). In the DST this space allowed the fitting of eight sleeper compartments each with two berths and separate dressing rooms for men and women. Baggage compartments at the front and rear of the aircraft provided a total volume of 306 cu ft (8.7m³).

In the day version, the DC-3, the standard accommodation in pre war days was for 21 passengers, three abreast in seven rows at a seat pitch of 38 inches (96.5cm) or 24 passengers in eight rows at 33 inch (83.8cm) pitch. After World War II 28 or 32 seat four abreast arrangements were the usual layout.

Structurally, the DC-3 followed the example set by its predecessors. The fuselage was of semi-monocoque all metal construction and the wings were fully cantilever all metal using the multi cellular Northrop method in three sections – centre and outer wings. Alclad skinning covered all surfaces except the flying controls which were metal framed and fabric covered. The hydraulically operated split flaps extended from immediately inboard of the ailerons to the remainder of the wing trailing edges and underneath the centre section. Fuel was housed in the wing centre section, up to 804 US gallons (3,043 litres) being accommodated.

Although the centre section of the DC-2 was retained in the DC-3, the overall span was increased by 10 feet (3.05m) to 95 ft 0in (28.95m), and the wing area also increasing accordingly. Also enlarged was the fin and rudder which once and for all cured the DC-2's longitudinal instability problems, while all of that aircraft's other flying vices were also removed, making the DC-3 an easy and forgiving aircraft to fly.

Other changes over the DC-2 included the installation of ice protection on the rudder counter balance, the fitting of extra carburettor heat for severe icing conditions, the moving of the landing lights from the nose to the wing leading edges, the fitting of electro-hydraulic pumps to assist in undercarriage and flap retraction in the case of an engine failure after takeoff, improved instrument lighting and the fitting of mechanical down latches on the main undercarriage legs to prevent retraction on the ground.

DC-3 variants were powered by two basic powerplants, the Wright R-1820 Cyclone nine cylinder single row radial and the Pratt & Whitney R-1830 Twin Wasp 14 cylinder two row radial. Both engines featured single stage superchargers although subsequent versions of both had two stage blowers. Some Pratt & Whitney powered DC-3 and C-47 versions later had this feature. The vast majority of aircraft were fitted with twin Wasps, including all of the more than 9,500 C-47s manufactured during World War II, although most early civil versions had Cyclones installed.

As originally flown, the DST/DC-3 was powered by the R-1820-G2 version of the Cyclone, producing 1,000hp for takeoff. Other pre war civil versions of the DC-3 were fitted with other variants of the Cyclone producing between 1,000 and 1,200hp for takeoff and a variant with the more powerful 100-series Cyclones was ordered by TWA and designated the DC-3B. The Pratt & Whitney powered DC-3 was designated the DC-3A (or DST-A in its sleeper form) and



The DC-3 production line at Santa Monica in March 1936, just four months after the prototype had flown. At this stage the aircraft was still three months away from entering service.



A USAAF C-47B Skytrain in typical World War II olive drab colour scheme.

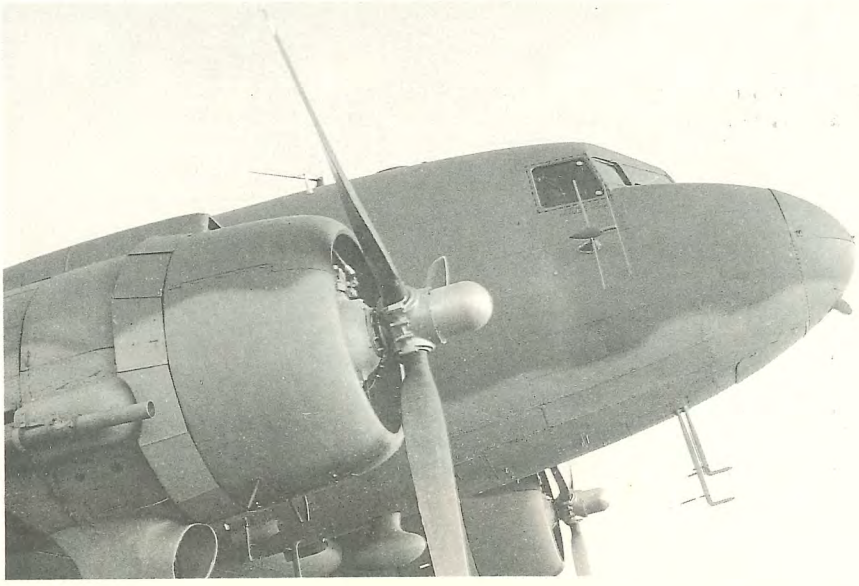
this appeared in late 1936. Several variants of the R-1830 Twin Wasp were installed, offering similar power ratings to the Cyclones. All DC-3s, both civil and military, had Hamilton Standard constant speed and feathering three bladed propellers fitted.

Maximum takeoff weights ranged from 24,000lb (10,886kg) initially to 25,200lb (11,430kg) by mid-1937, although the military variants which would follow could operate at higher weights, typically 29,300lb (13,290kg) or 30,000lb (13,608kg) for the C-47, depending on the particular model.

Into Service

The DC-3 gained its certification on 21 May 1936, and five weeks later American Airlines began its 'American Eagle' New York to Chicago service with its first DSTs. Transcontinental services began in September and in the meantime day services with DC-3s had begun in August. American's Douglases featured starboard side passenger loading doors so as to continue the tradition established by the Ford Trimotor, as did other airlines, whose older equipment often had their doors on the 'wrong' side. An early customer – and the first for the Twin Wasp powered DC-3A – was United Airlines, whose Boeing 247s were by now completely outclassed in all areas. United got its first DC-3s at the end of 1936 and started services with them in January 1937.





Two shots showing the much narrower engine cowling of the Wright Cyclone single row radial powered DC-3 (above) compared to the broad cowling which covered the two row radials in Pratt & Whitney powered versions (below). (Stewart Wilson/ John Goldsmith)

Orders for the DC-3 rapidly increased from within the USA and from export customers. As had been the case with the DC-2, Fokker handled the European agency for the type, assembling them in Holland and selling 63 to operators in the area including KLM, Swissair, Sabena and Air France. Australia's first DC-3 was delivered to Australian National Airways in September 1937 and by the end of 1938 it had been joined by a further three.

All over the world, operators were discovering the benefits of DC-3 operations. The bottom line of the profit and loss account was suddenly written in black rather than red ink and on top of that safety and reliability were better than had been possible before. It cost only slightly more to operate a DC-3 than a DC-2, yet the new airliner had 50 per cent more payload capability. A minimal aircraft/mile (or trip cost) increase and a very large decrease in seat/mile costs ... an accountant's dream!

Filling Military Needs

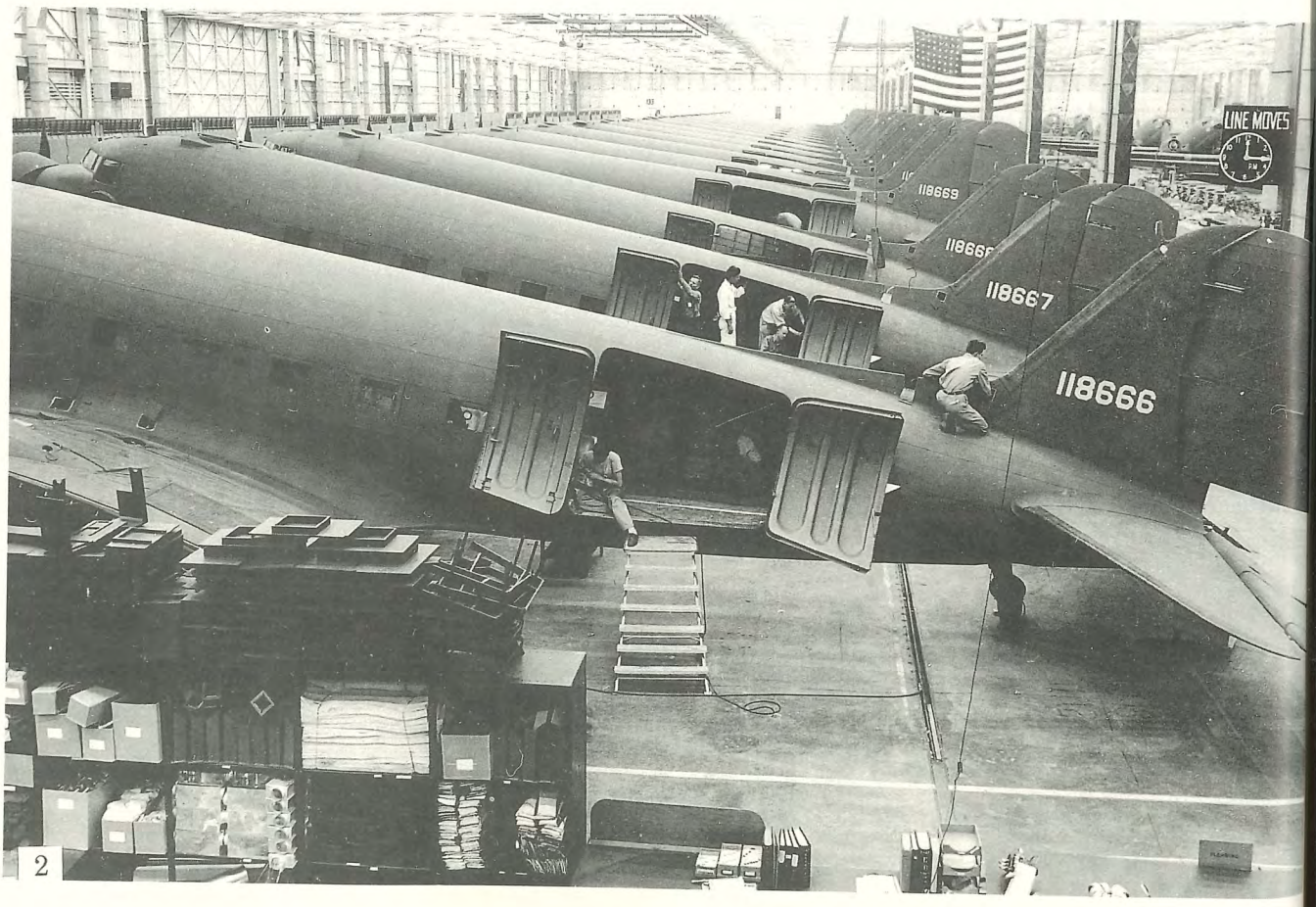
On 7 December 1941, Japan attacked the US naval base at Pearl Harbour in the Hawaiian Islands and America found itself taking a leading role in World War II. By that time just on 500 DC-3s had been built, of which 289 were in service with US airlines. In addition, 369 DC-3s were on order. As is standard procedure at such times, the newly renamed United States Army Air Force (USAAF) began impressing large numbers of civilian aircraft to fulfill transport and communications duties, among them DC-3s. The Douglas transports were initially acquired by two methods: requisitioning existing aircraft (ten per cent of transport aircraft in US airline service were impressed) and taking aircraft intended for civilian operators direct from the production line.

This resulted in numerous designations being given to DC-3s and DSTs so requisitioned, differences relating to the original customer, engine variant fitted and the interior installed. There were, for example, no fewer than 11 variants under the designation C-49 but in simple terms this covered aircraft powered by Wright Cyclone engines, as did C-50 and C-84. The designations C-48, C-51, C-52 and C-68 covered Pratt & Whitney powered DC-3As which had been impressed into service or requisitioned from the production lines.

Two major variants were developed specifically for military needs, the C-47 Skytrain and C-53 Skytrooper. Bot were Pratt & Whitney powered, the Twi Wasp engines receiving the designatio R-1930-92 in the case of those with singl stage superchargers and R-1830-90C two stage blowers were fitted. Bot offered 1,200hp for takeoff although th -90C was able to maintain 1,000hp up t 12,500 feet.

The C-53 was designed as a troo mover, and although it was fitted with th glider towing cleat on the extreme rea fuselage which would be a feature o subsequent dedicated military variants it lacked facilities for carrying heav cargo such as a reinforced floor or large cargo door on the port side. It had the normal DC-3 wooden floor and fixed inwards facing metal seats for 28 troops or paratroops. All 395 C-53s were powered by R-1830-92 engines and the first was delivered in August 1941.

By far the major production versio was the specialist military C-47, pro- duced in huge quantities from early 1942 until the end of hostilities in 1945. Development of the C-47 began in 1940 with the placing of an order for 545 examples by the then USAAC in Septem- ber 1940. The initial version (simply called the C-47 Skytrain) was powered by R-1830-92 engines and set the stan-



2

The production effort to manufacture nearly 10,000 C-47s and C-53s between 1942 and 1945 was a massive one involving three factories. This shot was taken in 1942 when the production rate was still building up. It hit its peak in 1944 when nearly 5,000 C-47s were delivered.

dard for a basic specification for the more than 9,500 examples which would follow. These included a large cargo door on the port side, a strengthened metal cabin floor with tie down fittings, stronger landing gear, folding wooden seats along the cabin walls for 28 troops and the glider towing cleat which had been a feature of the C-53.

The first C-47 was delivered in January 1942 from Douglas' new plant at Long Beach, California. Shortly afterwards, another new plant at Oklahoma City would also be churning out C-47s by the thousands, while the original Santa Monica factory produced 990 DC-3s and C-53s before being turned over to C-54 Skymaster and A-20 Havoc production. A total of 965 of the initial C-47 variant were built for the USAAF and other Allied nations plus 33 for the US Navy as R4D-1s (a further 33 operated by the USN but purchased under USAAF contracts). In Royal Air Force service, the C-47 was designated Dakota I.

The next variant was the C-47A, which differed from the original primarily in having a 24 instead of 12 volt electrical system. Production of this model reached 5,254 – 2,300 at Oklahoma City and 2,954 at Long Beach. The RAF called the C-47A the Dakota III; the designation Dakota II was allocated to DC-2s and -3s impressed into British service.

The third and final major production variant was the C-47B, or Dakota IV in RAF service. Developed for high altitude operations over the "hump" into China in the India-China area of operations, the C-47B was powered by R-1830-90C engines with two stage superchargers. It also had provision for ferry fuel tanks to be fitted in the cabin and could operate at an all up weight of 30,000lb (13,608kg).

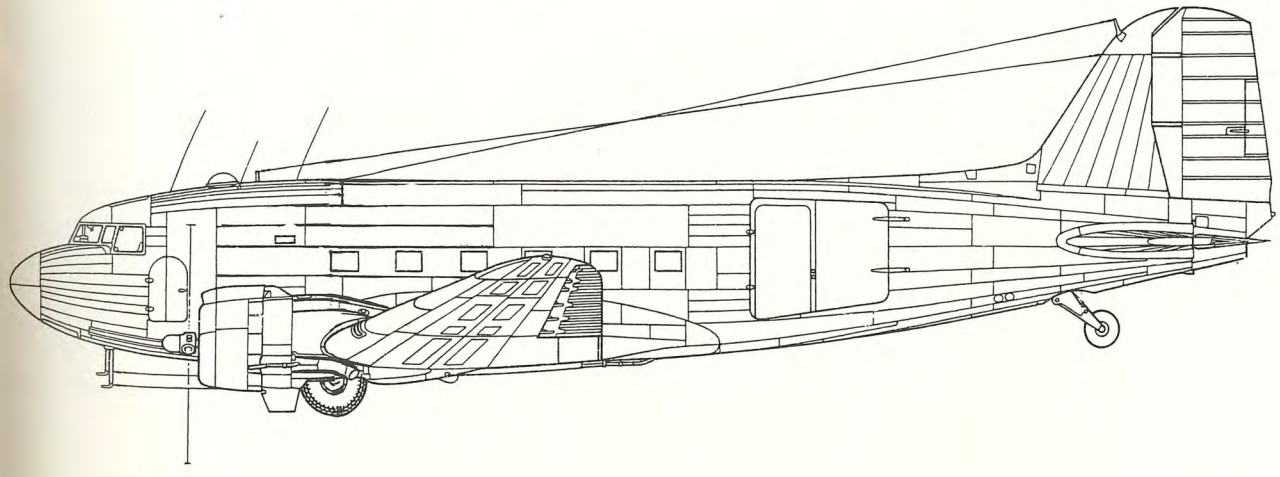
DOUGLAS C-47A DAKOTA III
Powerplants: *Two Pratt & Whitney R-1830-92 14 cylinder, two row, geared and supercharged radial piston engines each rated at 1,200hp for takeoff and 1,050hp at 7,500ft; three blade Hamilton Standard 3E50 constant speed and feathering propellers of 11ft 6.4in (3.51m) diameter; total fuel capacity 804 US gal (3,043 l) in four wing centre section tanks.*
Dimensions: *Wing span 95ft 0in (28.95m); length 64ft 5.5in (19.62m); height 16ft 11in (5.15m); wing area 987sq ft (91.7m²).*
Weights: *Max takeoff 29,300lb (13,290kg); typical empty equipped 18,190lb (8,250kg).*
Accommodation: *Flight crew of two plus 28 sideways facing troops or up to 18 stretchers with three medical crew, or up to 7,500lb (3,400kg) of freight.*
Performance: *Max speed 229mph (368km/h) at 7,500ft; max cruise 185mph (298km/h) at 10,000ft; range cruise 174mph (280km/h) at 7,500ft; initial climb 1,160ft (353m)/min, single engine climb 250ft (76m)/min; service ceiling 24,000ft (7,315m); single engined ceiling 9,000ft (2,743m); takeoff to 50ft (std technique) 2,640ft (805m); normal range 1,500mls (2,414km).*

Externally, the C-47B was identifiable by longer intakes on top of the engine cowlings. C-47B production amounted to 3,364 aircraft from June 1944, all but 300 of them being produced at Oklahoma City and the remainder at Long Beach. Many C-47Bs had their second stage blowers removed post war and were redesignated C-47D.

Other variants of note include the C-47C, an R-1830-92 amphibious floatplane equipped with a pair of Edo floats fitted with retractable wheels and capable of carrying an auxiliary fuel tank between the midships bulkhead in each float. Intended for use in the Pacific, only a few C-47Cs were converted. The C-117A had more in common with a DC-3 with R-1830-90C engines than a C-47 and was intended for the transport of VIP passengers. Equipped very much like a DC-3 airliner with a normal passenger door, 21 seats, cabin heating and suitable interior furnishings, production was interrupted by the end of the war and only 17 were completed.

One unusual variant was a glider Dakota. In the search for a troop carrying glider with greater capacity than was then readily available, a C-47 was converted to a new engineless configuration and redesignated the XCG-17. Trials proved the aircraft performed very well in its new role but the idea progressed no further than research testing.

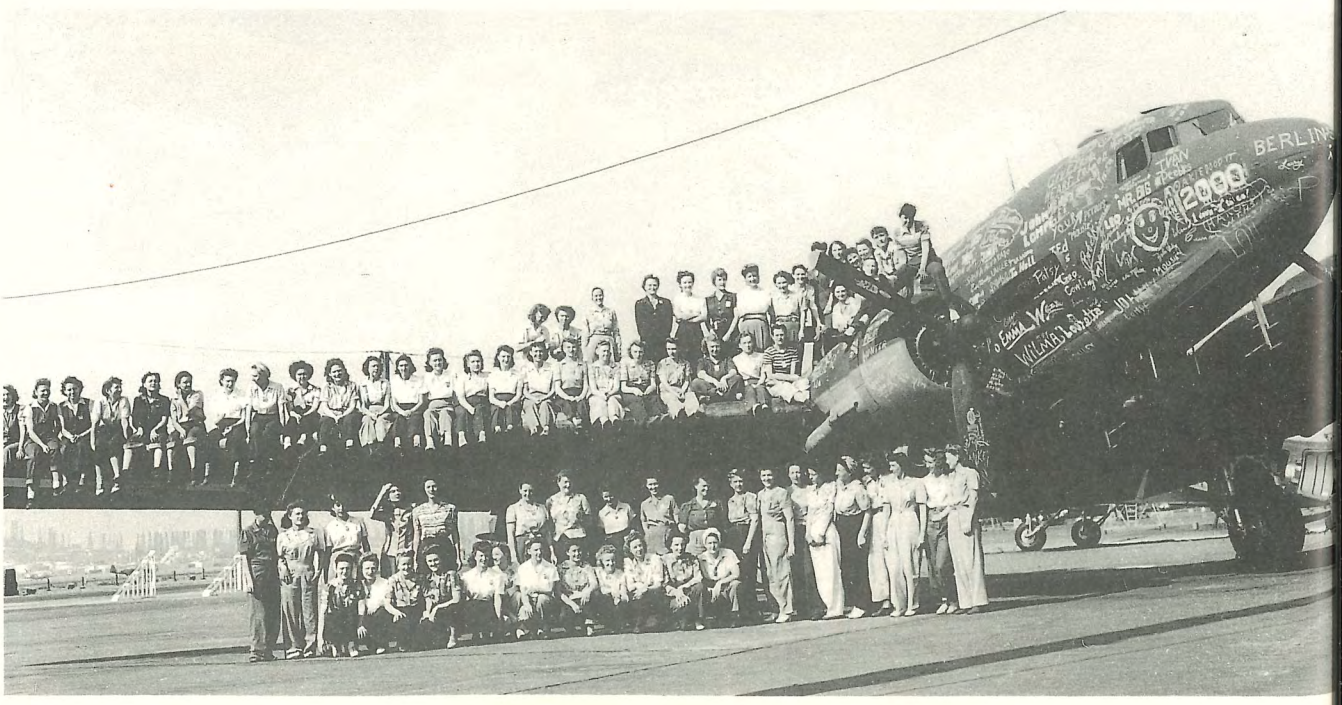
The production effort which surrounded the C-47 was a remarkable industrial achievement with no fewer than 4,878 of them leaving the production lines in the peak year, 1944. That figure represents a figure of better than 13 per day over the course of the year, although the April-June quarter exceeded that average handsomely when just



DOUGLAS C-47A DAKOTA III
(drawing supplied by Zvi Margulies)



A C-47 in typical wartime scenario, in this case unloading casualties flown in from the battle zone.



Without the efforts of the women who worked in the factories, the USA's prodigious output during the war would not have been possible. Here some 'Rosie Riveters' pose with the 2,000th C-47 to emerge from Douglas' Long Beach factory.



As far as can be ascertained, no fewer than 101 nations have operated DC-3s and C-47s over the years. Canada is one of them, receiving 570 during the war. '12937', a C-47A, was delivered in April 1943.

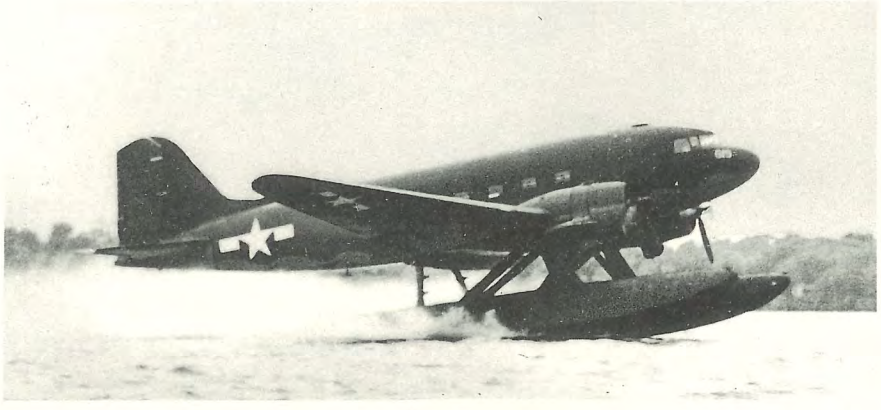


Two preserved C-47s formate over the American countryside. 42-100558 ('Buzz Bunny') in the foreground is a C-47A first delivered to the USAAF in November 1943.

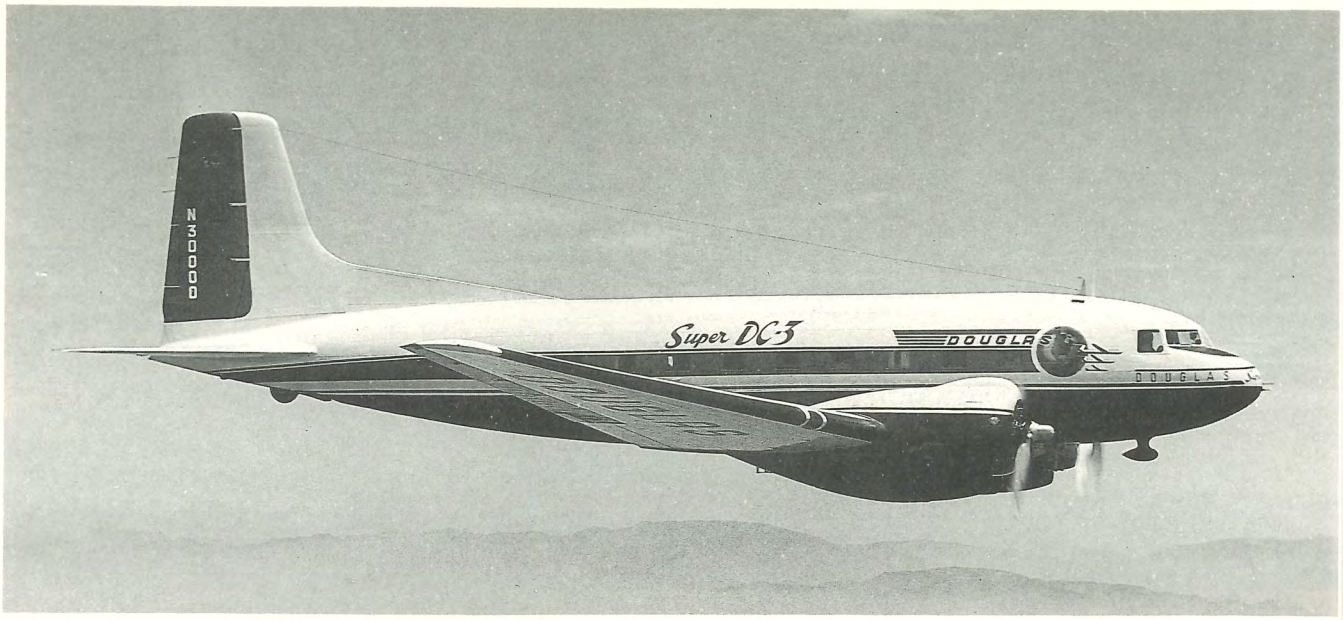
under 1,600 aircraft were delivered. Production of the C-47 in 1944 more than doubled the still healthy figure of 2,389 achieved in 1943, and although things began to wind down in 1945 as a result of Germany's capitulation, nearly 1,600 were delivered in that year. With Japan's surrender in September, no more aircraft were required and production had ended by November.

In addition to the 10,655 DC-3s and Dakotas built by Douglas, licence production adds more than 2,500 aircraft to the tally. Of those, 2,000 at the very least were manufactured in the Soviet Union from 1940 under the designation Li-2. Powered initially by 900hp Shvetsov M-62 engines (a development of the Wright Cyclone) and later by 1,200hp ASh-62s, many of these aircraft featured dorsal gun turrets for self defence and others had provision for the carriage of underwing bombs. Production ended in 1945 and the number built has been put as high as 2,800.

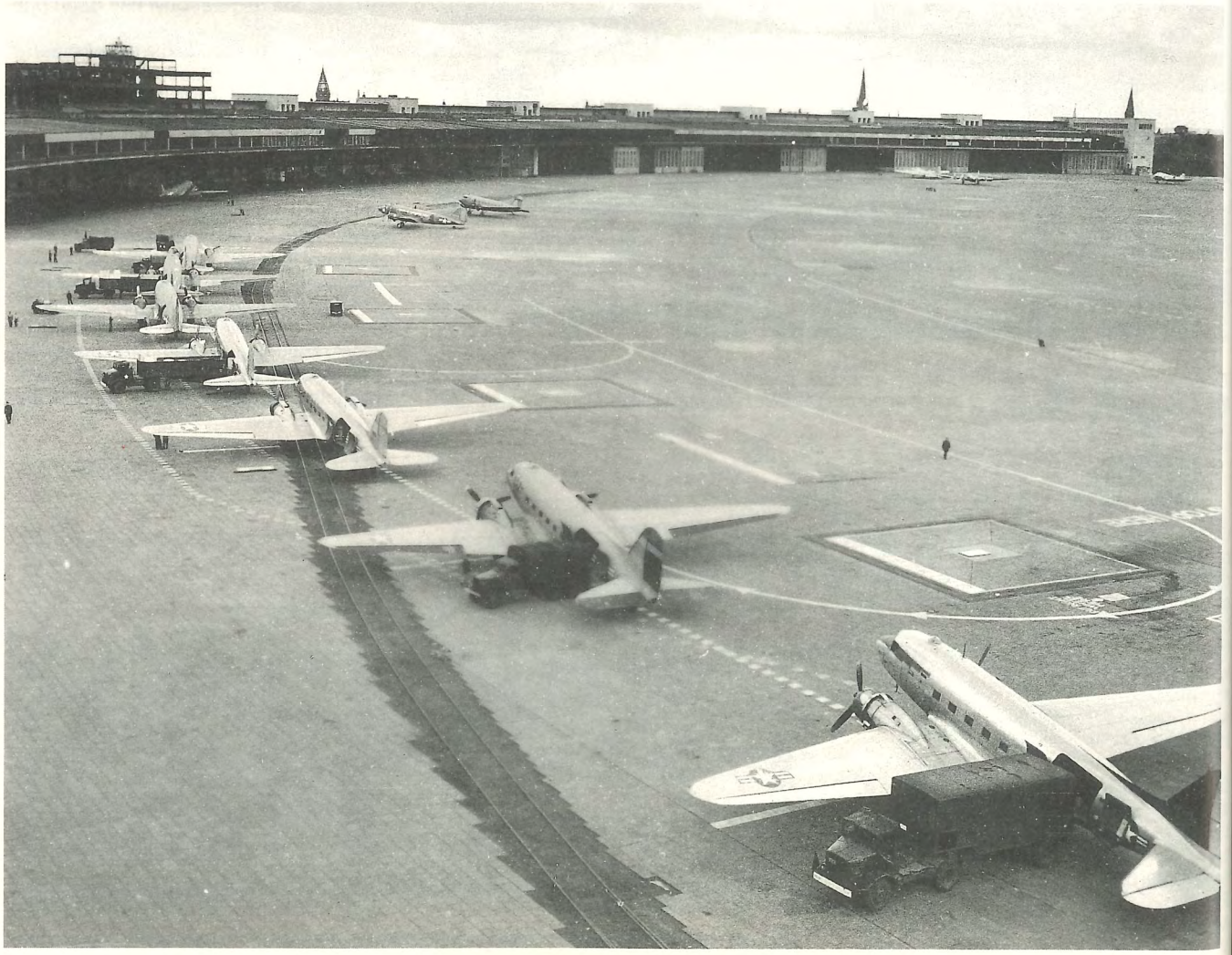
In 1934 Japan's Nakajima company purchased the production rights of the DC-2 and assembled 11 US built aircraft from late 1935, following these with about a dozen new built aircraft as the Ki-34. In February 1938 the Mitsui company obtained the rights to the DC-3 and following the assembly of five imported aircraft (two of which went to the Japanese Navy without the knowledge of the Americans) local manufacture gradually got under way. Several models powered by different versions of the Mitsubishi Kinsei radial engine were manufactured under the general designation L2D and production amounted to 487 aircraft by



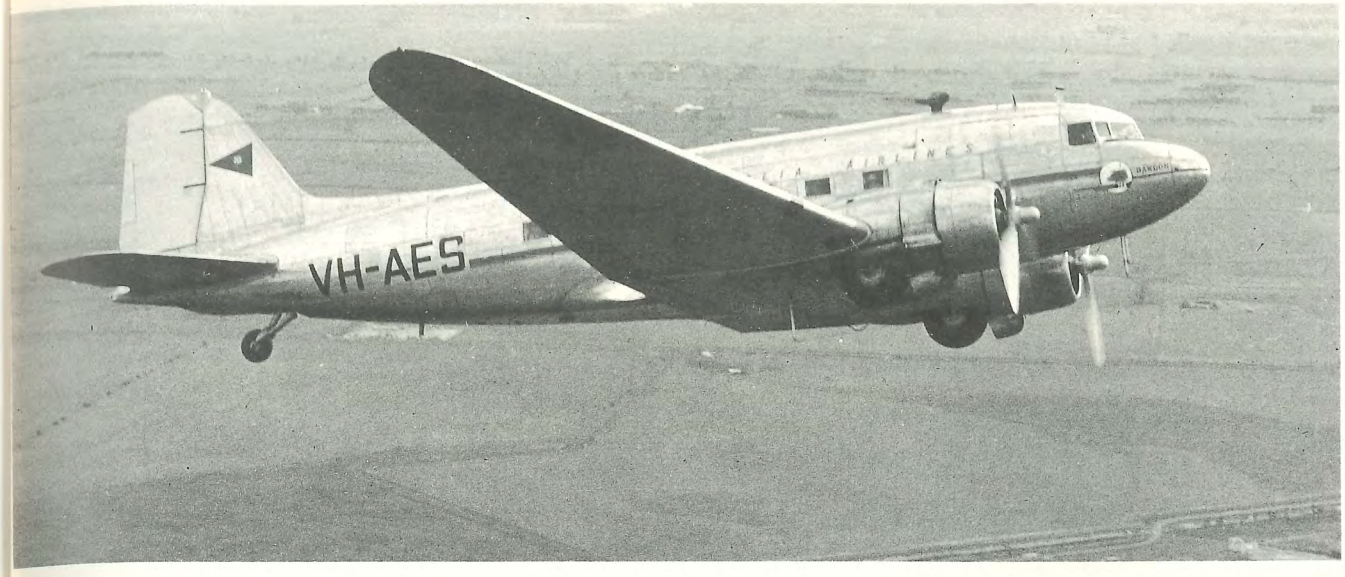
The C-47C was an amphibious conversion intended to operate in the Pacific. Nicknamed the 'Duck', the aircraft was fitted with 41ft (12.5m) long Edo floats, at the time the largest in the world. Although successful, only a handful of conversions were performed.



The Super DC-3, or DC-3S was a postwar attempt to keep the DC-3 line open. Powered by 1,475hp Wright Cyclone engines which gave it a much higher cruising speed than earlier models and treated to various cosmetic modifications, the DC-3S was not a commercial success. However 100 US Navy R4D-5s and -6s were converted to this standard and redesignated R4D-8s.



One operation in which Dakotas played a leading role was 'Operation Vittles', the Berlin Airlift of 1948. Pictured at Berlin's Tempelhof Airport during the relief flights are numerous USAAF C-47s.



Typical of the thousands of ex-military C-47s converted for civil duties after the war is Trans Australia Airlines' VH-AES, the aircraft which performed the operator's first services in September 1946. VH-AES was originally a C-47 built in 1942 and operated in Australia by the USAAF's 5th Air Force.

Showa (a Mitsui company) and Nakajima, the latter accounting for 71 of the total. As was the case with the Soviet Li-2, the Japanese variant was often armed.

Dakota Postwar

Attempts by Douglas to keep the DC-3 production line open after World War II were thwarted mainly by the flood of relatively inexpensive military surplus aircraft that became available from 1946. Nevertheless, 28 incomplete C-117 airframes were completed as airliners and sold under the designation DC-3D. Douglas also joined in the conversion of C-47s to civilian standards, offering such aircraft as the DC-3C.

In 1949, the company developed the Super DC-3 or DC-3S. This modernised, better performing aircraft had its appearance updated by fitting a taller, 'squared off' fin and swept back outer wings with square tips. Power was provided by a pair of 1,475hp Wright Cyclones in combination with increased fuel capacity which substantially increased the cruising speed and the range. The DC-3S didn't catch on but conversions were performed on 100 US Navy R4D-5s and -6s (C-47A and B) and redesignated R4D-8.

The quest to improve the performance of the DC-3 over the years has been a never ending affair, most attempts revolving around the fitting of turboprop engines. The first such conversions were performed in the United Kingdom. In 1949 Rolls-Royce fitted Dart turboprops to an RAF Dakota for trials, while in 1951 British European put two Dart-Dakotas into regular cargo work over an 18 month period to gain operational experience on



The versatile Dakota, this time as a crop sprayer, no less. There have been many DC-3s converted for aerial application duties over the years; this one is spraying spruce bud-worm for the US Forestry Department.



One of the more interesting of the several DC-3 turboprop conversions which have been developed was this one, by Specialised Aircraft in 1977. Power was provided by three PWAC PT6A-45 turboprops.

the Dart as a prelude to the Vickers Viscount, the world's first turboprop powered airliner, coming into service.

Several other turboprop conversions have come out of the United States in more recent years using Darts and more popularly, Pratt & Whitney Canada PT6s, one of which added a third, nose mounted engine. None have achieved more than a handful of sales and most have been limited to a single prototype conversion. A healthy number of DC-3s have been converted to 1,450hp Pratt & Whitney R-2000 radial engines (as fitted to the DC-4, DHC Caribou and other types), however.

It is not the role of this book to catalogue the DC-3's operational history, except in the service of the RAAF. But it is worth remembering the vital role the aircraft played in every theatre of World War II and in just about every conflict since. Nearly five decades of postwar military use have resulted in numerous new subvariants being developed, ranging from navigation trainers and search and rescue aircraft to the Vulcan rotary gun armed AC-47 gunships used in the Vietnam war, a conflict which gave the old 'Gooney Bird' a new lease of operational life for a time.

In its civilian guise, the DC-3 has and continues to be used in a wide variety of roles. These days, few are employed on scheduled passenger transport duties but many are carrying freight, tourists and charter passengers on every continent or performing aerial surveys and other such specialist activities.

A truly remarkable aeroplane.

DCs FOR THE RAAF

When Great Britain and her allies declared war on Germany in the first week of September 1939, Australia was in the early stages of a re-equipment programme, spurred on by the threat of war. Although this programme would become considerably more relevant two years later when Japan became involved in the conflict and posed a direct and serious threat to Australia's security, in 1939 a build up of arms was at least beginning.

The emphasis at that time for the Royal Australian Air Force's re-equipment was on operational types, usually of a 'general purpose' nature, although one extremely significant programme – the local manufacture of the Bristol Beaufort torpedo bomber – was already a definite one and the first orders had been placed.

Up until that time, the RAAF had not exactly been overwhelmed with transport aircraft capacity. Types such as the Avro Anson (which had maritime reconnaissance as its primary role) and Wackett Gannet provided limited airlift capability, but even the requisition of various types of small to medium sized civil aircraft at the outbreak of war did little to help the overall situation.

RAAF DC-2s and DC-3s

An aircraft offering greater capacity was urgently required, but despite four Wright Cyclone powered DC-3s being requisitioned on charter from Australian National Airways on 11 September 1939 the problem was not really solved, as the aircraft's duties were split between coastal patrol and transport.

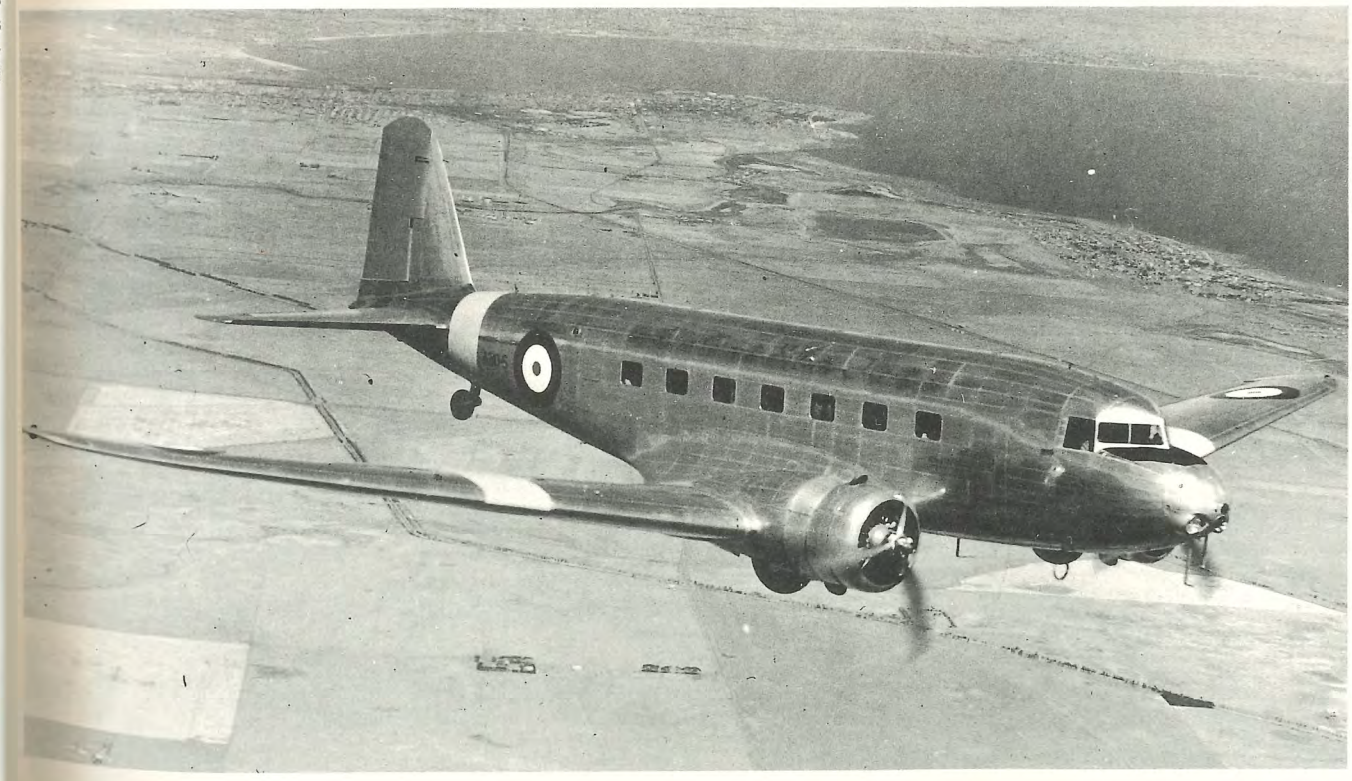
The four DC-3s had originally been delivered to ANA between September 1937 and November 1938 as VH-UZJ, VH-UZK, VH-ABR and VH-ACB, 'UZJ in fact being the first DC-3 to enter Australian service. The aircraft were given the RAAF serial numbers A30-1, 2, 3 and 4, respectively. The DC-3s served with No 8 Squadron based at Canberra for only a few months, A30-2 returning to ANA in February 1940, A30-4 in May and the remaining two aircraft in June.

The DC-3s' return to their civil owner left a gap in the RAAF's transport inventory which would not be filled until later in the year. In August 1940, the Australian Air Board decided to obtain 10 Douglas DC-2s through the offices of the British Purchasing Commission at a cost of £220,000 ($440,000) including spare parts. These aircraft were second hand, all of them having been purchased from Eastern Airlines by the BPC after they had become available due to the airlines' re-equipment with DC-3s.

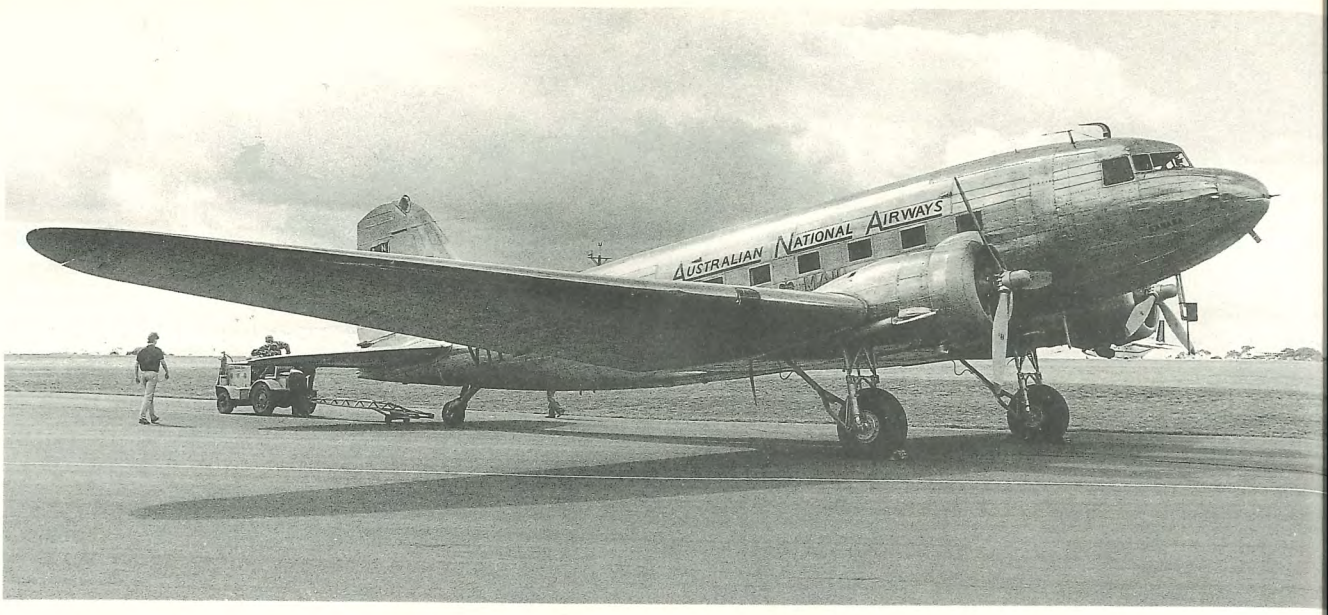
The DC-2s were allocated RAAF serial numbers in the A30-5 to A30-14 range and were delivered between November 1940 and March 1941. They served with Nos 8 and 36 Squadrons on transport duties but after the arrival of Dakotas they spent most of the war with secondary units such as Wireless Air Gunners' Schools, the Paratroop Training Unit and a Communications Unit. Five of the DC-2s were lost during their period of service with the RAAF, one was handed over to the Department of Civil Aviation in 1943 and the remainder were disposed of in 1946 and 1947.

Dakotas On Loan

The next source of DC-3s for the RAAF came from the USAAF, who from May 1943 lent approximately two dozen aircraft for a period of just over a year to fill the transport gap while deliveries of the RAAF's permanent fleet of ultimately 124



Douglas DC-2 A30-5, one of the ten former Eastern Airlines DC-2s obtained through the British Purchasing Commission for the RAAF in late 1940. This aircraft crashed at Port Moresby in September 1942. (CPE)

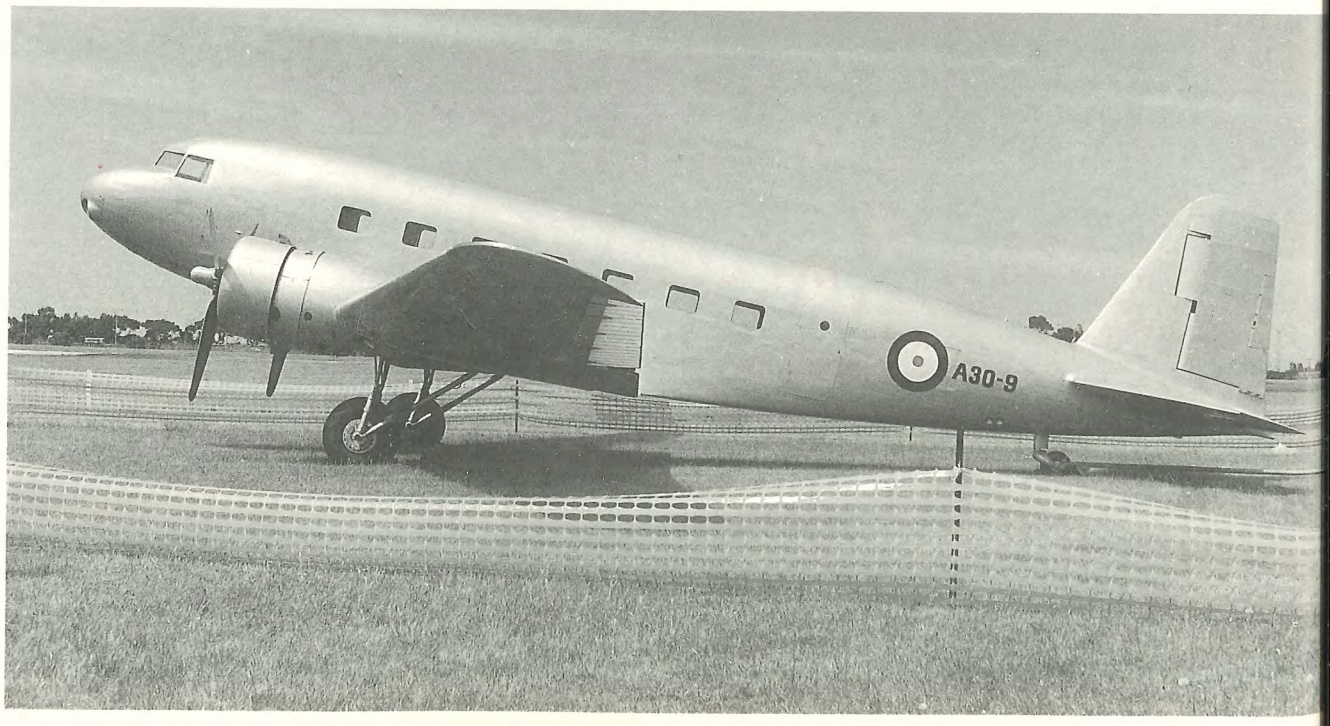


VH-ABR 'Kanana', one of the four Australian National Airways DC-3s requisitioned under charter by the RAAF immediately after the outbrea of war in September 1939. Returned to its owner the following year, 'Kanana' and its stablemates continued to serve the war effort, flying in civ colours. This historic aircraft is still with us, as shown by this recent photograph of the DC-3 resplendent in its original markings.

C-47s was building up. These loaned aircraft were not allocated RAAF serial numbers but carried callsigns. They came from several sources originally but immediately before being handed over to the RAAF they had been part of the USAAF's rapidly expanding fleet of transport aircraft based in Australia.

These aircraft were delivered in basically two groups and were used by No 36 Squadron. The exact model of Dakota which comprised these deliveries has varied from account to account, most settling on 23 C-53 Skytroopers and one C-49, an impressed DC-3. This account will conflict with those by stating that following the examination of US and other records, the first group of 11 aircraft actually consisted of three C-53s, six C-49s of various sub-marks and two C-50s. The C-49s were impressed aircraft from TWA, Delta and Eastern Airlines and one, which was formerly operated by KLM in the Dutch East Indies and in US service, was used by the Supreme Commander, South-West Pacific Area, General Douglas MacArthur. The C-50s were requisitioned from American Airlines.

These aircraft were handed over to the RAAF between May and August 1943 and were withdrawn from service in April and May of the following year, where



DC-2 A30-9 is preserved at Melbourne's Essendon airport, a major restoration having been completed in 1984. (Stewart Wilson)

upon they were allocated to Qantas, Australian National Airways and Guinea Airways.

Their withdrawal coincided with the delivery of the second group of aircraft loaned to the RAAF by the USAAF. These 13 aircraft were all C-47As, the first pair being taken on charge in January 1944 and the remainder in April. They remained in service only until September and October 1944 and then returned to the USAAF.

There is plenty of scope for confusion regarding Dakotas operating in Australia which were not allocated RAAF serial numbers but did have Australian callsigns painted on. Apart from those mentioned above, many others still officially on the strength of the USAAF operated with local callsigns, usually as part of the American component of the Australian Directorate of Air Transport (see next chapter) which had been formed in January 1942 at Amberley, Queensland. To add to the confusion, individual aircraft often carried different callsigns at different times and the same callsigns often appeared on different aircraft.

Lend-Lease Dakotas

In March 1942 the foundations were laid for the United States to supply Australia with military aircraft under the terms of the Lend-Lease scheme, an idea which played a substantial role in arming most allied nations during World War II, particularly Britain and the Commonwealth nations and the Soviet Union.

Under Lend-Lease, the RAAF received a total of 124 C-47 Dakotas between February 1943 and August 1945, these aircraft equipping six operational transport squadrons during the war (plus other smaller units) and several squadrons afterwards.

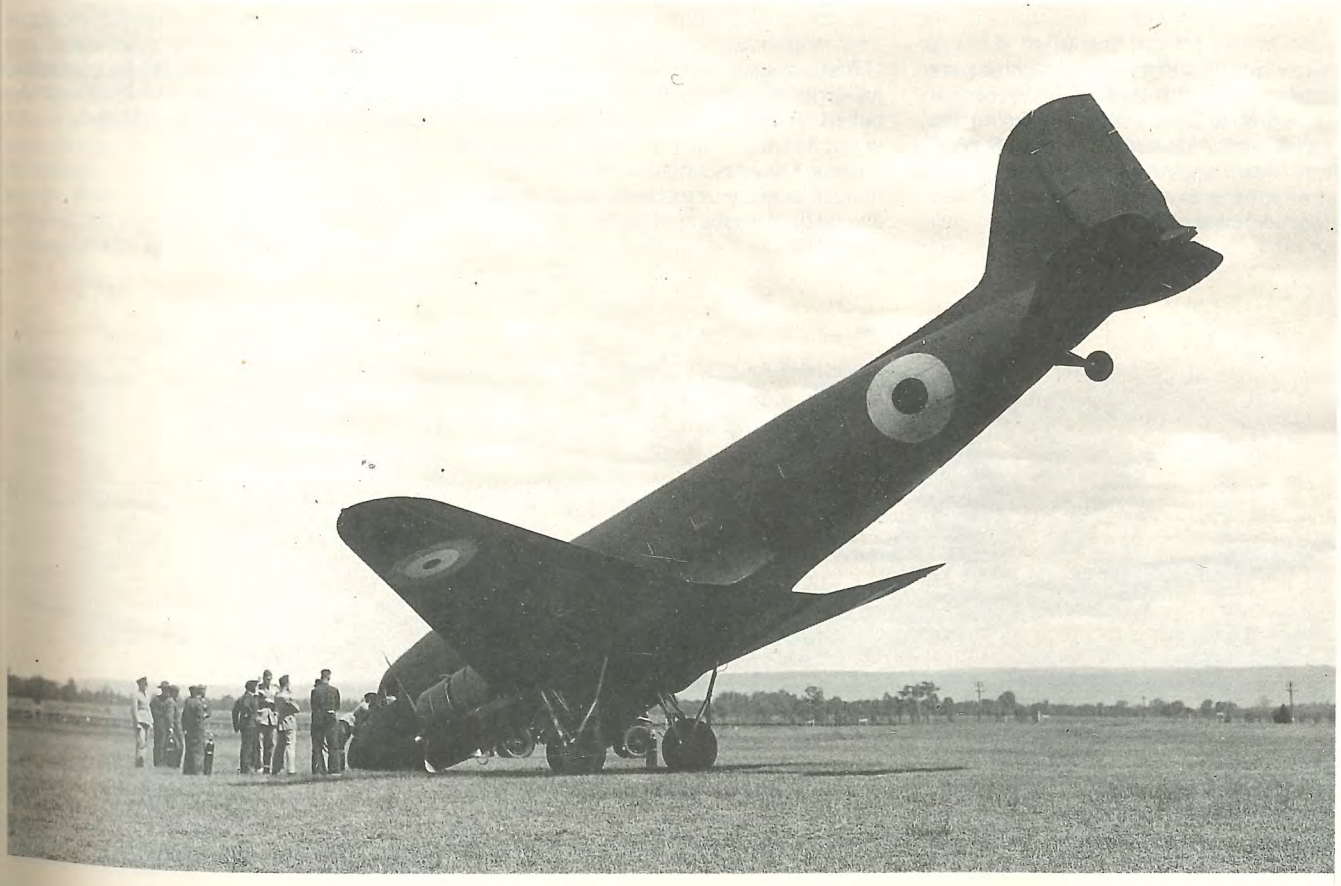
The aircraft were allocated serial numbers in the new A65 range (A65-1 to 124) in order to differentiate between them and those DC-2s and DC-3s previously obtained from civilian sources and operated under the A30 serial prefix. The original intention was to continue the A30 series, A30-15, 16 and 17 being allocated to the first three aircraft before they were given the definitive A65-1, 2 and 3 serials.

Once again, this account is going to differ from those previously published regarding the division of the marks of aircraft. Previously, the first nine Dakotas (A65-1 to 9) have been recorded as being C-47s, the next 50 (A65-10 to 59) as C-47As and the remaining 65 (A65-60 to 124) as C-47Bs. Again as a result of researching US, Douglas and other records, it is clear that only the first four aircraft were C-47s, the next 55 were C-47As and the remainder C-47Bs as previously documented.

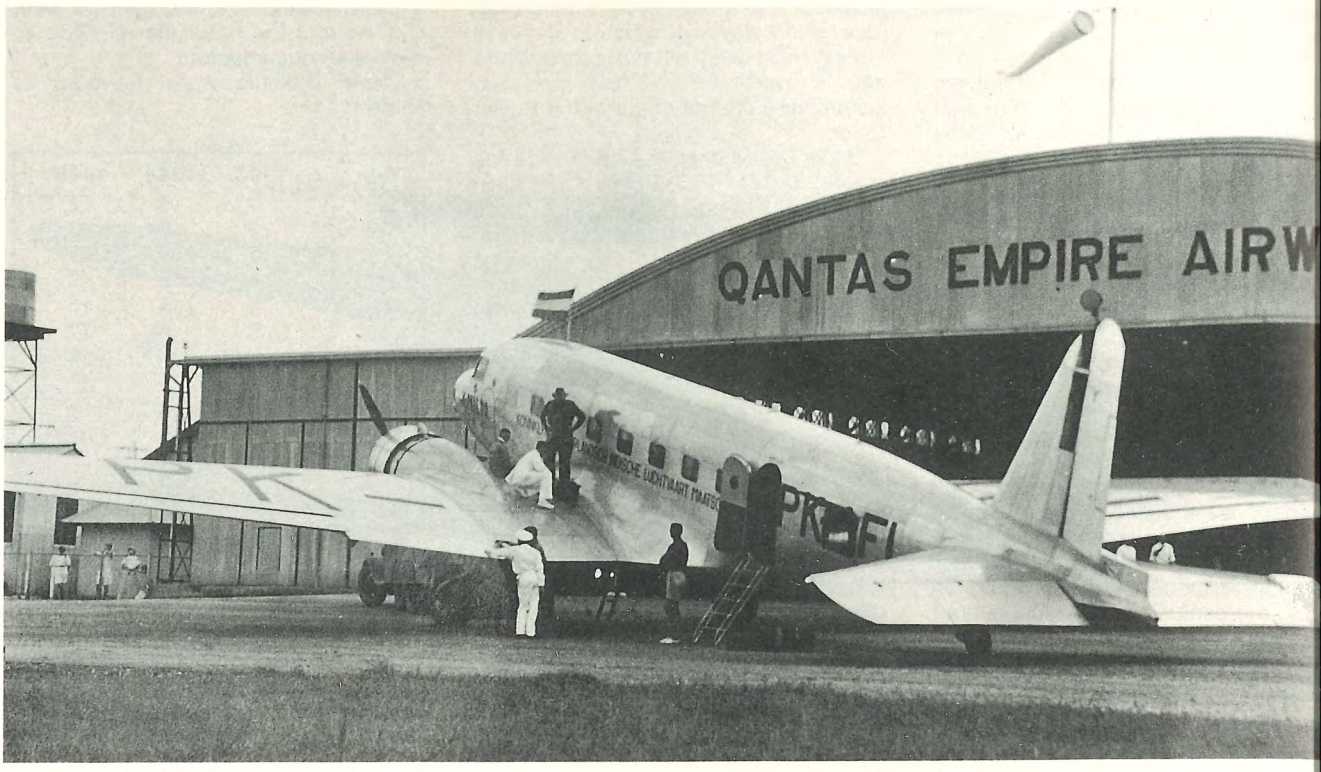
These Dakotas were delivered as follows:

Year	1943	1944	1945
Jan	–	5	2
Feb	2	10	6
Mar	2	5	9
Apr	4	3	9
May	1	4	16
Jun	5	4	11
Jul	–	1	4
Aug	5	3	1
Sep	–	4	–
Oct	–	–	–
Nov	–	–	–
Dec	5	3	–
TOTAL	**24**	**42**	**58**

There was one other possible source of Dakotas for the RAAF, although one which did not come to fruition. In January 1943, the Australian War Cabinet, concerned with the uncertainty of obtaining sufficient transport aircraft from overseas, proposed that the Dakota be manufactured in Australia by the Commonwealth Aircraft Corporation. At that time CAC was engaged in the manufacture of the Wirraway general purpose



A slight mishap for A30-1 (ex ANA VH-UZJ 'Kyilla') at Richmond in October 1939, after the pilot landed with the aircraft's parking brake on. 'Kyilla' had been the first DC-3 to operate in Australia, arriving in September 1937. (via Bob Mowle)



DC-2 PK-AFL, one of the several DC-2s, 3s and 5s purchased by the Australian government from the Dutch following the Japanese invasion the Netherlands East Indies in early 1942. After serving with the Allied Directorate of Air Transport and ANA during the war, it subsequen became well known as VH-CDZ in the service of Sydney's Marshall Airways. The aircraft was typical of the many DC-2s and DC-3s whi served Australia's military transport interests during the war but never became an official part of the RAAF.

trainer and the Boomerang fighter plus development of the aborted Woomera light bomber. It was also producing the Pratt & Whitney R-1340 Wasp and R-1830 Twin Wasp engines under licence, the latter for the Beaufort although it was also the powerplant of the Dakota.

Discussions between the Australian government and Douglas followed, based on the manufacture of 100 Dakotas under licence for both military and civilian use. Douglas would agree to production for military use only. That and other impractical aspects of the idea, plus the fact that Lend-Lease arrangements f the supply of Dakotas was in the win caused the idea to be abandoned.



Cleaning up immediately after takeoff is 34 Squadron's A65-10/VH-CTK, one of the 55 C-47A Dakotas supplied to the RAAF under Le Lease. Also received were four C-47s and 65 C-47Bs. (via Neil Mackenzie)

The ANA DC-3s

As described in the previous chapter, the first DC-3s to enter service with the RAAF were four aircraft requisitioned under charter from Australian National Airways in September 1939, shortly after war had been declared on Germany. Allocated the RAAF serial numbers A30-1, 2, 3 and 4, these aircraft served only briefly in Australian military markings before the first was returned to its owner in February 1940 with the remainder following in May and June.

Perhaps surprisingly, the primary role of these aircraft during their time with the RAAF was not transport (although this duty was performed), but coastal patrol with No 8 Squadron based at Canberra in the Australian Capital Territory. ANA's Captain Clarence Scott initially commanded the operation (with the rank of Squadron Leader), his aircraft patrolling not only the east coast of Australia but also as far afield as the area around Albany in Western Australia and off the north-western coast of the same state.

No 8 Squadron's primary role in these operations was to keep an eye out for German submarines or any sign of suspicious activity and to help keep the sea lanes clear for the numerous ships which were then carrying members of the Australian Infantry Forces to North Africa and other points on the opposite side of the world. Departing Sydney or Brisbane, the convoys would travel south down the east coast and then around the 'bottom' of Australia, continuing north up the coast of Western Australia and then on to their destination. Gabo Island (off the New South Wales/Victoria border) and Cape Leeuwin (the southern tip of Western Australia) were the key points for these operations.

The DC-3s were the most suitable type for this kind of operation at the time. The RAAF had a more specialised maritime patrol aircraft in service – the Avro Anson -- but this lacked the range to venture very far out to sea. To assist in performing this role, the DC-3s carried rubber rafts for air/sea rescue duties and sometimes machine guns. To facilitate an improved view for observers, side windows were often removed.

With a maximum of only four aircraft available to perform these operations, the DC-3s spent a large part of their time criss-crossing the continent and some lengthy flights were recorded. On these transit flights, personnel and/or cargo were usually carried. A typical convoy protection sortie could last up to ten hours while on one occasion, 8 Squadron's then commanding officer, Wing Commander (later Air Commodore) P G Heffernan, flew non stop from Pearce just north of Perth to Richmond near Sydney, a distance of 3,200 kilometres. With full fuel and ten passengers on board, the DC-3 arrived at Richmond after a 12 hour flight and with just 22 of its original 800 US gallons of fuel in the tanks.

That trip was part of a three way 'competition' between Heffernan and two other 8 Squadron pilots, Keith Virtue and Willis Reeve. All agreed to attempt a non stop west-east flight, Virtue trying for Brisbane and Reeve for Melbourne. Only Heffernan made it; Virtue got as far as Goondiwindi on the Queensland/New South Wales border about 300km short of his destination and Reeve suffered engine trouble causing a diversion to Adelaide.

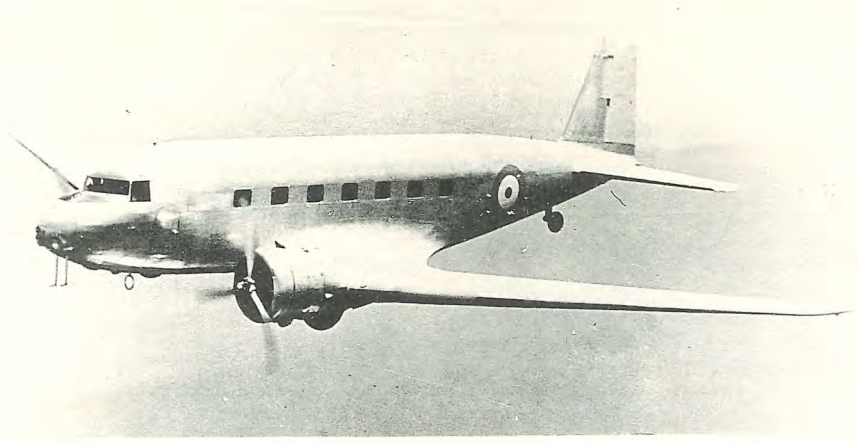
ANA At War

With the arrival of Lockheed Hudsons in 1940, ANA's DC-3s were returned, but that was far from the end of the airline's involvement with operational activities in World War II. With the entry of Japan into the war in December 1941 and the direct threat therefore imposed on Australia as the new enemy marched inexorably south through the Philippines, Malaya, Singapore and New Guinea, the need for improved air transport services became urgent. Although most of Australia's airlines and charter operators contributed to the effort, it was Australian National Airways which made perhaps the greatest contribution, particularly in the New Guinea area of operations where its aircraft carried men and materials between there and Australia and performed evacuation flights in the early stages of the conflict after Japan had overrun Australia's northern neighbour.

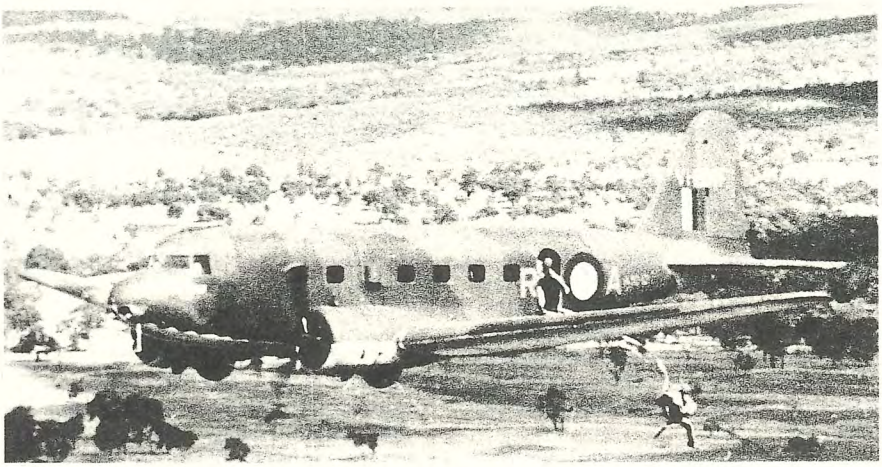
The greater part of ANA's mainly Douglas transports was used in these New Guinea operations, supplemented from time to time by new aircraft from various sources including those sold to



A65-100, an RAAF C-47B delivered in May 1945. The callsign VH-RFQ is partially missing due to the fitting of a rudder and the 'BK-P' code letters indicate an aircraft of No 35 Squadron. (CPE)



Douglas DC-2 A30-8 served with the RAAF's Signals School and No 2 Wireless Air Gunners School. It was shot down on a flight between Sourabaya and Koepang in January 1942. (via Neil Mackenzie)

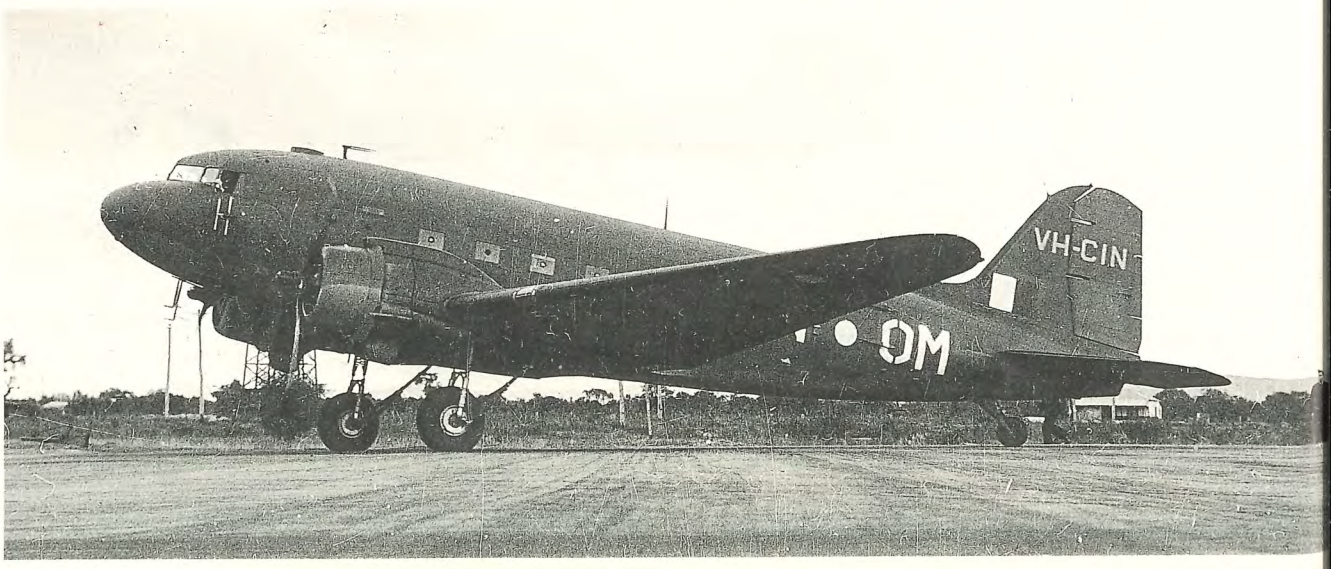


"One thousand, two thousand, three thousand ..." Camouflaged DC-2 A30-12/VH-CRF of 36 Squadron while on detachment to the Paratroop Training School at Richmond NSW. (via Neil Mackenzie)

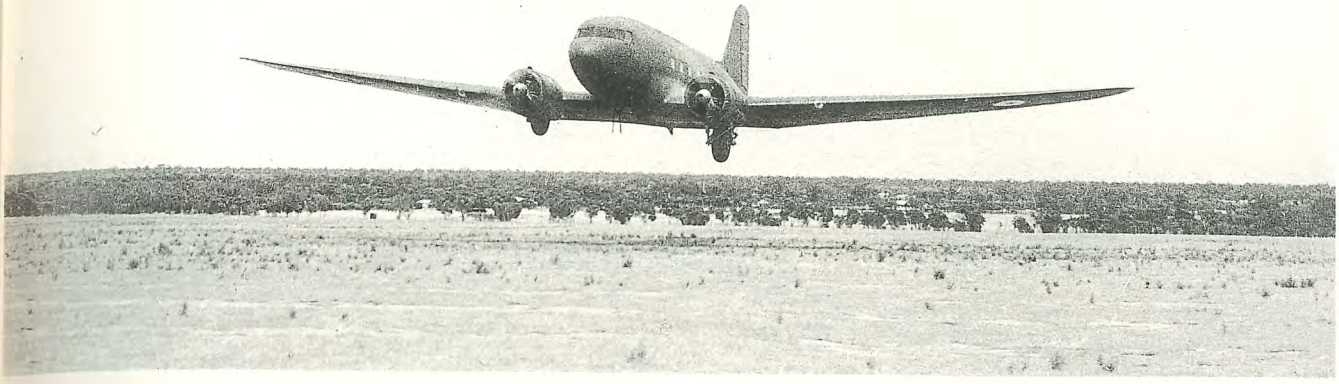
Australia by the Dutch government fol lowing the invasion of the Netherlands East Indies (now Indonesia) by the Japanese.

On 28 December 1941, an ANA DC-3 (VH-UZK 'Kurana' – one of the origina four aircraft requisitioned for the RAAF in 1939) arrived at Rabaul in New Guinea to begin evacuating women and children in the face of the Japanese advance. The operation developed from there, with ANA's DC-3s (and other airlines' aircraft) flying from Cairns or Townsville in northern Queensland to Port Moresby and then on to Rabaul if required. These flights were hazardous as they involved long legs over water, navigation aids were minimal or non existent and the attention of Japanese fighters was always a possibility. A fighter escort was often provided to minimise that particular risk, while other risks revolved around the notoriously difficult flying conditions in New Guinea and the fact that the aircraft were often overloaded. Forty passengers and their baggage was normal – some flights are known to have carried 50 or more.

The evacuation flights demanded a very high sortie rate with an aircraft typically recording three crossings of the northern Coral Sea to Port Moresby per day. The aircrews (who wore their usual ANA uniforms) could expect to work for up to ten hours a day for a 15 day period without a break, whilst a typical journey for a given aircraft might be: depart Cairns at 0230hrs, arrive Port Moresby 0630hrs and quickly pick up passengers for the return journey, arrive Townsville by 12 noon, refuel, depart Townsville, arrive Port Moresby 1900 hours, pick up a new load of passengers, return to Townsville by midnight.



C-47B Dakota A65-71/VH-CIN is still flying in 1990, operated by the RAAF Museum and the Australian War Memorial. This photograph shows the aircraft during its World War II service in the markings of 37 Squadron. (via Neil Mackenzie)



A few seconds of undercarriage asymmetry as a Dakota departs with what looks to be a heavy load. Engine failure at this point would require landing straight ahead if the safety speed of 92 knots indicated air speed had not been reached. (RAAF Museum)

The other aspect of ANA's operations in the region was equally demanding. Personnel and materials had to be transported to and from New Guinea often under the threat of enemy action and on some occasions semi clandestine missions were flown with ANA's aircraft delivering special troops behind the enemy's lines. Often these supply or 'special' missions were flown in conjunction with USAAF aircraft.

ANA's role in the New Guinea effort didn't end with simply flying aircraft in and out. The massive influx of American transports to the Northern Australia/ New Guinea region brought with it a need for crews to fly the aircraft, so ANA was given the task of training DC-3/C-47 pilots for the USAAF. In order to build up experience, an American pilot would join ANA's normal airline operations in Australia and remain there until he was qualified to take command of a USAAF aircraft on operational flying duties.

ANA's cooperation with the Americans extended to the establishment of the GHQ (General Headquarters) Courier, a special kind of airline set up to provide General Douglas MacArthur (the South-West Pacific Area's Supreme Commander) with communications between his headquarters in Brisbane and his commanders in the field. The Courier used USAAF C-47s, ANA captains and RAAF copilots and radio operators. It started operations in January 1943 between Brisbane and Port Moresby and extended that service to established airfields and rough strips near the front line as ground was regained by the US and Australian soldiers. In May 1944 an overnight courier service was instigated, the aircraft leaving Brisbane at 2000 hours and arriving in Port Moresby 11 hours later.

As the Allies pushed the Japanese back, the Courier was expanded to cover not just New Guinea and its environs but also the islands to the north including the Halmaheras and the Philippines after they had been recaptured in late 1944. As the service expanded, so did the extent of cargos carried, the orders from General MacArthur soon being supplemented by newspapers and other items for the troops' morale. ANA's contribution to the war effort is an important and often overlooked aspect of a period when Australia was under direct threat of invasion from an aggressive enemy. It also highlights the quickly established and ongoing co-operation between Australia and the United States.

Special Transport Flight

The urgency of the situation throughout the New Guinea area during 1942 cannot be understated and the need to supply the troops in the field became a vital part of the allied effort. Despite the continual build up of American forces in the area through the USAAF's 5th Air Force, the demand for more transport capability continued, resulting in the formation of the RAAF Special Transport Flight in December 1942. Operating from Ward's strip at Port Moresby, the flight consisted of a mixed bag of aircraft, the majority of which (15) were Lockheed Hudsons from No 1 Squadron RAAF.



Desperately trying not to look worried, students at the Paratroop Training School prepare to board an unidentified DC-2 before a practice drop. (via Neil Mackenzie)



C-47A Dakota A65-48/VH-CID of 36 Squadron prepares for a drop with the smaller door within the large cargo door open. This aircraft went to Trans Australia Airlines in 1948.

Supporting the Hudsons were a RAAF DC-2 from the Paratroop Training Unit plus various impressed commercial aircraft including a DC-2, a couple of DC-3s, DH.86s, Lockheed 10s and 14s and Stinson Reliant light aircraft.

The flight counted several aircrew from 36 Squadron among its number and continued operating until mid January 1943 when the situation had eased somewhat.

RAAF DC-2s and the ADAT

The delivery of ten Douglas DC-2s to the RAAF from late 1940 gave the RAAF a measure of reasonable transport capacity far greater than that which could be provided by existing RAAF transports and those requisitioned at the beginning of the war. Despite this, most of the aircraft initially served with ancillary units such as the various Wireless Air Gunners' Schools, the Signals School and the Service Flying Training School. Later in the war the Paratroop Training School was added to the list, but following Japan's entry into the conflict and the need for immediate air transport capability that brought with it, the DC-2s were soon involved in more active service.

No 36 Squadron was one of the four new RAAF transport squadrons formed in February and March 1942 in response to the need for more transport capability. Of the four, No 36 became the prime user of the DC-2s, with two of the others – Nos 34 and 35 – having to settle for the moment with a mixed fleet of mainly impressed civil aircraft such as the de Havilland Dragon and Tiger Moth or some 'one off' types. No 33 Squadron's initial equipment was Short Empire flying boats. These squadrons were established in various parts of the country so as to cover most of it – 33 was north-eastern, 34 north-western, 35 western and 36 southern.

No 36 Squadron was formed at Laverton, Victoria, on 11 March 1942 under the command of temporary CO Flt Lt W H Heath. Its initial equipment comprised one DC-2 (A30-14) and its staff consisted of two officers and 24 other ranks. Within a month two more DC-2s (A30-11 and 13) plus more personnel had joined the squadron while A30-12 and 10 were also on strength by the end of May 1942. As a result, 36 Squadron was the only RAAF unit in 1942 which was equipped with something resembling an efficient transport aircraft although it too had its share of other types.

Before July 1942 the squadron's activities largely consisted of flights from Laverton to Batchelor in the Northern Territory carrying stores and equipment, although flights to other destinations were also carried out. On 14 July 1942 the squadron came under the control of the recently established Directorate of Air Transport, Allied Air Forces (ADAT), part of the USAAF's Air Transport Command. This organisation was basically a joint US/Australian military airline operating a wide variety of transport aircraft flown by USAAF, RAAF, Dutch and Australian civil pilots. RAAF and USAAF aircraft were involved, as were several DC-2s and DC-3s which had previously been operated by KNILM in the Netherlands East Indies but had been flown to Australia in advance of the invading Japanese. ADAT's primary role was to provide transport for the men and equipment required in the New Guinea region and continued to operate until October 1944 when it disbanded. By that time the Douglas C-47 Dakota had become the standard aircraft of both the Australian and American elements of ADAT.

36 Squadron's DC-2s had meanwhile been subject to different procedures following its incorporation into the ADAT system, including a change in its freight pick up point from Laverton to Melbourne's Essendon airport. This and the fact that ANA was performing the major servicing of the aircraft at Essendon prompted the squadron to move its base to that airport in mid July.

By September the squadron's fleet had increased to seven of the ten DC-2s on RAAF strength with the arrival of A30-9 and A30-5 along with a pair of DH

Dragons, a DH.86 and a Beech 17 'Staggerwing'. A30-5's time with the squadron was tragically short. On the same day it was issued (14 September) it crashed and burned while landing at Port Moresby's Seven Mile strip, killing all on board.

In November 1942 the squadron began moving from Essendon to Stock Route strip at Townsville in Queensland (although a detachment remained behind) from where it continued its flights to New Guinea and within the Australian mainland. The arrival of Dakotas in early 1943 rendered the DC-2s obsolescent although some of the aircraft were subsequently detached to the Paratroop Training Unit at Richmond, NSW.

Apart from A30-5, four other RAAF DC-2s were lost or damaged beyond repair during their period of service. A30-8 was shot down by a Japanese fighter during a Timor to Koepang flight in January 1942, the crew swimming 40 kilometres to shore afterwards and surviving; A30-7 crashed in June 1942; A30-10 crashed in November of the same year and A30-13 suffered a landing accident in January 1943 and was converted to components.

Of the others, A30-6 went to the Department of Civil Aviation in May 1943 and then to ANA later in the year. Damage suffered in a December 1943 crash at Bendigo, Victoria, was repaired but the aircraft was finally lost in another crash at Darwin in May 1948.

A30-9 was struck off RAAF charge in July 1946, went to Marshall Airways in Sydney for use as a spares source and survives today fully restored and on display at – appropriately – Essendon airport. A30-11 is preserved at Albury, NSW, in the colours of PH-AJU 'Uiver' (KLM's England to Australia air race entry to commemorate its forced landing there) while the others went to Marshall Airways in 1946/47 after being struck off RAAF charge.

RAAF DC-2s, DC-3s and DAKOTAS
SUMMARY OF DELIVERIES

RAAF Nos	Type	Qty	Delivery	Remarks
A30-1/4	DC-3	4	09/39	ex ANA, returned 1940
A30-4/14	DC-2	10	11/40-05/41	ex Eastern Airlines
A65-1/4	C-47	4	02-03/43	Dakota I
A65-5/59	C-47A	55	04/43-08/44	Dakota III
A65-60/124	C-47B	65	09/44-08/45	Dakota IV

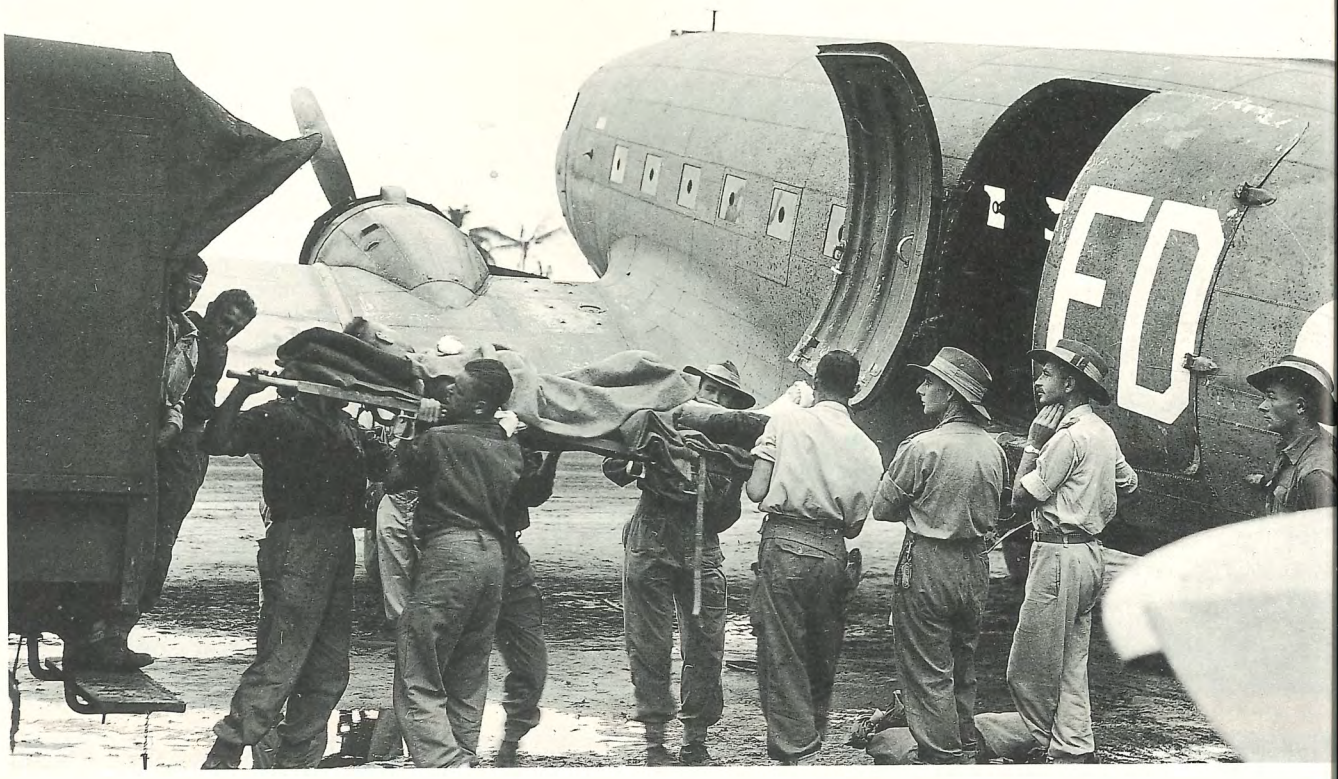
Notes: This table excludes aircraft loaned to the RAAF by the USAAF in 1943/44. Previous accounts list A65-1 to 9 as C-47s and A65-10 to 59 as C-47As. See text.

36 Squadron's Dakotas

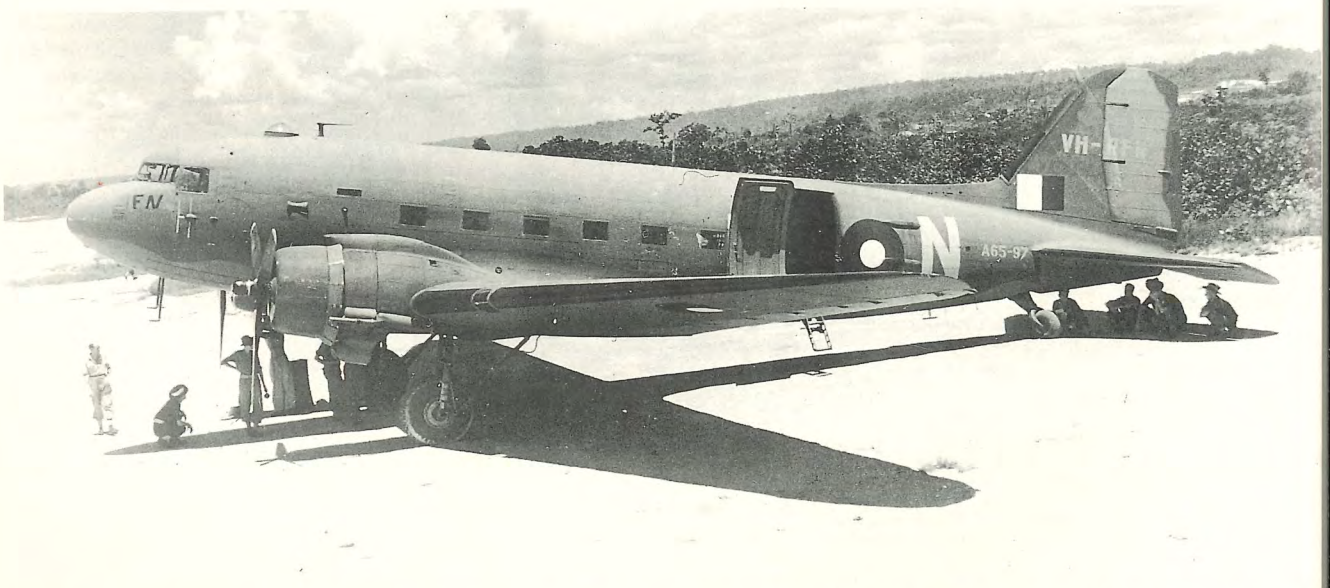
The arrival of the first of ultimately 24 Dakotas of various models loaned to the RAAF by the USAAF from the early months of 1943 added substantially to the airlift capabilities of the RAAF. These aircraft were operated by No 36 Squadron, at that stage based at Townsville and



Brute force is often the best way to get a load out of the door, as these airmen demonstrate in a 36 Squadron Dakota. Note the parachute pack adjacent to the 'pusher's' feet. (RAAF Museum)



The evacuation of the wounded was one of the RAAF Dakotas' more vital roles. This 34 Squadron aircraft was photographed at Balikpapan i July 1945. (via Neil Mackenzie)



A65-97, a C-47B of No 35 Squadron photographed in 1945. Two decades later, this Dakota was used by the CSIRO for cloud seeding exper ments. (via Neil Mackenzie)

with a year's experience on the DC-2 behind it. Five Dakotas joined the squadron initially, three C-43 Skytroopers and two C-50s, the latter pair originally intended for American Airlines but requisitioned by the USAAF from the production line.

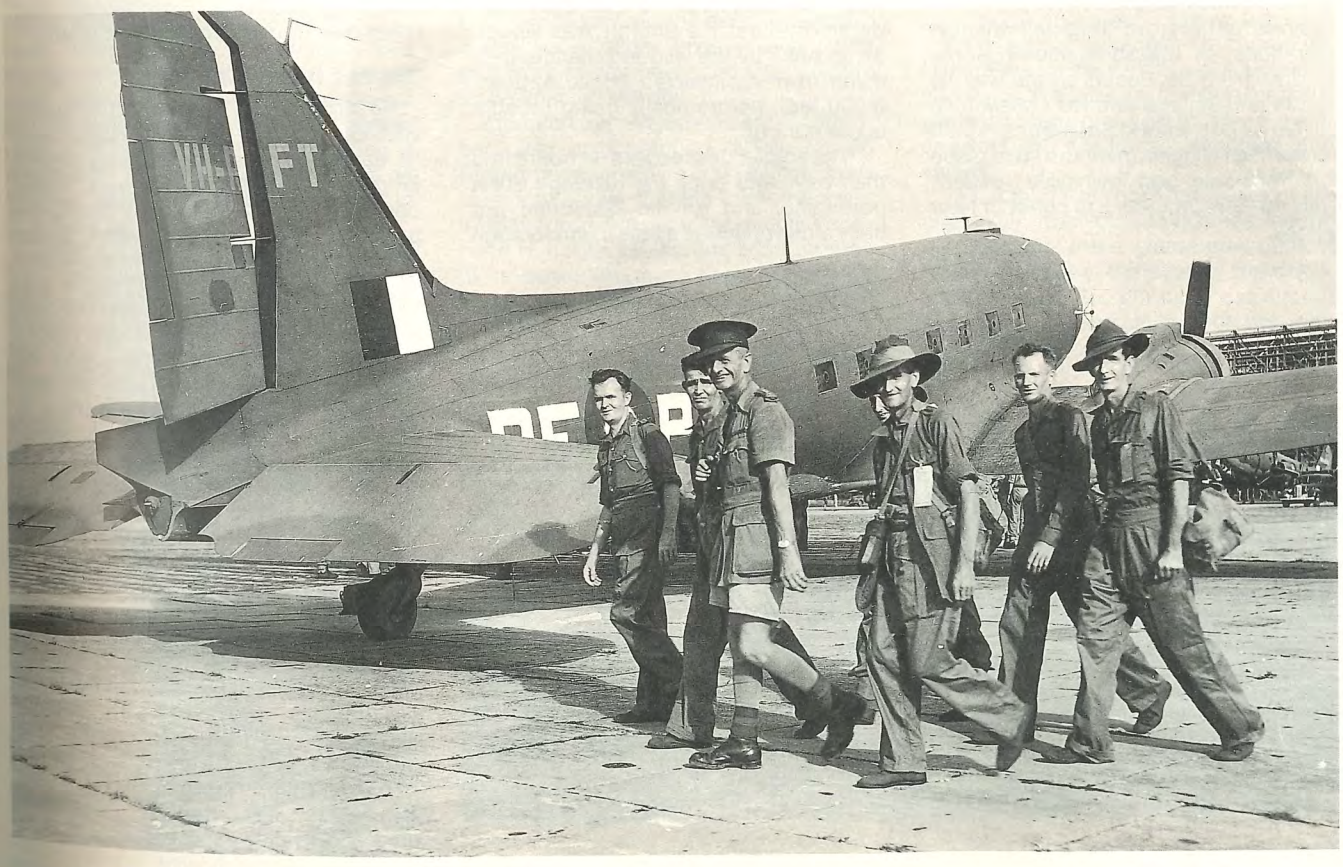
Another eight C-49 variants arrived on loan over the next few months but these and their predecessors were returned in April and May 1944 with the arrival of 13 C-47As fresh from the production line. The earlier aircraft were distributed between Qantas, ANA and Guinea Airways following their replacement by the purpose built C-47As. These aircraft were in turn replaced by C-47s obtained for the RAAF through Lend-Lease. The first of 124 of these aircraft (with A65 serial numbers) had been delivered to the RAAF in February 1943 although it would be another 18 months before 36 Squadron received its first example, at which time the loaned aircraft were returned to the USAAF.

The Dakotas proved to be a valuable asset for 36 Squadron, which with the arrival of the initial five aircraft had the distinction of being the first RAAF squadron to use the type purely for its intended role as a transport.

Although based at Townsville, a detachment of 36 Squadron aircraft began operating in New Guinea in early June 1943, by which time the tide had begun to turn against the Japanese in the area and the allies were beginning their push northwards. The New Guinea detachment was used for the transportation of general freight, mail and personnel to the various headquarters and camps in the region. Flights between New Guinea and the mainland also continued. These were the kind of operations which sustained the squadron for the next year or so although it did have some organisational changes in 1944. In June the squadron moved to another Townsville airstrip (Garbutt), the Richmond DC-2 detachment at the Paratroop Training School ceased to be part of the squadron in May, the Essendon detachment was wound up in August and the New Guinea detachment returned home in September.



A formation of 35 Squadron Dakotas with A65-100/VH-RFQ in the foreground. This Dakota was delivered to the Papua New Guinea Defence Force in 1975. (via Neil Mackenzie)



36 Squadron's A65-103/VH-RFT shares the tarmac with a group of important looking people. This view shows to advantage the glider towing cleat in the Dakota's tailcone area. In aircraft built for civil rather than military use, this was covered by a fairing. (via Neil Mackenzie)

In the meantime, 36 Squadron had chalked up an enviable record of performance with its Douglas transports. Although some three-quarters of its flying had been from Townsville to New Guinea, the remainder was spent in New Guinea itself, often operating from only roughly prepared strips and having to contend with the area's notoriously changeable weather conditions and the usually cloud covered Owen Stanley mountain ranges.

In the course of these activities the Dakotas carried everything from personnel to jeeps, trucks, ammunition, fuel, mail, general supplies and artillery pieces. Sometimes supplies or men would be paradropped into combat areas, the former activity earning the Dakota one of its many nicknames – the 'Biscuit Bomber'. Of course it wasn't just 36 Squadron's activities which were along these lines. Other RAAF units and the ever increasing number of USAAF transports in the region also earned their keep in the same way.

Some statistics reveal the rate of work. In the last two months of 1942 (when 36 Squadron still had DC-2s) the squadron's monthly average was 58,580 miles flown and 67,479lb of cargo carried. In 1943 these averages increased to 197,466 miles and 1,547,780lb per month; in the first eight months of 1944 there was a further substantial increase to 336,454 miles and 3,171,840lb per month.

In October 1944 the Directorate of Air Transport was disbanded and the RAAF resumed full control of all its air transport operations. In the same month some Dakotas from 36 Squadron (as well as Nos 34 and 35) assisted No 7 (Beaufort) and No 82 (Kittyhawk) Squadrons in their moves from Higgins (near the tip of Cape York Peninsula) and Townsville, respectively, to Tadji on the north coast of New Guinea.

Two of 36 Squadron's Dakotas were stationed at Tadji from January 1945 where they were used for supply dropping missions. Another aircraft went to Bougainville later in the same month to perform a similar role, the 'recovery rate' of these supplies on the ground reaching a very high 98 per cent, testimony to the squadron's accuracy in delivering them. At around the same time the squadron's normal scheduled run from Townsville to Noemfoor was extended to include Morotai in the Halmaheras Islands, a major allied base in the last year of the war.

These activities were not without cost, however. In February 1945 Dakota A65-34/VH-CUF crashed in enemy territory with the loss of four lives whilst returning to Tadji from a supply dropping mission. Four others were injured but survived, thanks almost entirely to the efforts of some Australian commandos who rescued them and got them out. In May 1945 the squadron lost another of its Dakotas, again during a supply drop mission out of Tadji. This time there were no survivors as the aircraft crashed into the side of a mountain.

Somewhat more amusing but potentially dangerous nevertheless was an incident involving a 36 Squadron C-53 (VH-CCC) and some unauthorised 'aerobatics' back in 1943. According to the RAAF Historical Section's Bob Piper: "It all happened crossing New Guinea's Owen Stanley Ranges at 12,000 feet when they decided to tackle a thunderstorm. First the aircraft was flipped on its back by the wild turbulence, then dived from its inverted position, down 8,000 feet, before finally being brought under control.

"The soldier passengers on board had their bayonets prick the fuselage like a porcupine, and an old fashioned pot belly stove punched a hole clean through the roof big enough for a man to put his head through.

"Wesley Lamar, a Douglas company engineer, checked it out back at Townsville and found 'wrinkles in the wing and stabiliser as well as rivets having been torn away as far back as a foot from the leading edge. One rib was hanging from a single rivet!'

"Such was the urgency of the war situation that the RAAF pilot loaded up a new cargo, turned the transport around, and to the amazement of the engineers, took off back north!" They built 'em tough in those days!

The cessation of hostilities in August 1945 did not see a substantial reduction in 36 Squadron's activities with the Bougainville and Tadji detachments remaining on station until late September, while an aircraft based at Morotai went to Singapore, another aircraft was allocated the weekly mail run to Lae and the remainder of the squadron's aircraft were used for the evacuation of prisoners of war from around the region and Singapore internees during October. By the end of that month all the squadron's overseas detachments were back at home and based at Townsville.

Subsequent activities associated with the end of the war included the establishment of detachments at Darwin, Ambon and Morotai again in early 1946, the latter operating a tri-weekly courier service to Tokyo and Hiroshima. Another tri-weekly courier service to Rabaul via Port Moresby, Lae and Finschhafen was taken over from 38 Squadron in March.



It's impossible to identify this stranded Dakota, the photograph clearly showing its predicament. Despite that, there's always time for the salvage party to have its picture taken! (via Neil Mackenzie)

The Dakota Squadrons

No 33 Squadron was formed at Townsville, Queensland, on 16 February 1942, its early equipment comprising Shorts Empire and Catalina flying boats. It later operated from Port Moresby during the period of greatest threat with a varied collection of light and medium impressed aircraft including Ansons, Dragons and Tiger Moths. It received its first Dakotas in 1943 and operated them in New Guinea until the end of the war whereupon the squadron returned to Townsville and was disbanded in May 1946. Its operations in New Guinea were typical of any transport unit in the area – carrying personnel and equipment to difficult airstrips wherever and whenever required. 33 Squadron also assisted in the evacuation of prisoners of war when hostilities ended.

No 34 Squadron was formed at Darwin on 23 February 1942 (just four days after the first Japanese raid on the city) and like most of the other transport squadrons which were established at the time, was initially equipped with usually impressed light transport aircraft. The squadron operated from several bases in the Northern Territory until it was temporarily disbanded in December 1942. It was reformed at Parafield airport near Adelaide the following month equipped with DH.86s and Dragons but in May 1943 re-equipment with Dakotas began, considerably enhancing its capabilities.

With its new Dakotas, 34 Squadron began ranging from Parafield to numerous points in Western Australia, the Northern Territory, New South Wales, Queensland and Port Moresby, the seven aircraft on strength in August 1943 logging 1,168 flying hours and carrying 371,152lb of freight. The high utilisation of 34 Squadron's Dakotas continued into 1944. In May of that year a new record was set with 1,624 hours recorded and 1,870 passengers and 1,065,067lb of freight carried. To cope with the maintenance demand, a night shift was introduced to the squadron's workshops.

In June 1944 a detachment of three of the squadron's Dakotas was established at Batchelor (NT) and in the same month it began operating a daily courier service between Batchelor and Townsville. The good use to which this squadron and the RAAF's other transport units were put is illustrated by 34 also temporarily taking over the courier run between Parafield and Archerfield (Qld), the stores run between Parafield and Mascot (NSW) and special flights into Port Moresby, Finschhafen, Nadzab and Hollandia.

Up until October 1944, 34 Squadron – like the RAAF's other transport units – was controlled by the Allied Directorate of Air Transport. When this organisation was disbanded the squadron was given the task of providing a daily courier service between Parafield and Darwin. Also in October, three aircraft were detached to Higgins (in Cape York Peninsula) from where they carried out special flights to Tadji, Hollandia and Noemfoor. The detachment moved to Garbutt (Townsville) in early November and continued operating into the New Guinea region until later in the same month when it returned to Parafield to be replaced by another detachment which went to Coomalie, NT.

The final year of the war saw 34 Squadron move to the allied base on Morotai Island and become involved in operation 'Oboe', the invasion of Borneo in May and June. It recorded two 'firsts' during this period – the first aircraft to land at Labuan (16 June) and the first transport aircraft to land at Tarakan (21 June) following its capture.

With the ending of hostilities, 34 Squadron's Dakotas then moved to Singapore to assist in the evacuation of prisoners of war and in November 1945 some of its aircraft began operating a weekly courier service from Morotai to Tokyo. By early 1946 most of the squadron had returned to Australia and in residence at Richmond NSW, it was disbanded in June.

The last of the original four RAAF transport squadrons established in February/March 1942 was No 35, formed at Pearce, WA on 11 March. Like its contemporaries, 35's initial equipment comprised a mixture of types but Dakotas were taken on strength later on. After operating in Western Australia and Queensland, the squadron was disbanded at Townsville in June 1946.

37 and 38 Squadrons

In terms of the date of its establishment, the next RAAF squadron to operate Dakotas was No 37, which had been formed at Laverton, Victoria on 15 July 1943. The Lockheed Lodestar was the squadron's main equipment between then and early 1945, flights within Australia and to the New Guinea region providing its main work. Morotai was added to the squadron's ports of call at the end of 1944. No 37 was the last RAAF wartime squadron to receive the Dakota, the first aircraft not appearing on strength until February 1945, by which time the squadron's main base was at Essendon, Victoria.

The Dakotas were soon put to good use and two squadron detachments were established in April 1945. Detachment 'A' was set up at Parafield, SA, for the purpose of servicing the squadron's aircraft on their scheduled flights to Western Australia and Darwin. Detachment 'B' was at Morotai as a 'lodger' unit with No 34 Squadron.

In May 1945 No 37 Squadron began a twice weekly courier service to Morotai through Parafield and Darwin, supplementing an existing service to the island via Charleville and Townsville. The journey from Essendon to Morotai took 26 hours to complete. Another courier service was added to the squadron's responsibilities in June, this time the daily run between Essendon and Brisbane's Archerfield. The end of the war saw 37 Squadron performing similar duties to its sister units – evacuating prisoners of war and conducting flights to Japan from Morotai.

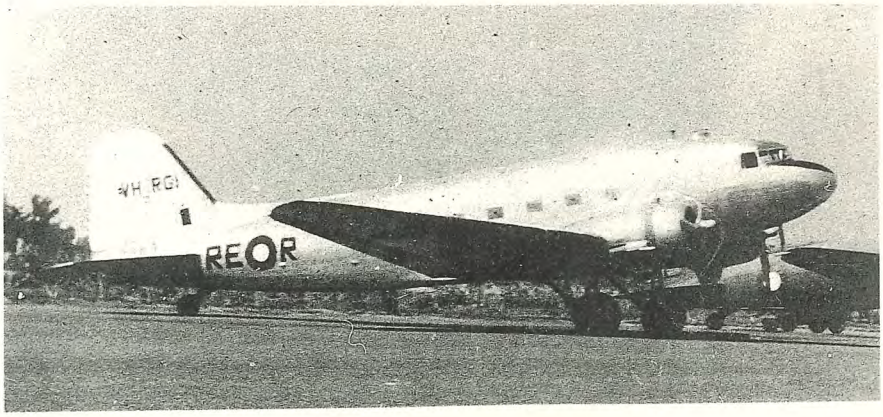
Although formed as late as 15 September 1943 at Richmond, NSW, No 38 Squadron received its first Dakotas considerably earlier than its contemporary, 37 Squadron. No 38 used mainly Lockheed Hudsons for the first eight months of its existence, using them for general freight, passenger and VIP duties within Australia.

The squadron received its first Dakotas in May 1944 and continued operating internal Australian routes but added flights to Hollandia, Biak and Noemfoor to its repertoire. In December 1944 No 38 Squadron moved to Archerfield (Brisbane) and continued to operate courier flights carrying passengers and freight to the South West Pacific Area, casualty evacuation flights and supply drop operations in New Guinea.

In July 1945 a detachment was sent to Morotai and participation in the invasion of Borneo was recorded. Throughout its period of operations in the South West Pacific, Western Pacific and East Indian Ocean areas, 38 Squadron recorded only one fatal accident, that being a Dakota which disappeared near Penau Lakes in Dutch New Guinea in September 1945 while en route from Biak to Merauke. 38 Squadron also assisted in the evacuation of prisoners of war after the fighting had ended and recorded some history when one of its Dakotas became the first RAAF aircraft into Singapore following the Japanese surrender.

The above briefly covers the extent of RAAF operations of the 'Douglas Commercials' during World War II and goes a long way towards explaining the efficiency and safety of Australia's airlines following it. The Dakotas' operations during the war demanded maximum effort from air and ground crews and the aircraft themselves, often under adverse conditions and always under the influence of a tight schedule. Of course the Dakota's service with the RAAF didn't end there, the type carrying on for many years through more units, three major conflicts and additional roles many and varied.

The role of transport and support aircraft in any conflict usually takes second place to the more glamorous combat types, at least in the eyes of the public and the press. But without these aircraft supplying men and equipment, the com-



Dakota A65-121/VH-RGI was delivered in July 1945 and initially served with 36 Squadron, as illustrated here. It subsequently spent time in Japan and with No 91 Wing on Korean duties. (via Neil Mackenzie)

bat aircraft would not be able to fly and the troops on the ground would not be able to fight. The transports' aircrews flew missions which were just as risky and required just as much skill as those involved in direct combat, and their crews gave their lives frequently.

In 1945, Flt Lt S V Leslie, RAAF, wrote the following poem in dedication to the Dakotas and their crews:

The Biscuit Bombers

They are not heroes, these few silent men,
Sleeping beneath their sandy mounds.
In life they would deride the flow'ry pen
That wordily on errantry expounds.

No worse than most, no better than the rest,
They did their duty (what man can do more?);
Afire with youth they gladly faced the test
Of Life and Death – recked not what the score.

They knew no glory would attend their deeds;
Their breasts would never wear an honoured prize,
Nor formal voice recite the splendid screeds
Extolling courage shown in battleskies.

The "Biscuit Bombers" was the laughing name
With which they dubbed themselves in modest fun:
They little knew how soon immortal fame
For that derisive title would be won.

With skill their slow and unwieldy craft they flew
Searching the muddy river beds below
To find the tiny, urgent rendezvous;
Skimming the treetops, watching the hill-sides grow.

Threading the valleys, wing tips scarcely clear
Of clutching jungle; hurdling sudden walls;
Gauging a distance; knowing a chilling fear
When, soaring clear, the aircraft nearly stalls.

Dark buds, the vital packages are thrown
Upon the air, to burst in vivid bloom;
Filled by the wind the silken flow'rs blown
To a sunlit rent in the green fantastic gloom.

In a last salute the lightened plane sweeps low
To drop its richest gift – a bag of mail,
Then lifts away from the foetid jungle trails
Where diggers grimly stalk the yellow foe.

... Invisible beneath the strangling vines
A battered aircraft lies on its side.
A withered palm alone its tomb defines
And soon the hungry growth this sign shall hide.

For once the transport failed to leap the hill
Which, unexpected, loomed across its way.
With broken wings it lies forever still
'Neath leafy tides that drown the light of day.

No heroes these – the title they'd disdain,
Tho' death their courage never could entrall;
What greater epitaph could man attain:
"These men heard – and answered – duty's call!"



The RAAF's penultimate Dakota, A65-123/VH-RGK, the Dakota reserved for the exclusive use of the Governor General for some years. It was taken over by the Royal Australian Navy in 1968 and disposed of in 1973. The target towing Beaufighter in the background dates this photo graph as being immediately postwar. (CPE)

DAKOTA POSTWAR

The end of World War II brought with it an inevitable reduction in the strength of all Australia's services, the RAAF included. At its peak in 1944 the RAAF had more than 164,000 personnel on strength, forty-seven times that with which it had entered the war in 1939. By 1948 that peak figure had been reduced to only 8,000 personnel as the RAAF was constantly cut back and many fine officers and men – including those at the highest levels – retired, sometimes against their wishes.

The 'new look' RAAF as announced in 1947 would see some of the manpower strength restored. Under a five year plan, personnel strength was to increase to just under 14,000 and there would be 16 squadrons including four Citizen Air Force fighter units. Included in the 16 would be two transport squadrons equipped with Dakotas.

In the previous year, 1946, there had already been some reorganisation of the transport squadrons. Nos 33, 34 and 35 were disbanded and Nos 36, 37 and 38 were moved from their Garbutt (Qld), Essendon (Vic) and Archerfield (Qld) bases and relocated at Schofields, west of Sydney, where they came under the control of No 86 (Transport) Wing.

Further reorganisation came into effect in June 1948 as the five year plan was implemented. At that time, 37 Squadron was disbanded and Nos 36 and 38 Squadrons moved from Schofields to nearby Richmond (still under the auspices of 86 Wing), from which they still fly today equipped with C-130 Hercules and Caribou aircraft, respectively.

36 Squadron kept its Dakotas until 1958 when they were replaced by the first Lockheed Hercules to enter RAAF service. In preparation for this, the squadron's complement of Dakotas had been gradually run down over the previous year, and the last three aircraft were transferred to No 38 Squadron in July 1958. With them went the training activities which had previously been incorporated in the squadron's normal transport duties. Another of 36 Squadron's responsibilities in previous years had been the operation of the Governor General's Flight within its own activities since 1950. A Dakota was set aside for the exclusive use of the Governor General and members of his household and a crew was on permanent standby to cater for his requirements.

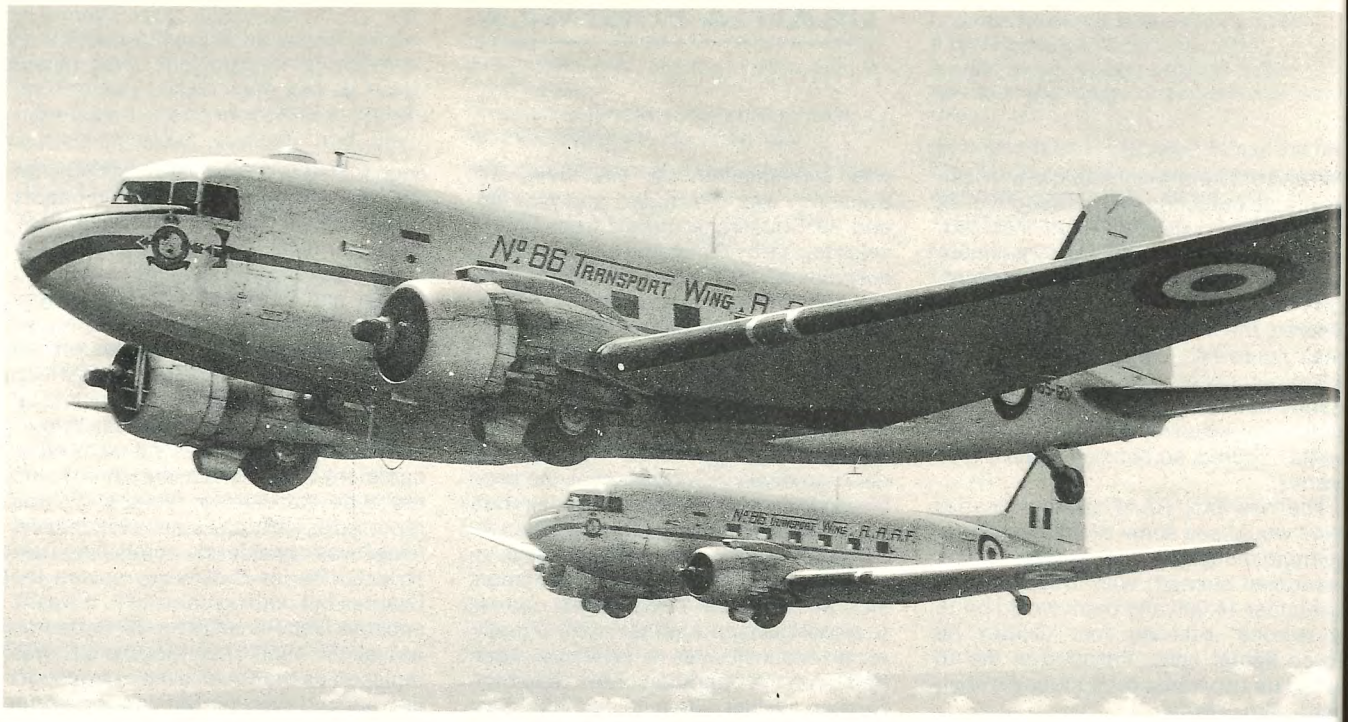
38 Squadron didn't relinquish its last Dakotas until 1964 when the first of its new de Havilland Canada Caribou STOL tactical transports was delivered. As such, No 38 was the final RAAF operational squadron to fly the Dakota, although for the last five years of its time on the type it was designated a Transport Training Squadron within 86 Wing. Several other units and flights continued to use the Dakota, including the search and rescue and transport flights at Pearce (WA) and Butterworth (Malaysia) – until the Caribou took over – and the Aircraft Research and Development Unit (ARDU) at Edinburgh, South Australia. In mid 1990 ARDU still had four Dakotas flying.

As has been the case with many other operators of the Dakota, the RAAF found the type difficult to replace. It was reported as early as August 1952 that the RAAF was considering purchasing Fairchild C-119s or C-123s to replace the Dakotas but nothing came of it. It wasn't until the first Hercules for 36 Squadron arrived in 1958 that the Dakota was replaced as the RAAF's major transport aircraft, and even then another squadron (No 38) operated Dakotas for six more years until the first Caribou arrived. No 34 Squadron's VIP Dakotas remained in service until the second half of 1964 when they were replaced by two Vickers Viscounts.

Of the other former Dakota squadrons, No 33 lay inactive for many years before re-emerging at Richmond with Boeing 707s in the 1980s; No 34 Squadron remains the RAAF's 'VIP' transport unit,



Dakota A65-63 of the Central Flying School in flight. This was one of the longer serving RAAF Dakotas, not being withdrawn from use until 1979 and then transferred to the Papua New Guinea Defence Force. (Defence PR)



No 86 (Transport) Wing came into being in 1946, incorporating Nos 36, 37 and 38 Squadrons, all equipped with Dakotas. In 1948 No 37 Squadron was disbanded, leaving the RAAF with just two transport squadrons. A65-120 in the foreground survived only until 1954 when it crashed off Japan. (RAAF Museum)



A Dakota which still serves. A65-78 still flies with the ARDU at Edinburgh, SA. It is seen here well into its takeoff run. Note the rudder deflection.

currently operating Falcon 900s and HS.748s from Canberra and in previous years Dakotas, Convair 440s, Viscounts, Falcon 20s and BAC One-Elevens; No 35 Squadron was reformed in Vietnam from the Vietnam Transport Flight equipped with Caribou and is current with them; and No 37 Squadron was reformed at Richmond in 1966 and equipped with its current C-130E Hercules.

Japan Courier and Berlin

As mentioned in the previous chapter, No 34 Squadron began what was known as the Japan Courier in November 1945. Between then and when it was taken over by Qantas in December 1947, the Japan Courier was shared between the various RAAF Dakota squadrons and became the main activity of No 86 Wing when it was established.

The Courier was basically a tri-weekly service from Australia to Japan to provide supplies, replacements and mail to the Australian component of the British Commonwealth Occupation Forces (BCOF) in that country. RAAF units based in Japan as part of the BCOF were Nos 76, 77 and 82 Squadrons, all equipped with P-51 Mustang fighters.

Involving a round trip of some 20,000 kilometres, the courier service was at that time the longest scheduled air route flown by twin engined aircraft in the world and involved the fitting of 100 imp gal (454 litre) fuel tanks in the fuselage of the Dakotas. The use of Dakotas for the service provoked some criticism, claims being made that larger, faster and longer ranging four engined aircraft would be more suitable and safer. In a June 1947 incident, an engine failure in an 86 Wing Dakota forced the jettisoning of freight, baggage and 18 bags of mail over the Halmaheras Islands in order to maintain height. When Qantas took over the service it used Avro Lancastrians and later Douglas DC-4s.

In June 1948, the Soviet Union enforced a land and sea blockade of Berlin, a city controlled by the conquering allies, Britain, France, the USA and the Soviets. Berlin was until late 1990 situated in East Germany under partial Soviet control (East Berlin), and the blockade was intended to literally starve West Berlin (controlled by the western nations) and force it to become part of the Soviet empire.

In both military and humanitarian terms it was vital that this did not happen, but the only access to Berlin was via three narrow air corridors. It was decided to supply the city by air, so beginning a massive operation which commenced in June 1948 and ended 16 months later, by which time British and American aircraft had flown more than 2.3 million tonnes of goods of all descriptions into the city and the Soviets had admitted defeat.

The Australian government offered an RAAF transport squadron to assist in the operation, and although no RAAF aircraft joined in, 41 Dakota crew members from No 86 Wing flew with Royal Air Force transport units. Sqdn Ldr C A Greenwood flew the first Australian mission on 15 September 1948, carrying 3,300kg of flour from the RAF base at Lubeck in northern Germany to Berlin's Gatow airport. RAAF Dakota crews were involved with 'Operation Plainfare' until August 1949, by which time they had flown 2,062 sorties and carried 6,964 passengers and 7.1 million kilograms of freight.

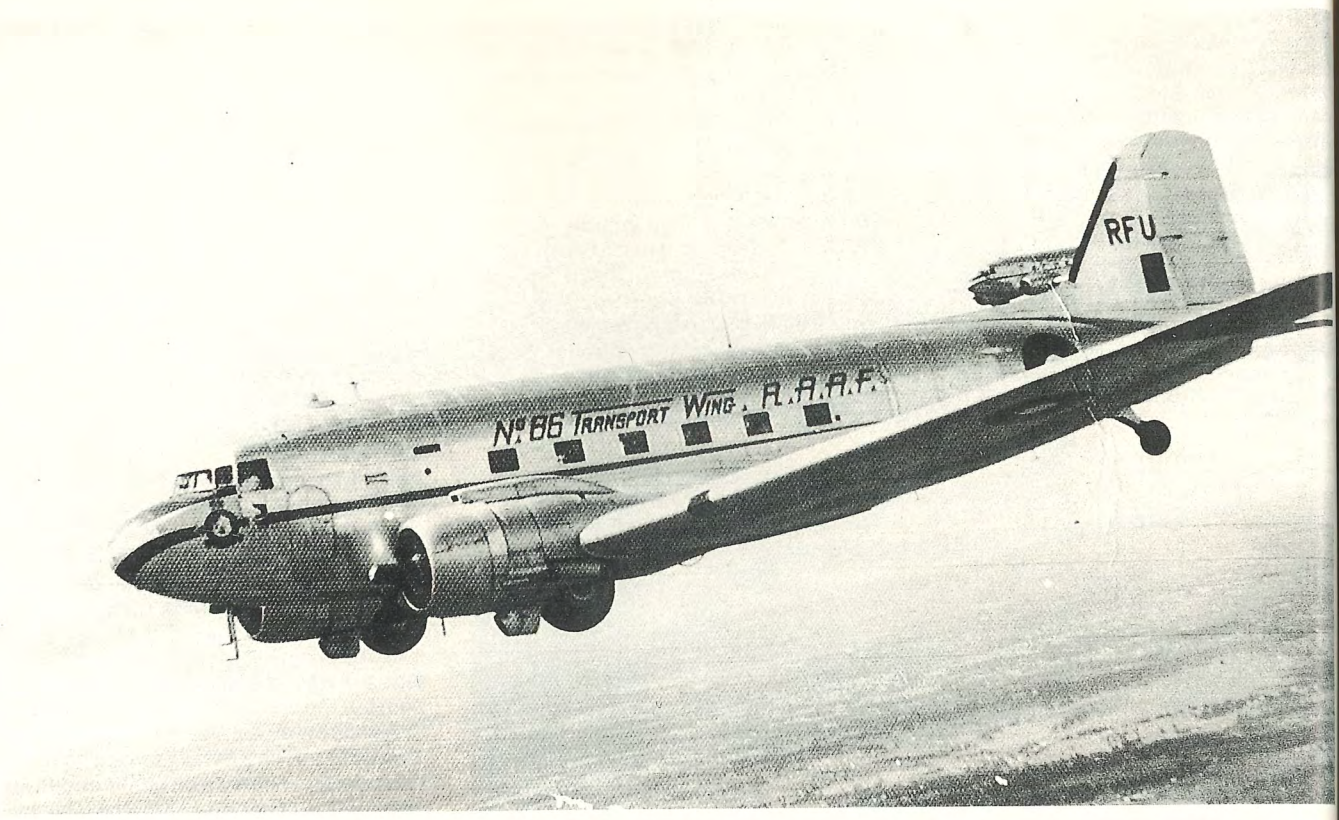
Following its retirement from RAAF service in 1980, Dakota A65-69 was presented to the West Berlin Traffic Museum in memory of the efforts made by Australian Dakota crews during the Berlin airlift. Between 1964 and 1980 this Dakota had been part of the RAAF's Transport Support Flight at Butterworth, Malaysia and the aircraft departed there on 6 June for the RAF base at Gutersloh, West Germany, under the command of Flt Lt Garry Dunbar.

Eleven days and 12,000 kilometres later the Dakota arrived in West Germany where it was repainted in RAF colours and given the British serial number ZD215. This was necessary as only civil and military aircraft of France, the USA and Britain were permitted to use the air corridors into West Berlin, the aircraft's final destination. The Dakota's final flight

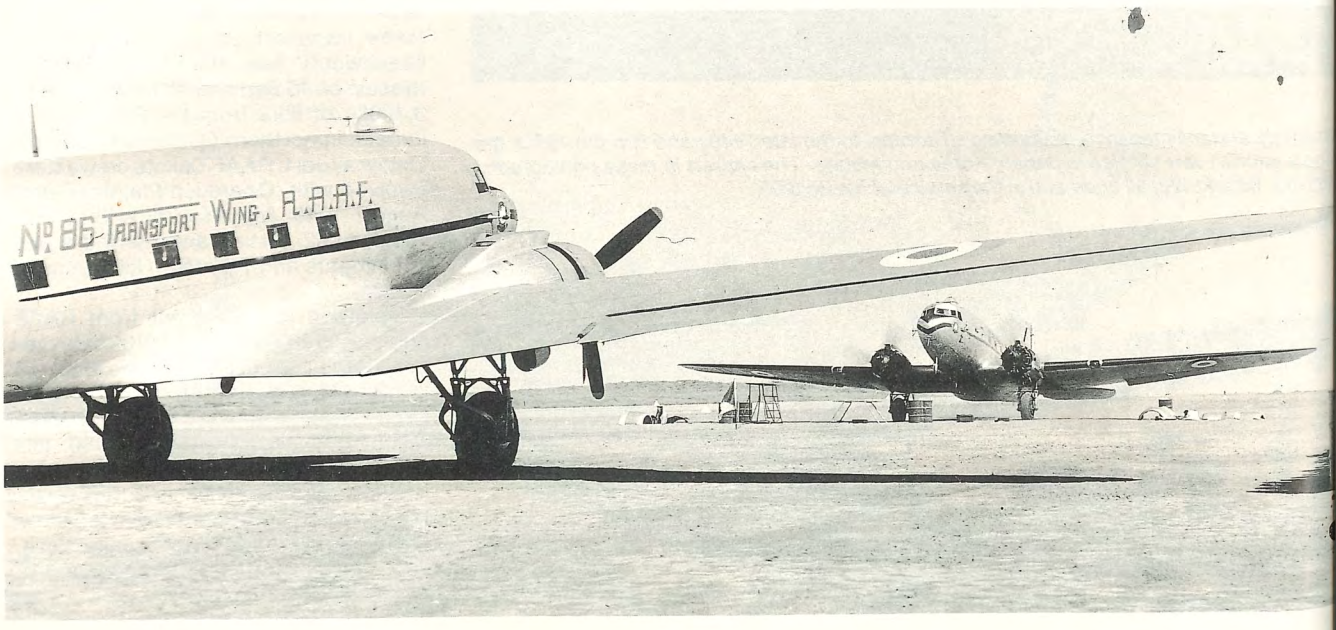


Assembly and maintenance of 86 Wing's Dakotas. In the late 1940s and into the 1950s the Wing's aircraft saw service in Japan, Korea and Malaya. The aircraft in these photographs (A65-63, 68 and 122) all ended up in the service of the PNGDF.





Dakota A65-104 circa 1946, still carrying its callsign insignia (VH-RFU) on its tail and wartime roundels and fin flashes. (via Neil Mackenzie)

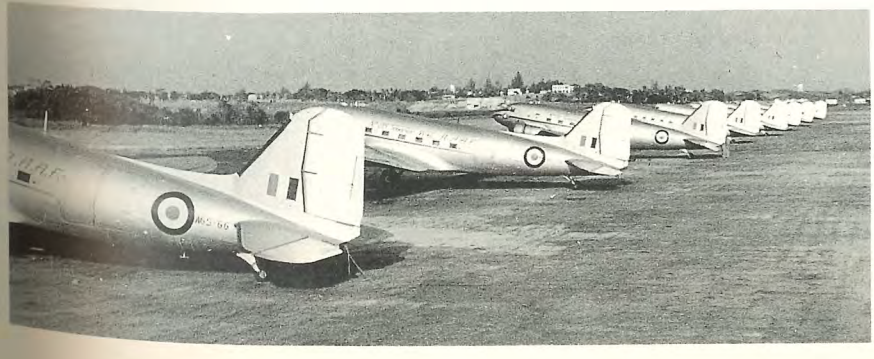


RAAF Dakotas were used for support duties on the various British atomic tests conducted in Australia during the 1950s. These two are pictured at Onslow, WA, during Operation 'Hurricane', the October 1952 tests at Monte Bello Island. (via Peter Finlay)









(left) 38 Squadron Dakotas on duty during their involvement in the Malayan Emergency between June 1950 and December 1952. The shots show the aircraft flying supply drop missions and at their base at Changi. The initial complement was eight aircraft, but this was reduced to four in 1951 due to the pressing needs of the war in Korea. (Bob Short)

into Berlin's Gatow airport was completed on 18 June 1980, with the RAF's Sqdn Ldr Al Culloway in command and an Australian veteran of the Berlin airlift, Air Vice Marshall David Evans (later the RAAF's Chief of Staff) as part of the crew. A65-69 reverted to RAAF colours once at Gatow and along with an RAF Handley Page Hastings, forms a fitting reminder of a huge exercise in air transportation.

There is a plaque on the aircraft which states: "This Douglas DC-3 (Dakota) was presented to the people of Berlin by the Australian Government. It proves a lasting reminder of the Royal Australian Air Force crews who flew the Berlin airlift and commemorates the vital role of the Dakota in preserving the freedom of Berlin".

The Malayan Emergency

A general increase in communist activity around the world in the late 1940s manifested itself close to Australia's 'front door' in 1948 with the rise of communist insurgents in Malaya. In June of that year, terrorists murdered three English rubber planters, beginning a state of emergency which was not formally ended until 1960. In between time, the RAAF was directly involved in the prolonged military campaign against the Malayan terrorists, and the whole episode went a long way towards shaping Australian policy and influence in the region for many years after that.

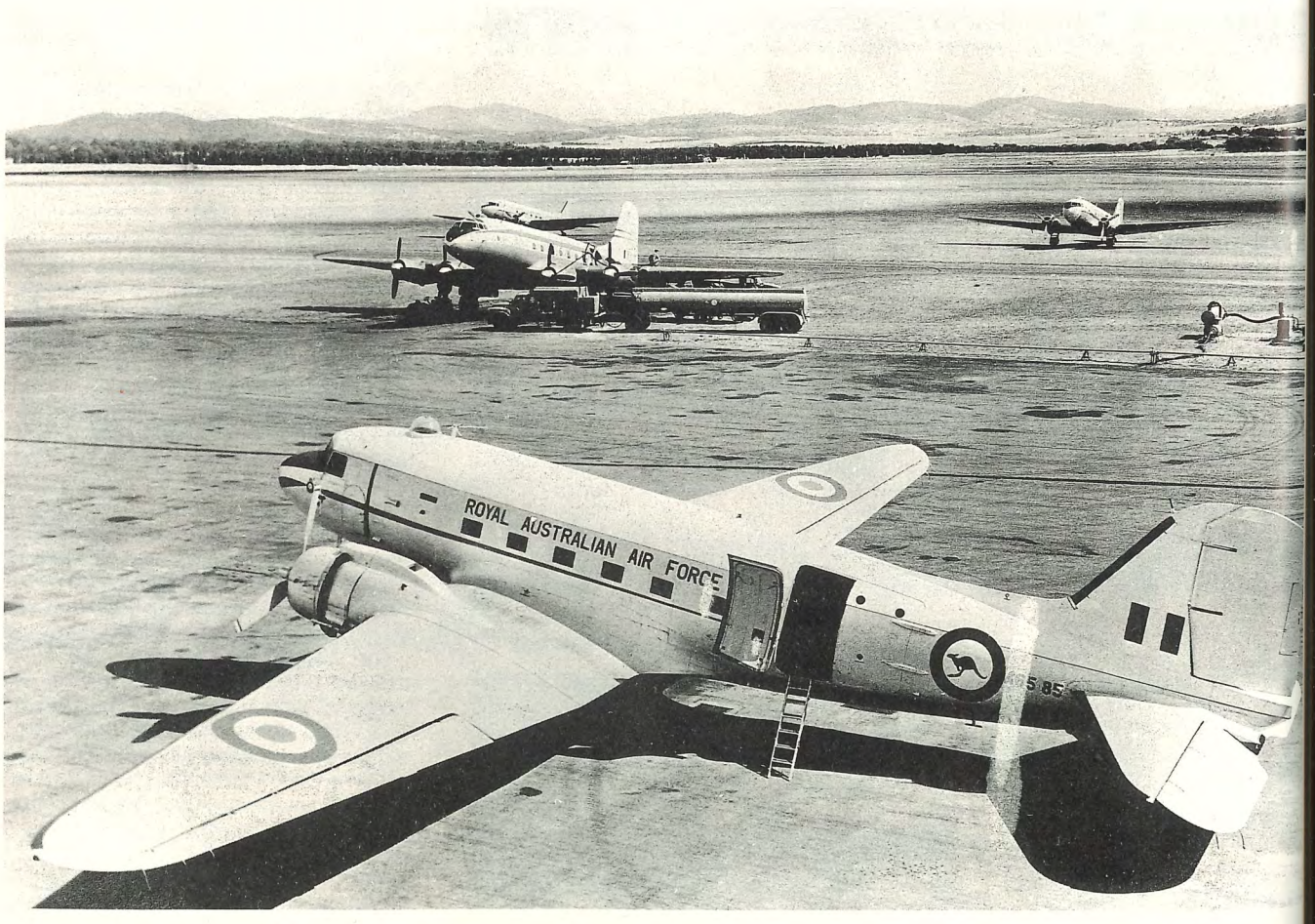
The best known of the RAAF's operations in Malaya are those conducted by the Avro Lincoln bombers of No 1 Squadron, whose aircraft operated against the terrorists continuously for eight years from July 1950. Although of a shorter tenure, of equal importance were the operations carried out by No 38 Squadron and its Dakotas between June 1950 and December 1952 when they returned to Australia.

The squadron's Malayan campaign involved moving virtually *in toto* to its base at Changi, Singapore. The squadron's complement of Dakotas was eight, and its commanding officer at the time was Wng Cdr J F Lush. Aircrew of both 38 and 36 Squadrons were used during the course of the Dakotas' time in the Malayan region.

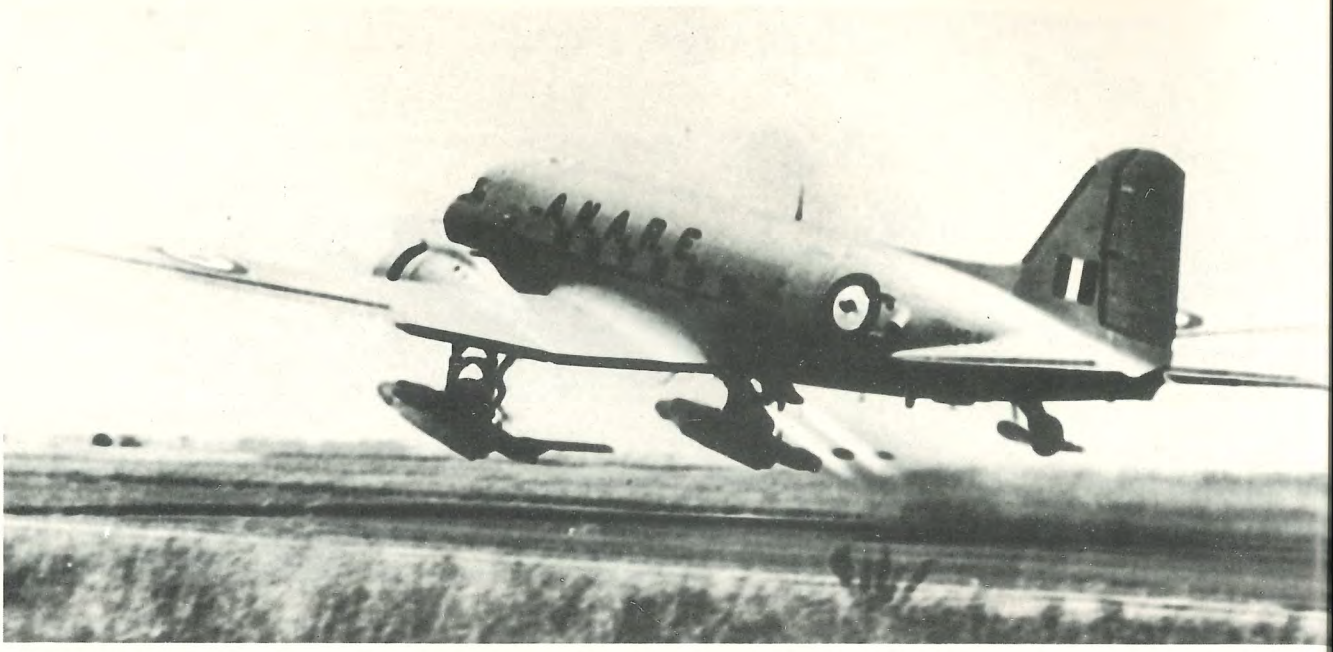
After familiarisation flights and jungle survival courses the squadron operated with the RAF's Far East Transport Wing and during its more than two years on operations flew over the entire region,



Nice shot of 'natural metal finish' Dakota A65-84 during its takeoff run. This was yet another of the aircraft ultimately handed over to the PNGDF on retirement from the RAAF. (CPE)

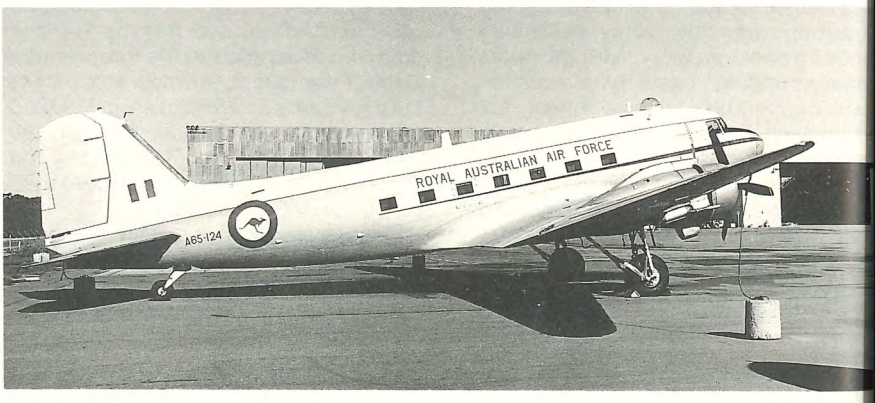


A Royal Air Force Handley Page Hastings shares the ramp with three RAAF Dakotas in the 1950s. A65-85 in the foreground was allocated for the exclusive use of the Governor-General between 1947 and 1950.



A65-81 tests its JATO equipment at Laverton before going to Antarctica. One of these tests resulted in the grass alongside Laverton's runway being set ablaze! (RAAF Museum)

capability to support the Korean operations was a prime reason for the withdrawal, specifically due to the RAAF's undertaking to provide medical evacuation services for the Commonwealth forces there. By then the RAF had sufficient air transport strength in Malaya to carry on without the Australians.

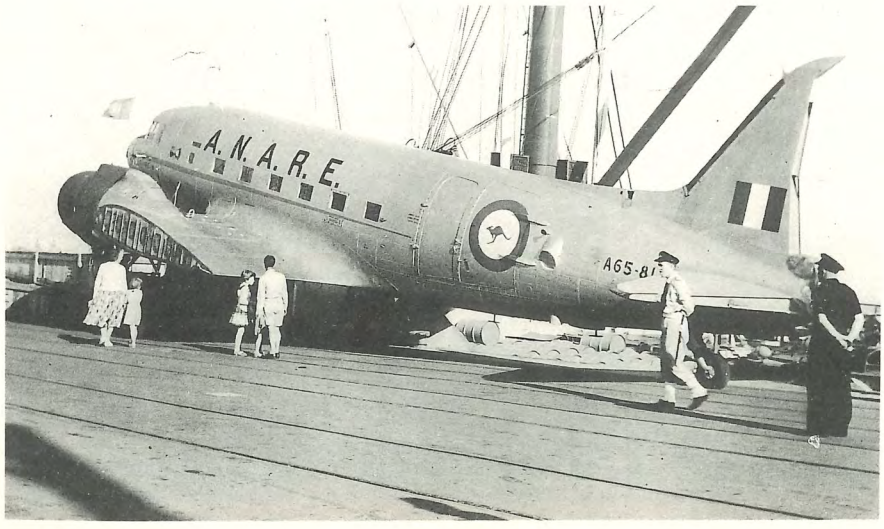


The RAAF's last Dakota, A65-124. It is now with the Air Force Association Museum at Bull Creek, WA.

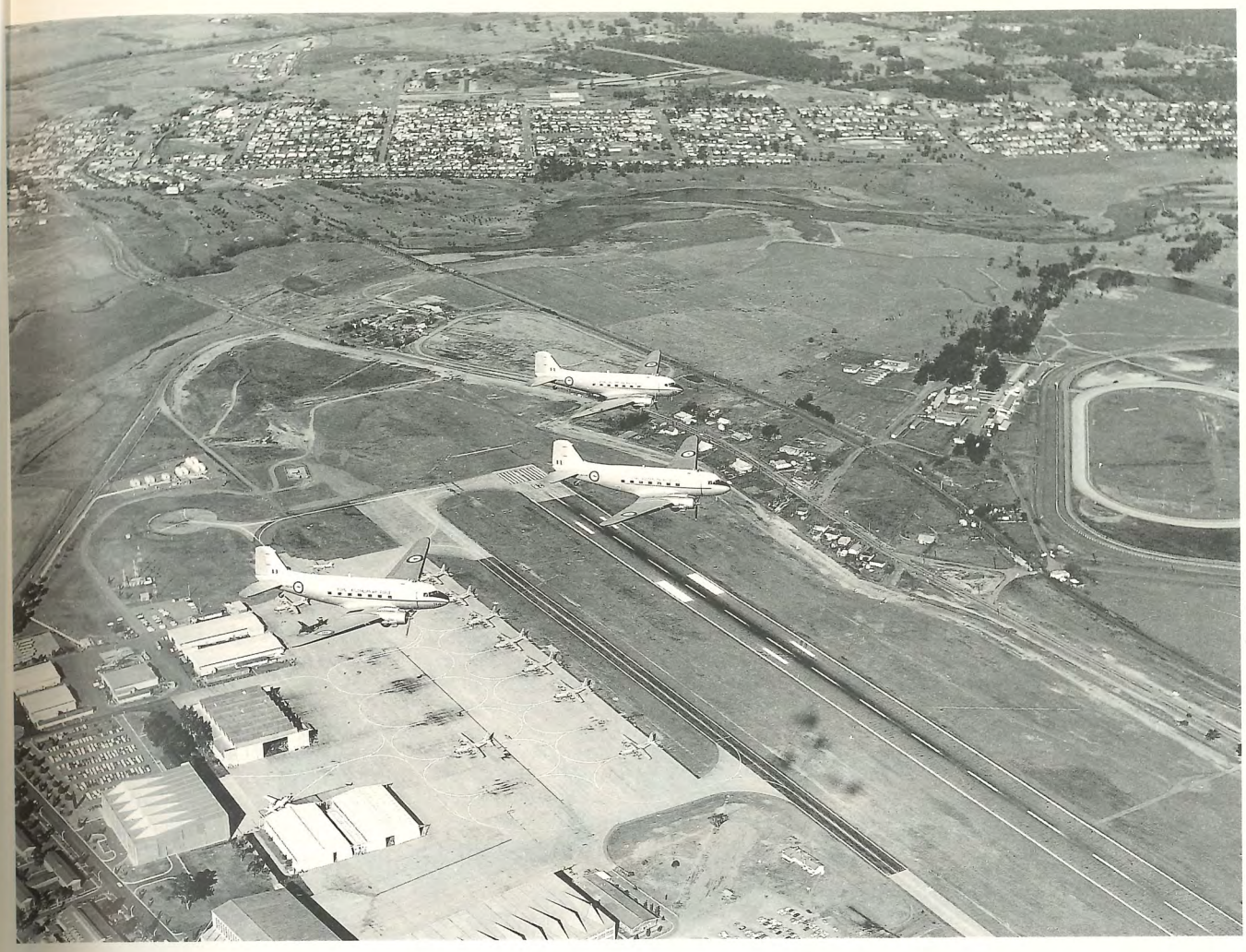
Dakotas In Korea

In the early morning of 25 June 1950, an artillery barrage and armoured push announced the start of the Korean War. On that day, the Soviet backed North Korean army began its campaign to gain control of democratic (and US backed) South Korea, the two countries separated by a border based on the 38th Parallel. So began a war which was not resolved for three years, and one which would involve the armed forces of North Korea and later Communist China on one side and those of South Korea, the USA and several other friendly nations – including Australia – operating under the auspices of the United Nations on the other.

The RAAF was an early participant in the conflict. On the day it started, 77 Squadron's Mustangs and personnel were preparing to return home at the end of their period as part of the BCOF in that country. Instead, they were sent into another shooting war and remained involved until it was all over in July 1953. By then, 77 Squadron had been operating Gloster Meteor jet fighters for two years.



Partially dismantled A65-81 ready for shipping to Antarctica aboard the MV Thala Dan in December 1959. (RAAF Museum)



A trio of Dakotas over the RAAF's main transport base at Richmond NSW with Hercules and a Caribou visible below.



A65-63 photographed at Richmond NSW in the early 1960s. The fin emblem is of the Central Flying School, East Sale. This Dakota spent nine years from 1964 with the Transport Support Flight at Butterworth, Malaysia and later went to the PNGDF.

Korea to base hospitals in Japan. This task ultimately resulted in the carriage of more than 12,000 wounded allied personnel out of Korea in addition to the 100,000 passengers and 600 tonnes of freight and mail carried during the course of other duties.

As had been the case with previous wartime operations by RAAF Dakotas, 30 Transport Unit's sortie rate was prodigious in Korea. Seven hundred flying hours per month was not uncommon, despite the often extremely difficult weather conditions (which necessitated a high proportion of Ground Controlled Approaches) and the difficulties in sustaining serviceability of the aircraft. Aircrew attached to the unit usually logged between 900 to 1,000 flying hours during their nine month tour of duty while the average level of serviceability maintained was excellent at between 75 and 83 per cent. Remembering that one aircraft out of eight was always allocated to scheduled maintenance, only 87.5 per cent serviceability (seven-eighths) was possible. An 83 per cent figure means that all of the remaining seven aircraft were available for operations five days out of seven.

Some reorganisation of the Transport Unit took place on 10 March 1953 when it was renamed No 36 (Transport) Squadron. The original 36 Squadron had been absorbed into No 38 Squadron a few days before, and the 'new 36' carried on its famous name. Four months later the Korean war was over but 36 Squadron remained in the area for two further years. Its first task was the evacuation of Commonwealth prisoners of war, after which it operated from Iwakuni for nearly two more years before it was reduced to a Flight in March 1955, returned to Australia and re-established as a full squadron again in July. During its period in Japan the squadron carried more than 42,000 passengers, 1.5 million kilograms of freight and 1.2 million kilograms of mail.

Vietnam

Unlike the earlier conflicts in Malaya and Korea, RAAF Dakotas had only a brief direct involvement in the Vietnam war. The first occasion was in the early stages of Australia's participation and during the period when the best methods of airlifting the wounded back to Australia were being evaluated. From September 1965, five special flights using Dakotas as medical evacuation (Medevac) aircraft were made, but not unexpectedly these were found to be unsuitable for the task due to their unpressurised cabins, low speed and relatively short range. As is described later in this book, the C-130E Hercules became the standard RAAF aircraft for this task following the delivery of the first examples in August 1966.

RAAF Dakotas also saw some Vietnam-related service at the other end of the conflict in 1975 when a small number of aircraft were involved in the evacuation of refugees at the time of South Vietnam's surrender to the Communist North in April of that year. RAAF Hercules transports bore the brunt of these operations.

Rainmaking and Antarctic Dakotas

Apart from regular squadron or transport flight service, the RAAF's Dakotas have been used for various 'one off' jobs over the years including rainmaking experiments. In 1947 an RAAF Dakota was used in early experiments and in 1950 a Dakota which dropped dry ice onto suitable clouds produced 'artificial' rain over Tasmania.

In conjunction with the Commonwealth Scientific Industrial Research Organisation (CSIRO) and the US Navy, a Dakota conducted rainmaking trials in Hawaii, while in 1957 the CSIRO was loaned four RAAF Dakotas for cloud seeding operations over drought affected areas of Australia. The Dakotas involved were A65-81, 96, 97 and 117 and these aircraft conducted cloud seeding trials over selected areas of New South Wales, Victoria and Queensland. In at least one case, the production of rain was attributed directly to the cloud seeding. This



Dakota A65-108 in its operational days, in this case wearing the badge of No 34 (VIP) Squadron on its nose.



One of several Dakotas which served with the RAAF's No 34 (VIP) Squadron over the years, A65-118, photographed circa 1966. This aircraft was sold in the USA in 1968. (RAAF Museum)



Still with the ARDU in 1990 was A65-94. This shot was taken about a decade earlier when the aircraft was awaiting disposal. A reprieve came in 1982 when it was reactivated and allocated to the ARDU.

was June 1957 in the Darling Downs area of Queensland and the Dakota involved was A65-117.

Similar experiments continued over several years using not only Dakotas but also Avro Lincolns and a pair of Cessna 310s operated by the CSIRO and especially equipped for the purpose. From 1961 only one RAAF Dakota was allocated to the task (from 38 Squadron) and following a 1965 decision to conduct rainmaking experiments only with civil aircraft, Dakota A65-97 was allocated to the CSIRO's Division of Cloud Physics and given the civil registration VH-RRA. This particular Dakota remained with the CSIRO until it was retired in 1978.

One of the most interesting 'special' Dakotas was A65-81, attached to the Australian National Antarctic Research Expedition (ANARE) in late 1959. Technically, the aircraft was operated by the Department of External Affairs and flown by members of the RAAF Antarctic Flight.

A65-81 underwent some modification before it operated from Antarctica's ice. Performed by De Havilland Aircraft at Sydney's Bankstown airport, the modifications included the fitting of skis over the main wheels, a trimetrogon camera installation in the rear fuselage which provided a horizon to horizon picture, Marconi Doppler equipment, a Bendix Polar Path compass and JATO bottles to the fuselage underside to assist in takeoff.

The modifications were completed by November 1959 and testing was performed before the aircraft was shipped to the Australian Antarctic base at Mawson Sound, arriving there on 25 January 1960. One slightly amusing incident occurred during the tests when a JATO takeoff resulted in the grass alongside the runway at RAAF Laverton being set alight!

The Dakota was delivered to Mawson with its outer wings, rudder and elevators removed but due to extremely difficult weather conditions was not assembled and ready for flight until mid June. Between then and 9 December it flew on a total of 47 days logging 160 hours in the air on photography, heighting, field party support and reconnaissance missions. A65-81's career ended on 9 December with its destruction and the disbanding of the RAAF Antarctic Flight shortly afterwards. A fierce blizzard accompanied by 100-plus knot (185km/h) winds hit Mawson destroying a DHC Beaver and blowing the Dakota 15 kilometres away from where it had been lashed down.

ARDU Service

The Aircraft Research and Development Unit (ARDU) is a special component of the RAAF, being its flight test establishment. Originally formed in 1941 as the Special Experimental Flight at Laverton, Victoria, ARDU tests all new aircraft entering RAAF service, evalu-



Light years apart technologically, but both serving a purpose. A Dakota of the RAAF's Transport Support Flight at Butterworth lands in front of one of the Mirage IIIO fighters it supported. (Defence PR)

ates modifications, the use of armaments (and the development of new weapons) and examines all aspects of the RAAF fleet's operational capabilities. ARDU handles the trials associated with everything from air to missiles to experimental colour schemes.

Based at Edinburgh near Adelaide, ARDU is now the last RAAF unit to fly Dakotas, four of them (A65-78, 86, 94 and 95) being on strength in mid 1990. In addition, A65-114 is still with ARDU, albeit not airworthy at the time of writing. ARDU's Dakotas are still relatively young in terms of flying hours, with about 14,000 hours on the highest time aircraft. They are used for a variety of roles including that of straight transport in support of the unit's other activities (thus avoiding tying up the full time transport squadrons' aircraft) and for the testing of new equipment, something which has resulted in numerous holes being cut in the airframe and the fitting of very non standard electrical and other systems over the years.

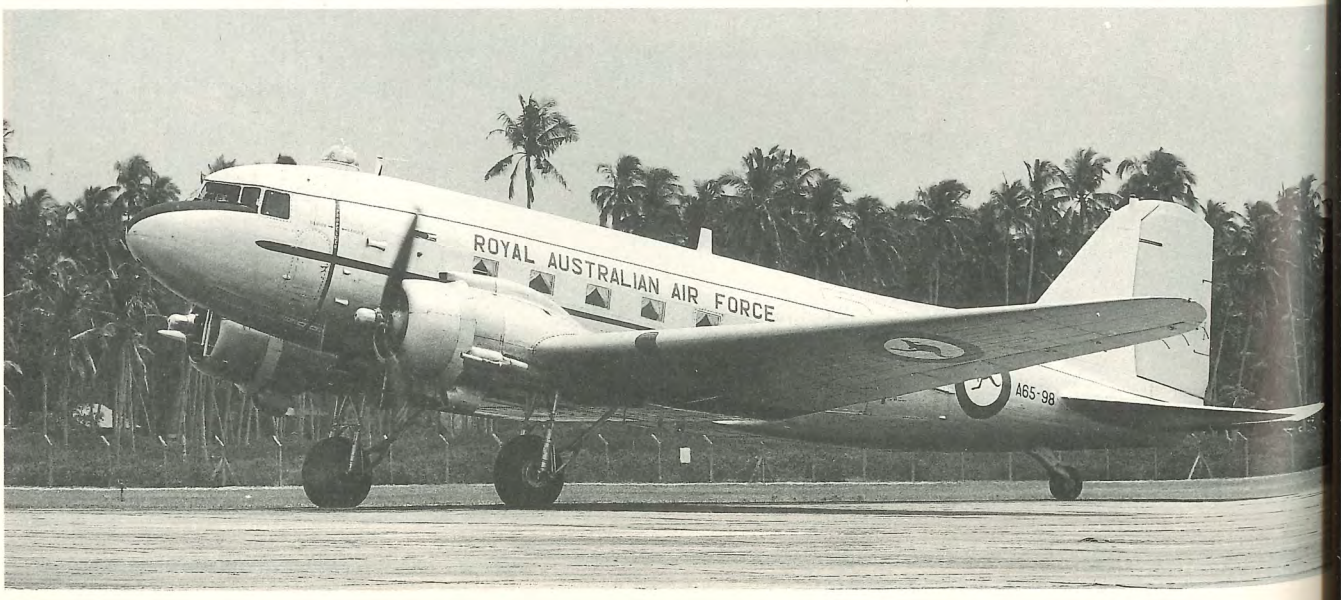
A good example of the Dakota's use with ARDU is provided by the testing of WRELADS – Weapons Research Establishment Laser Airborne Depth Sounding – equipment with uses in such areas as submarine detection and seabed mapping which was tested using A65-86 for six years from 1978. Other tests and trials might be conducted not over years but months, weeks, days ot even hours, depending on precisely what is involved.

Dakota Disposal

The number of Dakotas in service with the RAAF began to decline shortly after the end of World War II, with numerous aircraft going to civilian operators in the period 1946-48 and others steadily disposed of since. Most of the C-47s and C-47As were sold or withdrawn in the late 1940s and early 1950s, leaving the C-47B model as the RAAF's major representative of the type over a period of nearly four decades.

The exact means of disposal of the RAAF's Dakotas can be found in the tables which follow, but some are worthy of particular mention. Four aircraft were transferred to the Royal Australian Navy, A65-23 and 43 (C-47As) in 1950 and 1949, respectively, and A65-90 and 123



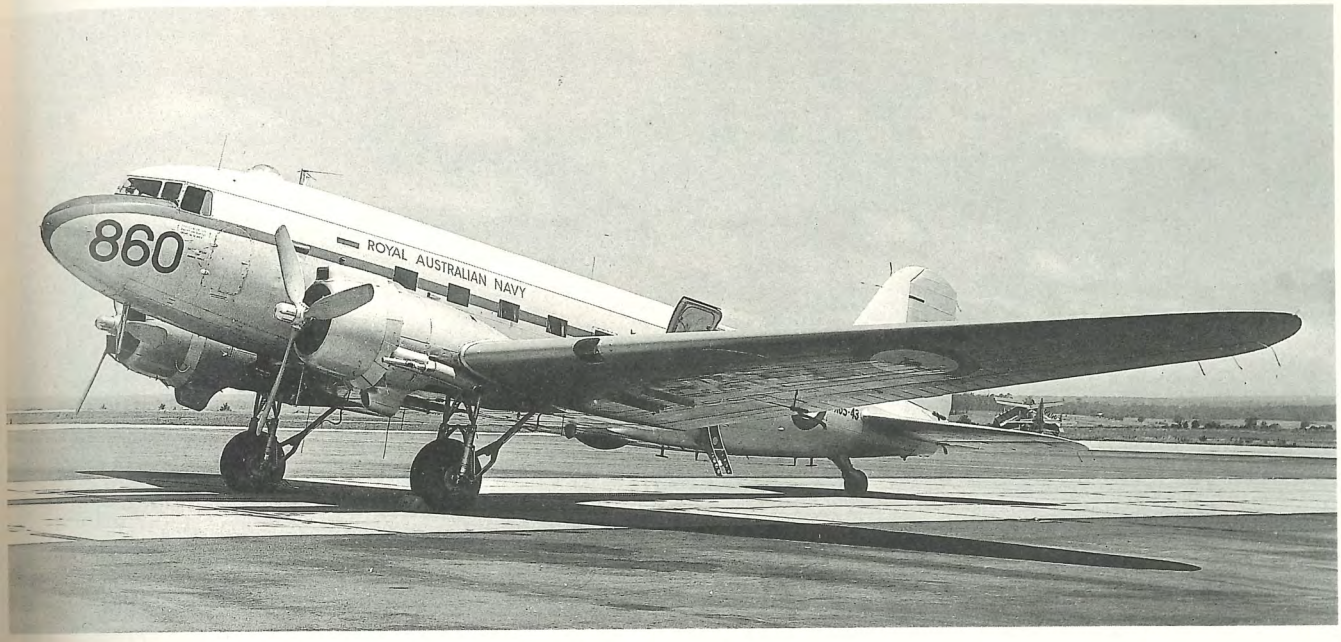


Dakotas with curtains in their windows, indicating a passenger role. A65-90 (above) has 34 (VIP) Squadron's badge on its nose, while A65-98 is pictured while with the Butterworth Transport Supply Flight. A65-90 still flies with the Royal Australian Navy's Historic Flight as N2-90.

(C-47Bs) in 1968. All were subsequently given RAN serial numbers with the N2 prefix replacing the previous A65. The suffixes remained as before.

N2-23 and 43 were modified for use as flying classrooms for Fairey Firefly observer training , the modifications including the provision of four stations for navigation training and another four for anti submarine detection training. Subsequently, both were fitted with Fairey Gannet retractable radar scanners for training purposes, while N2-43's appearance changed radically when a DH Sea Venom radar unit was installed in its nose. N2-123 was disposed of in 1974 and N2-23 in 1977, while N2-43 is on display at the RAN Museum at Nowra, NSW and N2-90 is still airworthy and operated by the RAN Historic Flight.

Another military operator of former RAAF Dakotas is the Papua New Guinea Defence Force (PNGDF). Six aircraft (A65-63, 65, 67, 68, 84 and 100) were presented to New Guinea between 1975 and 1981, the earliest examples being handed over at the time of the country's





One of the four Dakotas transferred from the RAAF to the RAN at two stages of its naval career. In the shot above, the aircraft is in basically standard configuration and retains its RAAF A65-43 serial number. In the shot below it has a Sea Venom radar mounted in its nose and has acquired the modified RAN serial N2-43.



One that still flies, the ARDU's A65-86.

gaining of independence from Australia. A seventh Dakota (A65-122) was taken into the PNGDF in 1980 as a non flying ground instruction aircraft.

Several other ex RAAF Dakotas have gone overseas in the form of foreign aid from the Australian government, among them A65-14, 30, 80, 88 and 96 to Cambodia and A65-26, 82, 103 and 121 to Indonesia.

Apart from the ARDU aircraft, one other RAAF Dakota remains airworthy. A65-71 is operated jointly by the RAAF Museum and its owners, the Australian War Memorial. Resplendent in its original 1945 colour scheme and displaying its VH-CIN callsign, this Dakota is a regular performer at air displays around Australia. It ended its formal RAAF service in 1973 with the Transport Support Flight at Butterworth, Malaysia, from whence it was moved to Canberra. This particular Dakota's main claim to fame – apart from its current status – is an incident it survived in May 1956 when it struck a ship's mast off Coffs Harbour, NSW. The extensive damage sustained to its port propeller and fuselage was repaired, although there is no word if its pilot's chances of rapid promotion were similarly patched up!

Also still in the RAAF's care is A65-108, a veteran of 86 Wing, 91 Wing in Japan, 34 (VIP) Squadron and 38 Squadron. This Dakota is on display at the RAAF Museum, Point Cook, Victoria and is being held for further display in the National Air and Space Museum proposed for nearby Laverton.

The Dakota came very close to leaving the service of the RAAF with a whimper rather than the bang it deserved, although the word 'bang' might be considered more appropriate in view of what follows. In October 1980 a newspaper report claimed that two Dakotas were to be used as targets for the Karinga cluster bomb and that the Dakota was to be phased out of RAAF service without the ceremony it so richly deserved. The information relating to the Karinga was supposed to be secret and an investigation was mounted into the source of the disclosure, an officer receiving a severe reprimand as a result.

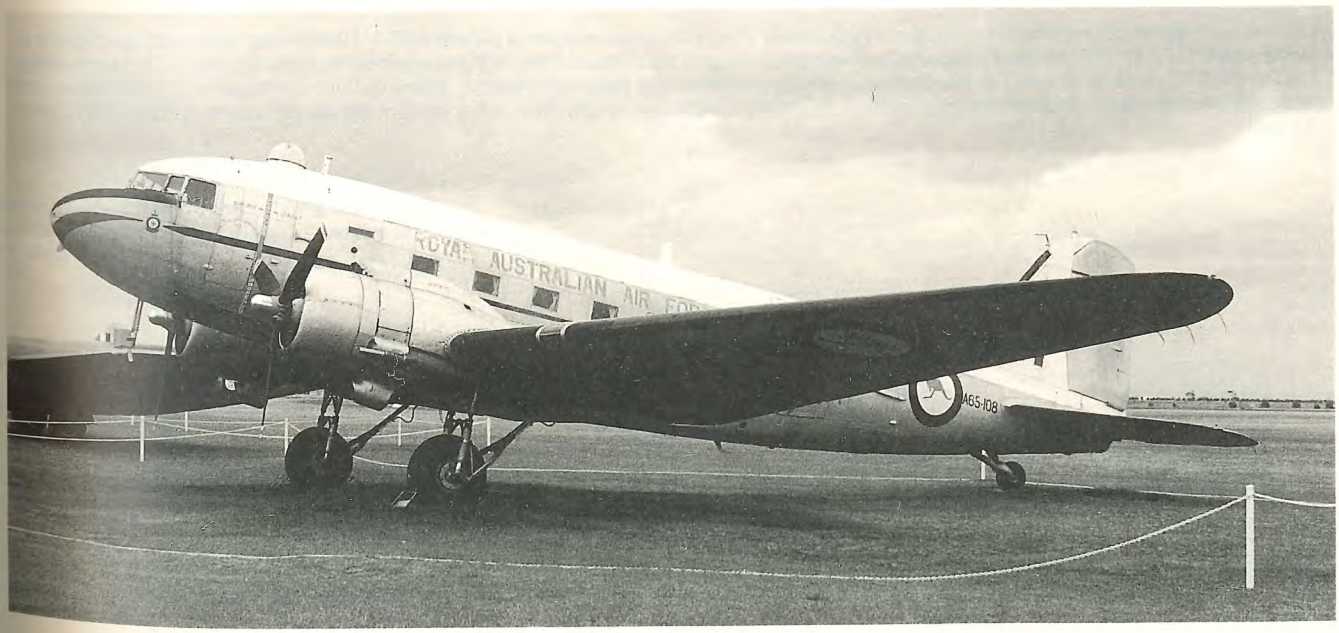
It was subsequently announced that the Dakotas in question would not be blown to pieces in Karinga trials and that one of them (A65-124) would in fact be presented to the Air Force Association of Western Australia for preservation and display.

By this stage the ARDU's five Dakotas were the only examples still regularly flying with the RAAF (other recently retired examples were up for tender, in use as ground instructional airframes or undergoing refurbishment for foreign aid) and their continued use was constantly under review. In 1983 such continued operation by the ARDU was approved, subject to regular examinations of their cost effectiveness, the availability of spare parts and the supply of aviation gasoline, a comparatively rare and very expensive commodity.

The Dakotas survived to see the 50th anniversary of their introduction to RAAF



Preserved and operated jointly by the Australian War Memorial and the RAAF Museum is A65-71/VH-CIN, complete with original 1945 colour scheme.



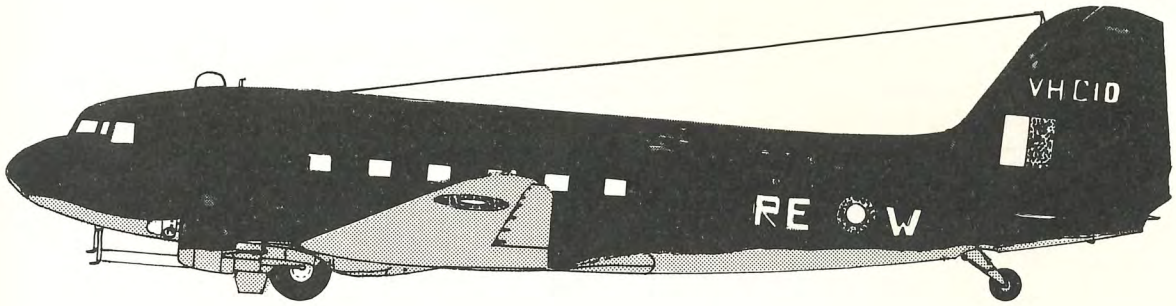
Residing at the RAAF Museum, Point Cook, is A65-108. If the proposed National Air and Space Museum at Laverton goes ahead, this aircraft will be among its exhibits. (Stewart Wilson)

service in 1989 and continue to survive in 1990. As has been the case with many air forces around the world, they have displayed remarkable longevity in the service of Australia and the signs are they will do so for a while yet. For just how long is the question, but when the day they are finally retired comes – as it inevitably will – it will be difficult to look back at the Dakota's career with anything less than a healthy degree of admiration and indeed wonder at this incredible aeroplane's achievements.

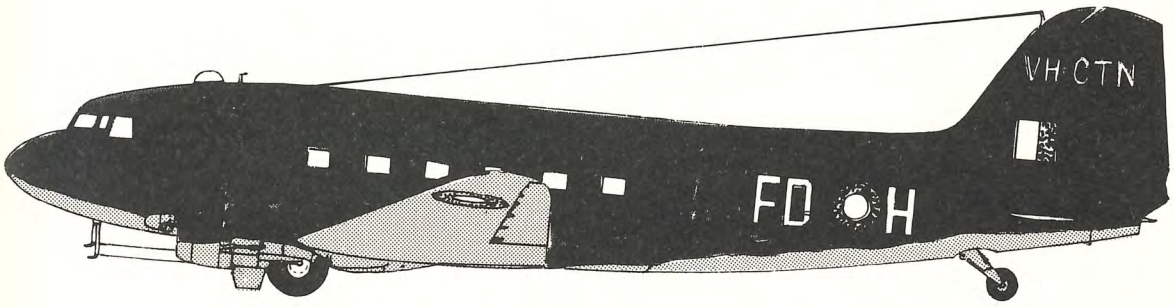


An unusual but highly commendable bit of private restoration. This is the nose section of Dakota A65-111 which was badly damaged by fire at Laverton in late 1971. In 1976, Mr David Anderson of Watsonia, Victoria, purchased A65-111's damaged cockpit section and set about restoring it. The job took 13 years, and now permanently mounted on a trailer, it is taken to airshows where visitors can inspect a Dakota nose and cockpit section, complete with instruments and controls. Perhaps not surprisingly, the number plate of the towing vehicle is "DAKOTA"! (David Anderson)

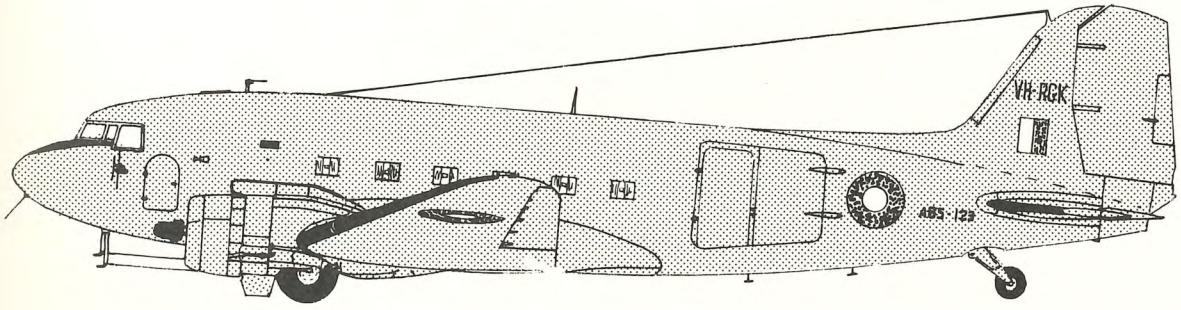
Dakota A65-48/RE.W (VH-CID) of No 36 Sqn, RAAF, 1945
Olive drab upper surface with neutral grey undersurface. Portions of the upper surface have been repainted. Codes and callsign are white. Serial is pale grey (shown in black for clarity).



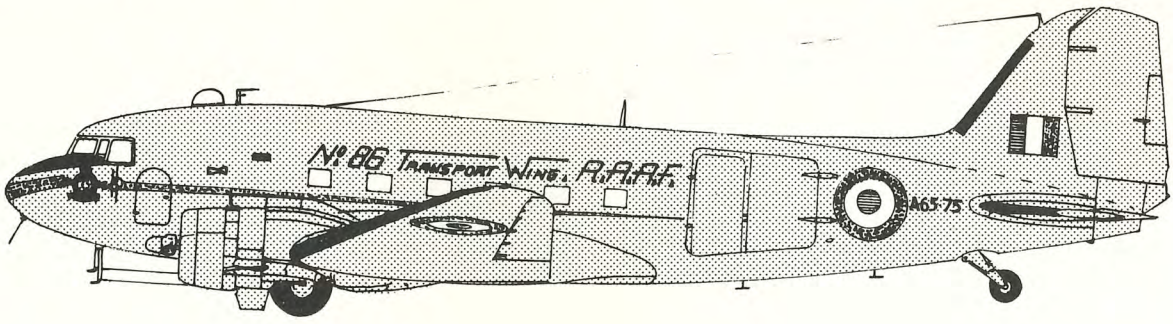
Dakota A65-12/FD.H (VH-CTN) of No 34 Sqn, RAAF, 1945
Olive drab upper surface and neutral grey undersurface. Code is white, Callsign is light grey. Serial is black.



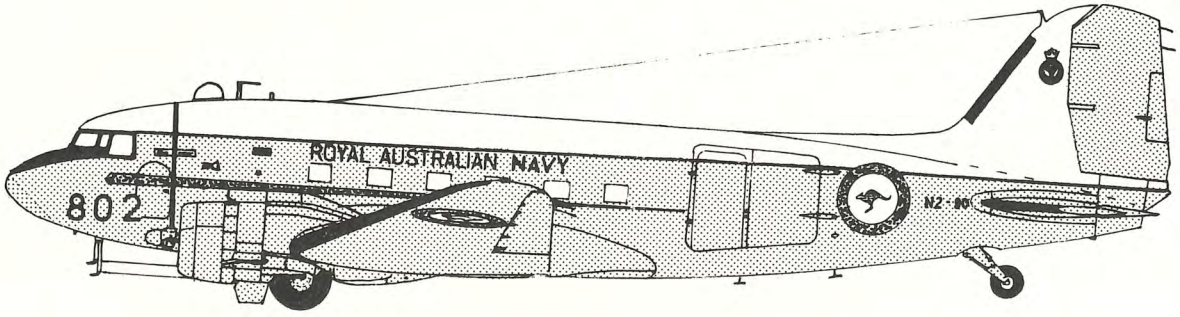
Dakota A65-123 (VH-RGK), RAAF, late 1945
Used as VIP transport. Overall polished aluminium. Serial, callsign and anti-glare panel on nose are black.



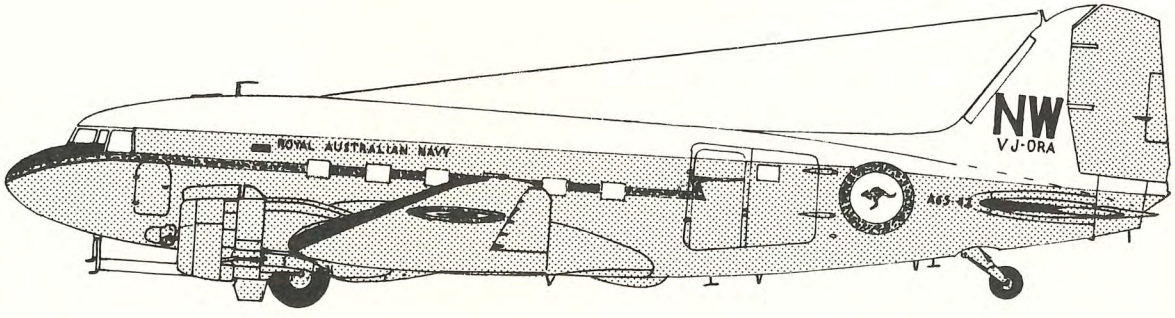
Dakota A65-75 of No 86 Transport Wing, RAAF, Korea, 1950
Overall silver. Lettering above windows in red. Anti-glare panel on nose and serial are black. Flash is insignia blue. Wing badge below cockpit window.



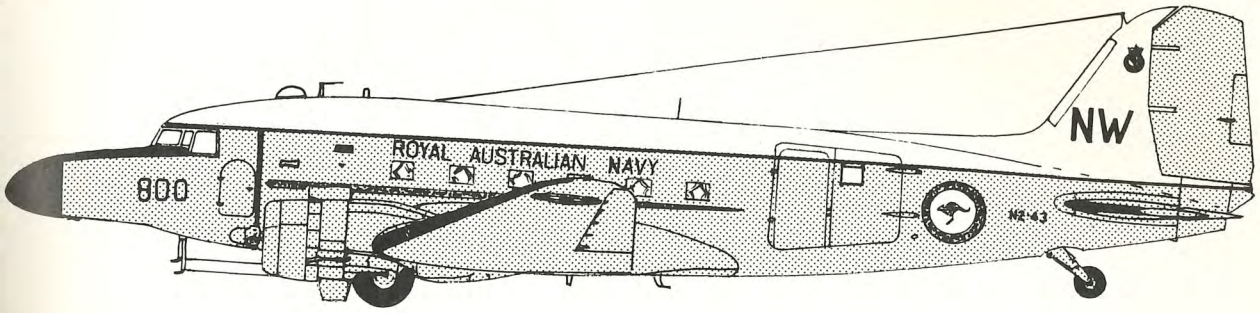
Dakota N2-90 of No 851 Sqn, RAN
Upper fuselage and fin are white. Rest of aircraft is silver with insignia blue cheatline dividing the two sections. Lettering on fuselage sides, anti-glare panel on nose, cockpit frame and serial are black. Propeller warning stripe is red. Squadron badge on fin.



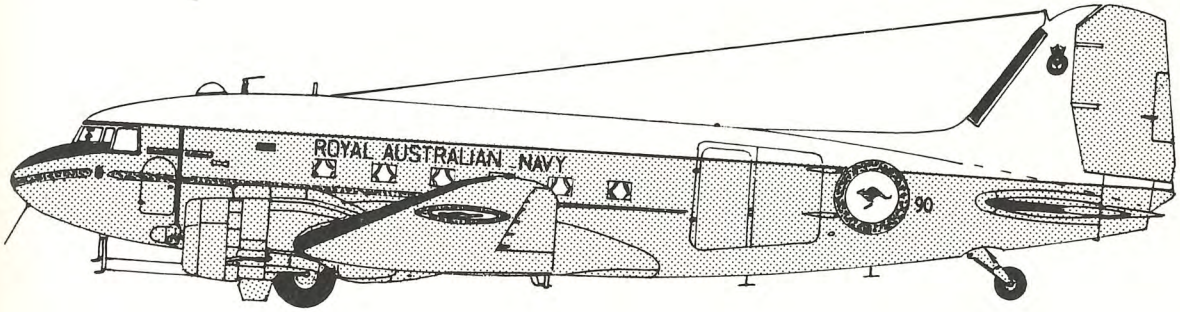
Dakota A65-43 RAN
Standard scheme. Tail codes are black.



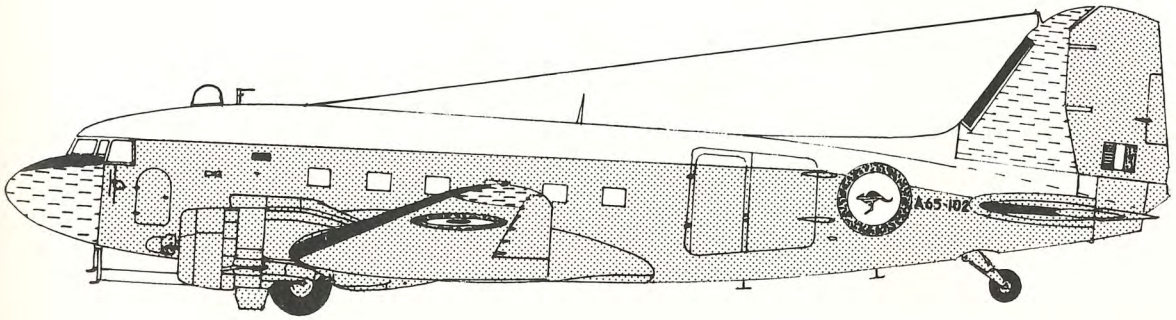
Dakota N2-43 RAN
Modified with a Sea Venom radar unit in the nose. Similar scheme to N2-90. Flash along fuselage side is insignia blue. Astrodome has been overpainted in white. Note the small size of the national insignia.



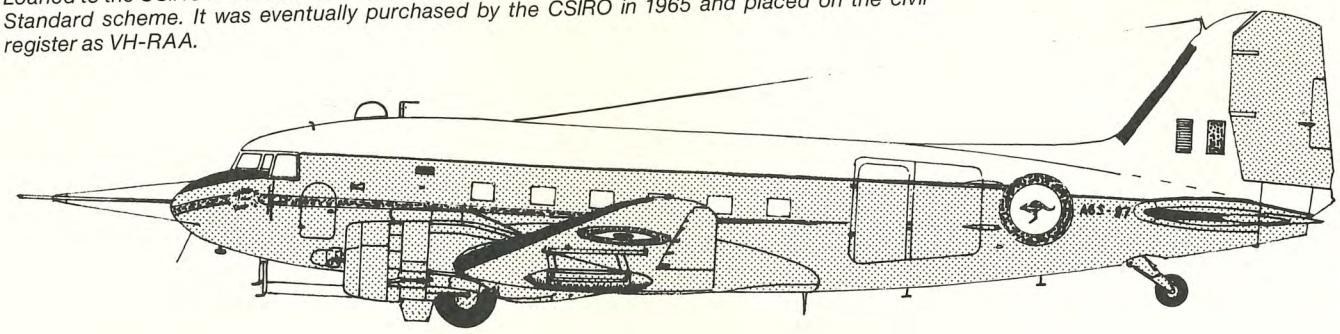
Dakota 90 (N2-90) of No 851 Sqn RAN
Standard scheme. Squadron badge appears on the fin and is repeated below the cockpit window.



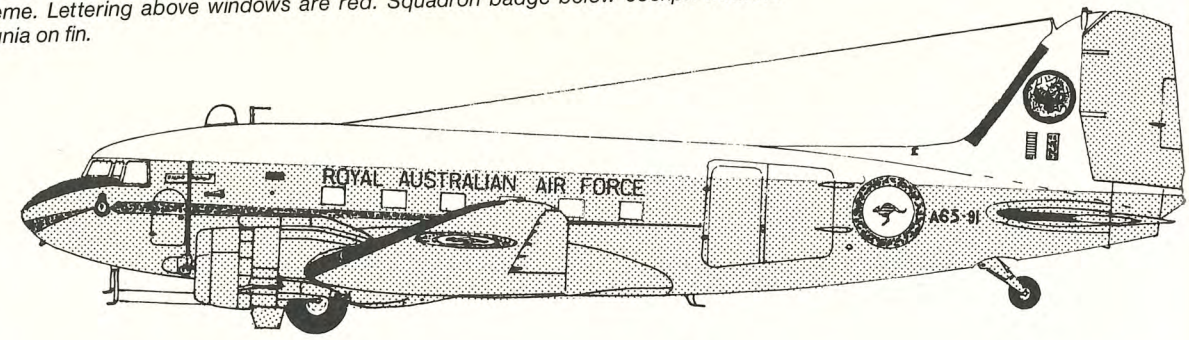
Dakota A65-102 RAAF, unit unknown, late 1950s
Standard scheme, with dayglo nose, fin and wing tips. Early style roundels on wings.



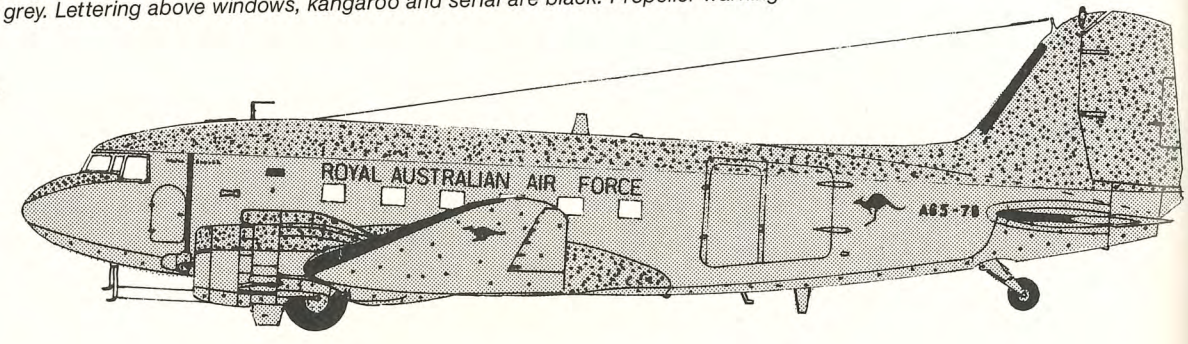
Dakota A65-97, RAAF
Loaned to the CSIRO in the late 1950s for use as a flying laboratory on cloud seeding experiments. Standard scheme. It was eventually purchased by the CSIRO in 1965 and placed on the civil register as VH-RAA.



Dakota A65-91 of the Central Flying School, RAAF, 1978
Standard scheme. Lettering above windows are red. Squadron badge below cockpit window. Squadron insignia on fin.



Dakota A65-78 of ARDU
Used to test new maritime colour scheme, late 1980s. Upper fuselage, fin, anti-glare panel on nose, wing and tailplane upper surfaces are dark grey. Fuselage sides are medium grey. Undersurface is light grey. Lettering above windows, kangaroo and serial are black. Propeller warning stripe is red.




Olive Drab


Insignia Blue


Silver




Grey


Dayglo


Insignia Red

Two pleasing portraits of RAAF Dakotas, A65-63 (top) wearing the emblem of the Central Flying School, East Sale on its fin and ARDU's A65-78 with experimental 'low visibility' markings. A65-78 still flies with ARDU. (RAAF)







A65-71/VH-CIN is owned by the Australian War Memorial and in its original World War II markings is a favourite at airshows.



RAAF DC-2s AND DAKOTAS

Abbreviations: n/a – not available/applicable; soc – struck off charge; wfu – withdrawn from use; cvtd – converted; cvsn – conversion; compnts – components; ff – first flight; u/c – undercarriage; t/o – takeoff; w/o – written off; deliv – delivery; regist – registration; ANA – Australian National Airways; DCA – Department of Civil Aviation; CSIRO – Commonwealth Scientific Investigation Research Organisation; TAA – Trans-Australia Airlines; RAN – Royal Australian Navy; RAE – Royal Australian Engineers; Callsn – callsign; MMA – MacRobertson Miller Aviation; EWA – East West Airlines.

Notes: The first table relates to civil DC-2s and DC-3s taken into RAAF service in the early stages of the war and allocated serials in the A30 range; the second table lists the C-47 Dakotas supplied to the RAAF under Lend-Lease from February 1943 (A65 serials) and the third lists aircraft loaned to the RAAF in 1943/44 – these were not given Australian military serials but used callsigns as noted.

RAAF Dakotas often had several different callsigns during their service lives. Where this is the case, the most common is listed. Also, callsigns were sometimes repeated on different aircraft.

Important: These tables are intended to show the aircrafts' fate immediately at the end of its service with the RAAF. No attempt has been made to document its subsequent history which in many cases involved numerous owners and registration markings.

A30 SERIES DC-2s and DC-3s

RAAF No	Model	Regist	Deliv	Disposal/Remarks
A30-1	DC-3	VH-UZJ	09/39	impressed, returned to ANA 06/40
A30-2	DC-3	VH-UZK	09/39	impressed, returned to ANA 02/40
A30-3	DC-3	VH-ABR	09/39	impressed, returned to ANA 05/40
A30-4	DC-3	VH-ACB	09/39	impressed, returned to ANA 06/40
A30-5	DC-2	NC13737	11/40	ex Eastern A/L, crashed Seven Mile Strip, Pt Moresby NG 09/42
A30-6	DC-2	NC13733	12/40	ex Eastern, to DCA 05/43 as VH-CRJ
A30-7	DC-2	NC13740	12/40	ex Eastern, crashed 06/42, cvtd to compnts
A30-8	DC-2	NC13781	01/41	ex Eastern, shot down Sourabaya-Koepang flight 01/42
A30-9	DC-2	NC13782	02/41	ex Eastern, soc 07/46, extant restored at Essendon Vic
A30-10	DC-2	NC14969	03/41	ex Eastern, crashed 11/42 remains to RAF training centre Wagga NSW
A30-11	DC-2	NC13736	03/41	ex Eastern, soc 10/46, preserved Albury NSW as 'PH-AJU/Uiver'
A30-12	DC-2	NC13731	03/41	ex Eastern, soc 10/46, to Marshall A/W
A30-13	DC-2	NC14970	04/41	ex Eastern, landing accident 01/43, cvtd to compnts
A30-14	DC-2	NC13738	05/41	ex Eastern, soc 01/47, to Marshall A/W

A65 SERIES DAKOTAS

RAAF No	Callsn	Model	USAAF No	Deliv	Disposal/Remarks
A65-1	VH-CTA	C-47	41-38713	02/43	to ANA 10/46 as VH-ANY
A65-2	VH-CTB	C-47	41-38690	02/43	crashed on t/o Archerfield Qld 03/43
A65-3	VH-CTC	C-47	42-32786	03/43	crashed off Turtle Head Qld 12/43
A65-4	VH-CTD	C-47	42-32881	03/43	to ANA 08/46 for spares
A65-5	VH-CTE	C-47A	42-23423	04/43	to ANA 09/47 as VH-INB
A65-6	VH-CTF	C-47A	42-23425	04/43	ditched in sea 09/45
A65-7	VH-CTG	C-47A	42-23426	04/43	crashed Tarakan 10/45
A65-8	VH-CTH	C-47A	42-23427	04/43	to TAA 09/46 for spares
A65-9	VH-CTI	C-47A	42-23424	05/43	to Qantas 12/46 as VH-EAM
A65-10	VH-CTK	C-47A	42-23728	06/43	to Guinea Airways 01/47 as VH-AVM
A65-11	VH-CTJ	C-47A	42-23729	06/43	crashed Lae 03/46, cvtd to compnts
A65-12	VH-CTN	C-47A	42-23730	06/43	to ANA 09/46 as VH-AFK
A65-13	VH-CTL	C-47A	42-23731	06/43	to MMA 01/47 for spares
A65-14	VH-CTM	C-47A	42-23732	06/43	to Cambodian AF 11/71 foreign aid
A65-15	VH-CTO	C-47A	42-24135	08/43	crashed Milne Bay PNG 06/44
A65-16	VH-CTP	C-47A	42-24136	08/43	to TAA 12/46 as VH-TAI
A65-17	VH-CTQ	C-47A	42-24137	08/43	to Guinea Airways 11/46 as VH-ANK
A65-18	VH-CTR	C-47A	42-24138	08/43	to Qantas 05/48 as VH-EBE
A65-19	VH-CTS	C-47A	42-24139	08/43	to TAA 09/46 as VH-TAH
A65-20	VH-CTU	C-47A	42-92194	12/43	to TAA 08/46 as VH-TAF
A65-21	VH-CTC	C-47A	42-92196	12/43	to EWA 08/58 as VH-EWB
A65-22	VH-CTV	C-47A	42-92197	12/43	to Qantas 04/48 as VH-EAQ
A65-23	VH-CTB	C-47A	42-92199	12/43	to RAN 04/50 later as N2-23, soc 09/75
A65-24	VH-CTW	C-47A	42-92200	12/43	wfu 02/49, fuselage for training
A65-25	VH-CTX	C-47A	42-92255	01/44	to Qantas 04/48 as VH-EAR
A65-26	VH-CTJ	C-47A	42-92257	02/44	to Philippine AF 02/73
A65-27	VH-CTY	C-47A	42-92269	01/44	crashed Pt Moresby 07/45, cvtd to compnts
A65-28	VH-CUA	C-47A	42-92264	01/44	to ANA 08/47 as VH-INC
A65-29	VH-CTZ	C-47A	42-92274	01/44	to TAA 08/46 as VH-TAE
A65-30	VH-CUB	C-47A	42-92292	01/44	to Cambodian AF 11/71, foreign aid
A65-31	VH-CUC	C-47A	42-92480	02/44	to DCA 10/48 as VH-ABC
A65-32	VH-CUD	C-47A	42-92547	02/44	to Queensland Airways 08/47 as VH-BBV
A65-33	VH-CUE	C-47A	42-92546	02/44	crashed Ward's Strip Pt Moresby 05/44
A65-34	VH-CUF	C-47A	42-92448	02/44	crashed off Tadji 02/45
A65-35	VH-CUI	C-47A	42-92450	02/44	to ANA 09/47 as VH-INI
A65-36	VH-CUJ	C-47A	42-108840	02/44	to Qantas 06/48 as VH-EBF
A65-37	VH-CUG	C-47A	42-92537	02/44	crashed Nasizab PNG 06/44
A65-38	VH-CUH	C-47A	42-92447	02/44	crashed on landing 12/45
A65-39	VH-CIG	C-47A	42-92548	02/44	crashed and burned Tadji PNG 05/45
A65-40	VH-CUM	C-47A	42-92708	03/44	to TAA 09/58 as VH-TAW
A65-41	VH-CUK	C-47A	42-92709	03/44	to MMA 04/49 as VH-MMF
A65-42	VH-CUL	C-47A	42-92710	03/44	to Qantas 08/57 as VH-EBV
A65-43	VH-CUW	C-47A	42-92711	03/44	to RAN 12/49, wfu 08/77, now at RAN Museum Nowra NSW
A65-44	VH-CIA	C-47A	42-93009	03/44	to Qantas 04/48 as VH-EAP
A65-45	VH-CIB	C-47A	42-93008	04/44	to Qantas 12/46 as VH-EAK
A65-46	VH-CIC	C-47A	42-93010	04/44	to DCA 10/48 as VH-JVF
A65-47	VH-CUO	C-47A	42-93011	04/44	to TAA 08/46 as VH-TAG
A65-48	VH-CID	C-47A	42-93198	06/44	to TAA 07/48 as VH-TAT
A65-49	VH-CIE	C-47A	42-93199	05/44	to Qantas 12/46 as VH-EAL
A65-50	VH-CIF	C-47A	42-93197	05/44	crashed near Canberra ACT 08/54
A65-51	VH-CIH	C-47A	42-93200	05/44	to TAA 09/46 as VH-TAJ
A65-52	VH-CII	C-47A	42-108949	05/44	to TAA 09/46 as VH-TAK
A65-53	VH-CTO	C-47A	42-93430	06/44	ground collision with B-24 A72-182 12/45, cvtd to compnts
A65-54	VH-CUP	C-47A	42-93428	06/44	crashed near Rabaul PNG 11/45
A65-55	VH-CUQ	C-47A	42-93429	06/44	to TAA 07/48 as VH-TAU
A65-56	VH-CIJ	C-47A	43-48104	07/44	crashed in sea near Milne Bay PNG 09/45
A65-57	VH-CUR	C-47A	43-48106	08/44	to Qantas 12/46 as VH-EAO
A65-58	VH-CIK	C-47A	43-48105	08/44	to TAA 09/46 as VH-TAL
A65-59	VH-CIL	C-47A	43-48103	08/44	to TAA 09/46 as VH-TAM
A65-60	VH-CUS	C-47B	43-48737	09/44	to Stanair Corp USA 08/68 as N16891
A65-61	VH-CUT	C-47B	43-48738	09/44	crashed near Wissel Lakes PNG 09/45
A65-62	VH-CKD	C-47B	43-48739	09/44	crashed Longreach Qld 06/45
A65-63	VH-CKN	C-47B	43-48740	09/44	wfu 1973, to PNG Defence Force 1981 as P2-005
A65-64	VH-CUU	C-47B	43-49379	12/44	wfu 12/79
A65-65	VH-CUV	C-47B	43-49376	12/44	to PNG Defence Force 1981 as P2-006
A65-66	VH-CUW	C-47B	43-49378	12/44	damaged 12/50 and scrapped

RAAF No	Callsn	Model	USAAF No	Deliv	Disposal/Remarks
A65-67	VH-CUX	C-47B	43-49377	01/45	to PNG Defence Force 08/75 as P2-003
A65-68	VH-CUY	C-47B	43-49869	01/45	to PNG Defence Force 01/76 as P2-004
A65-69	VH-CUZ	C-47B	43-49866	02/45	wfu 1980, preserved Berlin-Gatow airport as RAF ZD215
A65-70	VH-CIM	C-47B	43-49868	02/45	to Stanair Corp USA 08/68 as N16892
A65-71	VH-CIN	C-47B	43-49870	02/45	operated by Australian War Memorial
A65-72	VH-CIO	C-47B	44-76336	02/45	to Adastra Airways 02/59 as VH-AGU
A65-73	VH-CIP	C-47B	44-76339	02/45	damaged Townsville Qld 09/71, soc 10/73
A65-74	VH-CIQ	C-47B	44-76348	02/45	crashed 12/50 and scrapped
A65-75	VH-CIR	C-47B	44-76335	03/45	crashed Daly Waters NT 10/56
A65-76	VH-CIS	C-47B	44-76343	03/45	to Aeroquipment of Aust 04/60 as VH-CDA
A65-77	VH-CIT	C-47B	44-76347	03/45	crashed Mascot NSW 06/45
A65-78	VH-CIU	C-47B	44-76345	03/45	with ARDU mid-1990
A65-79	VH-CIV	C-47B	44-76337	03/45	to Aeroquipment of Aust 03/60 as VH-CDB
A65-80	VH-CIW	C-47B	44-76340	03/45	to Cambodia 11/71 foreign aid
A65-81	VH-CIX	C-47B	44-76341	03/45	damaged in blizzard Mawson Antarctica 12/60 and w/o
A65-82	VH-CIY	C-47B	43-49867	03/45	to Indonesian AF 1970 as P504
A65-83	VH-CIZ	C-47B	44-76543	03/45	missing on flight to Darwin 12/45
A65-84	VH-RFA	C-47B	44-76545	04/45	to PNG Defence Force 08/75 as P2-002
A65-85	VH-RFB	C-47B	44-76546	04/45	to Stanair Corp USA 08/68 as N16130
A65-86	VH-RFC	C-47B	44-76547	04/45	with ARDU 1990
A65-87	VH-RFD	C-47B	44-76544	04/45	damaged 10/59, scrapped 1962
A65-88	VH-RFE	C-47B	44-76548	04/45	to Cambodian AF 11/71 foreign aid
A65-89	VH-RFF	C-47B	44-76549	04/45	crashed East Sale Vic 11/58
A65-90	VH-RFG	C-47B	44-76551	04/45	to RAN 02/68 as N2-90, current with RAN Historic Flight
A65-91	VH-RFH	C-47B	44-76552	05/45	to RAAF Radio School 1979
A65-92	VH-RFI	C-47B	44-76555	04/45	crashed New Guinea 01/61
A65-93	VH-RFK	C-47B	44-76761	05/45	to Aeroquipment of Aust 03/60 as VH-CDC
A65-94	VH-RFK	C-47B	44-76774	05/45	with ARDU 1990
A65-95	VH-RFL	C-47B	44-76764	05/45	with ARDU 1990
A65-96	VH-RFM	C-47B	44-76765	04/45	to Cambodia 11/77, foreign aid
A65-97	VH-RFN	C-47B	44-76767	05/45	to CSIRO 10/65 as VH-RRA
A65-98	VH-RFO	C-47B	44-76770	05/45	wfu 12/79, instructional airframe
A65-99	VH-RFP	C-47B	44-76771	05/45	crashed Garfield Vic 01/58, cvtd to components
A65-100	VH-RFQ	C-47B	44-76777	05/45	to PNG Defence Force 08/75 as P2-001
A65-101	VH-RFR	C-47B	44-76780	05/45	to Stanair Corp 08/68 as N16893
A65-102	VH-RFS	C-47B	44-76781	05/45	wfu 1980, to Paradak 08/81 as VH-PTS
A65-103	VH-RFT	C-47B	44-76962	05/45	wfu 1971, to Philippines AF 05/73
A65-104	VH-RFU	C-47B	44-76963	05/45	damaged beyond repair Darwin NT 12/74 by Cyclone Tracy
A65-105	VH-RFV	C-47B	44-76968	05/45	Dept of Supply 07/69 as VH-UPQ, Woomera Rocket Range duties
A65-106	VH-RFW	C-47B	44-76958	05/45	crashed Pearce WA 07/61
A65-107	VH-RFX	C-47B	44-76970	05/45	destroyed by explosion and fire Wama Strip Morotai 12/45
A65-108	VH-RGZ	C-47B	44-76965	06/45	at RAAF Museum Point Cook Vic
A65-109	VH-RGX	C-47B	44-76969	05/45	to MMA 06/58 as VH-MMD
A65-110	VH-RGY	C-47B	44-76960	06/45	crashed Leyte, Philippines 01/46
A65-111	VH-RFY	C-47B	44-76972	06/45	wfu 10/72, subsequently destroyed by fire
A65-112	VH-RFZ	C-47B	44-76971	06/45	crashed Duntroon ACT 03/57
A65-113	VH-RGA	C-47B	44-77127	06/45	crashed into Botany Bay, Sydney NSW 02/52
A65-114	VH-RGB	C-47B	44-77128	06/45	at RAAF Edinburgh SA 199 (ex ARDU)
A65-115	VH-RGC	C-47B	44-77132	06/45	crashed into sea off Darwin NT 10/46
A65-116	VH-RGD	C-47B	44-77121	06/45	crashed Schofields NSW 05/50
A65-117	VH-RGE	C-47B	44-77124	06/45	to Stanair Corp 08/68 as N16894
A65-118	VH-RGF	C-47B	44-77125	06/45	to Stanair Corp 08/68 as N16895
A65-119	VH-RGG	C-47B	44-77131	06/45	to Stanair Corp 08/68 as N16896
A65-120	VH-RGH	C-47B	44-77129	07/45	crashed off Japan 06/54
A65-121	VH-RGI	C-47B	44-77120	07/45	to Indonesian AF 08/73
A65-122	VH-RGJ	C-47B	44-77123	07/45	to PNG Defence Force 12/80 for ground instruction
A65-123	VH-RGK	C-47B	45-958	07/45	to RAN 02/68 as N2-123, wfu 10/73
A65-124	VH-RGL	C-47B	45-957	08/45	to Air Force Association Museum, Bulls Creek WA 1980

DAKOTAS LOANED TO RAAF BY USAAF

Callsgn	Model	Deliv	Remarks
VH-CCB	C-53	05/43	ex USAAF 41-20053, wfu 05/44 then to Guinea Airways
VH-CCC	C-53	05/43	ex USAAF 41-20053, wfu 04/44 then to Qantas
VH-CDB	C-49	06/43	ex USAAF 41-7687, wfu 04/44 then to ANA
VH-CDC	C-49	06/43	ex USAAF 41-7690, wfu 04/44 then to ANA
VH-CDD	C-49	06/43	ex USAAF 41-7691, wfu 04/44 then to ANA
VH-CDE	C-49	07/43	ex USAAF 41-7693, wfu 04/44 then to ANA
VH-CDG	C-49	01/44	ex USAAF 41-7686, wfu 04/44 then to ANA
VH-CDJ	C-50	06/43	ex USAAF 41-7698, wfu 04/44 then to Guinea Airways
VH-CDK	C-50	05/43	ex USAAF 41-7697, wfu 04/44 then to Guinea Airways
VH-CKA	C-47A	01/44	returned 09/44
VH-CKB	C-47A	01/44	returned 09/44
VH-CKC	C-47A	04/44	returned 10/44
VH-CKD	C-47A	04/44	returned 09/44
VH-CKE	C-47A	04/44	returned 10/44
VH-CKF	C-47A	04/44	returned 10/44
VH-CKG	C-47A	04/44	returned 09/44
VH-CKH	C-47A	04/44	returned 10/44
VH-CKI	C-47A	04/44	returned 10/44
VH-CKJ	C-47A	04/44	returned 09/44
VH-CKK	C-47A	04/44	returned 10/44
VH-CKL	C-47A	04/44	returned 10/44
VH-CKM	C-47A	04/44	returned 10/44
VH-CWA	C-53	06/43	ex USAAF 41-20070, wfu 04/44 then to Qantas
VH-CXL	C-49	08/43	ex KLM PH-ALW, wfu 04/44 then to ANA

Note: the above table is not necessarily complete.

LOCKHEED
C-130 HERCULES



All three of the Hercules variants used by the RAAF over the years: C-130A (bottom), C-130E (middle) and C-130H (top). (RAAF)





Dakota A65-114 (top) of ARDU and A65-70 (bottom) provide a splash of colour with their Dayglo paint. The latter was photographed at Richmond NSW in 1964. (RAAF/Eric Allen)





Two of ARDU's Dakotas (top) over their base at Edinburgh, South Australia in 1984. On that occasion five of the unit's aircraft were launched. Another special occasion was the 50th anniversary of the DC-3's first flight in December 1935. To celebrate, a DC-3 'rally' was held in Australia and one of the participants was A65-114 (bottom) seen here taxying at Sydney Airport. (ARDU/Eric Allen)



Dakota A65-68 (top) at East Sale, Victoria, in 1961. This aircraft later went to the PNGDF, while the Australian National Antarctic Research Expedition's A65-81 (bottom) was destroyed by a blizzard at Mawson Sound in early 1961. (Eric Allen/David Wilson)







Four RAAF Dakotas were transferred to the Royal Australian Navy, among them A65-123/N2-123 (top) and A65-43/N2-43 (bottom). The latter was fitted with a Sea Venom radar in its nose for training purposes, considerably altering its lines.

LOCKHEED HERCULES

Lockheed could not have picked a better name when it christened its new four engined turboprop transport aeroplane nearly three decades ago. Hercules, the legendary hero of Greek mythology of prodigious strength counted among his achievements 12 tasks of immense labour. His aeronautical namesake has exceeded that tally by a handsome margin. Indeed, the Lockheed C-130 Hercules has become the transport workhorse of the western world's air forces, performing a multitude of tasks by way of a bewildering array of major variants and sub-variants.

By mid 1990 more than 1,900 'Herky Birds' and 'Fat Alberts' have emerged from Lockheed's plant at Marietta, Georgia, outlasting the production lives of later designs such as the C-141 Starlifter and giant C-5 Galaxy jets and serving the armed forces of over 50 nations. Although primarily a military aircraft, civil versions of the Hercules have also been developed and sold, accounting for about six per cent of the production tally. Originally built during World War II, the Marietta factory had previously been operated by Bell and had seen production of 667 Boeing B-29 Superfortresses by that company and was in the process of manufacturing 386 Boeing B-47E Stratojets by Lockheed when the Hercules project began.

Of the nations which have operated the Hercules, Australia has been a regular customer over the years with three batches of 12 aircraft being delivered, the first in 1958. The initial RAAF order for a dozen C-130A Hercules was in fact the first export contract placed for the aircraft and was followed by a similar number of C-130Es (delivered 1966) and C-130Hs (1978), the latter variant replacing the 'A' models in one of the two RAAF squadrons which operate the type.

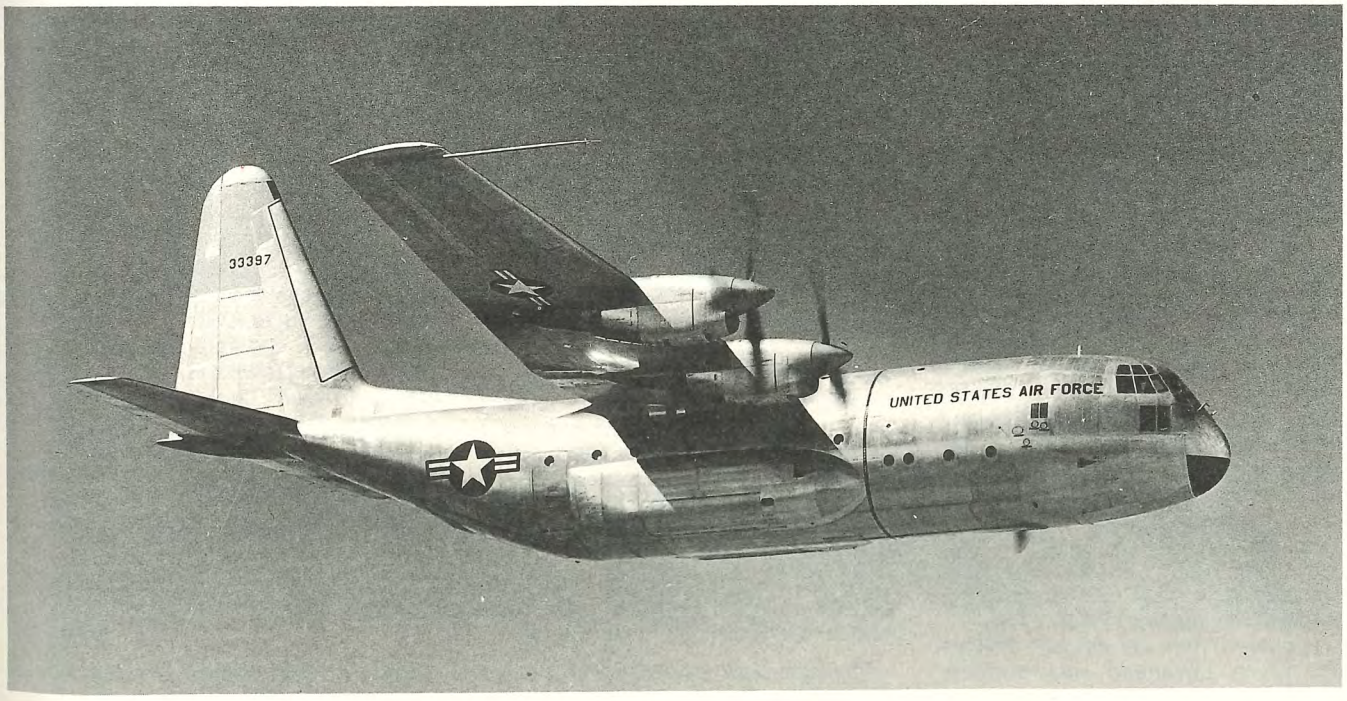
Developing A Workhorse

By the early 1950s and with the experience of the Korean war in full flight, it had become clear that the United States Air Force's transport force had become dated and needed upgrading. At that stage it consisted entirely of piston engined aircraft such as the Douglas C-47 and Curtiss C-46 Commando for what may be termed 'battlefield support' roles and the Fairchild C-119 Flying Boxcar, Douglas C-54 Skymaster (DC-4), Douglas C-118 (DC-6), Boeing C-97 Stratofreighter and Douglas C-124 Globemaster for other tactical and strategic transport tasks.

In 1950 the decision was made to develop a new series of military transports using turboprop engines, this decision resulting in three General Operational Requirements (GORs) being issued to aircraft manufacturers in 1951 and 1952. The first – which ultimately led to the Hercules – was for a medium sized tactical transport to support the army in the field, its general requirements including the ability to operate from short, unprepared strips, to drop supplies or troops after low level flights and to be able to double as a logistic transport operating at high speed, high altitude and over longer ranges.

The GOR specifically mentioned four typical missions, the first requiring the aircraft to carry a 25,000lb (11,350kg) payload 1,100nm (2,040km) to forces holding a bridgehead in enemy territory and return without refuelling, the second – resupply – called for a 37,800lb (17,145kg) payload to be carried over a radius of 950nm (1,760km) and return without refuelling or a 25,800lb (11,700kg) payload over 1,300nm (2,410km) and return.

The third specified mission was as a straight cargo transport and assuming there would be refuelling available at the point of arrival, the aircraft should be capable of carrying a 37,800lb (17,145kg) over a distance of 1,700nm (3,150km). The GOR's fourth requirement was as a troop carrier, in which case 92 equipped ground troops or 64 paratroops needed to be carried. For the record, the other two GORs ultimately resulted in the



The prototype YC-130A Hercules, flown for the first time on 23 August 1954 and displaying the abbreviated 'Roman' nose which distinguished the first 20 or so aircraft.



A production C-130B displays the Hercules' definitive nose profile first seen on the C-130A and the result of fitting AN/APN-59 radar.

Douglas C-133 Cargomaster very large turboprop transport and the Boeing KC-135 tanker/transport jet.

The GOR for which the Hercules was developed was issued on 2 February 1951 and the leading contenders to win it were Fairchild with a four engined development of the C-119, Douglas, Boeing and of course Lockheed. Lockheed had submitted several proposals, and one of them – Project 206, Model No 82 – was selected for further development in June 1951 and the contract for the construction of two prototypes signed the following month.

Under Lockheed's advanced design department chief, Willis Hawkins, the design of what would become the Hercules emerged as the definitive form for freight aircraft and many military transports since – high wing, rear loading ramp, large vertical tail surfaces and undercarriage housed in blisters in the lower sides of the portly fuselage. The latter feature allowed the fuselage to sit close to the ground for easy loading from trucks and, to facilitate operation from rough fields, each main undercarriage consisted of two large wheels in tandem fitted with low pressure tyres.

Compared with the elegant designs with which Lockheed was normally associated, the Hercules was unquestionably less than beautiful, but here was a case where practicality was more important than aesthetics.

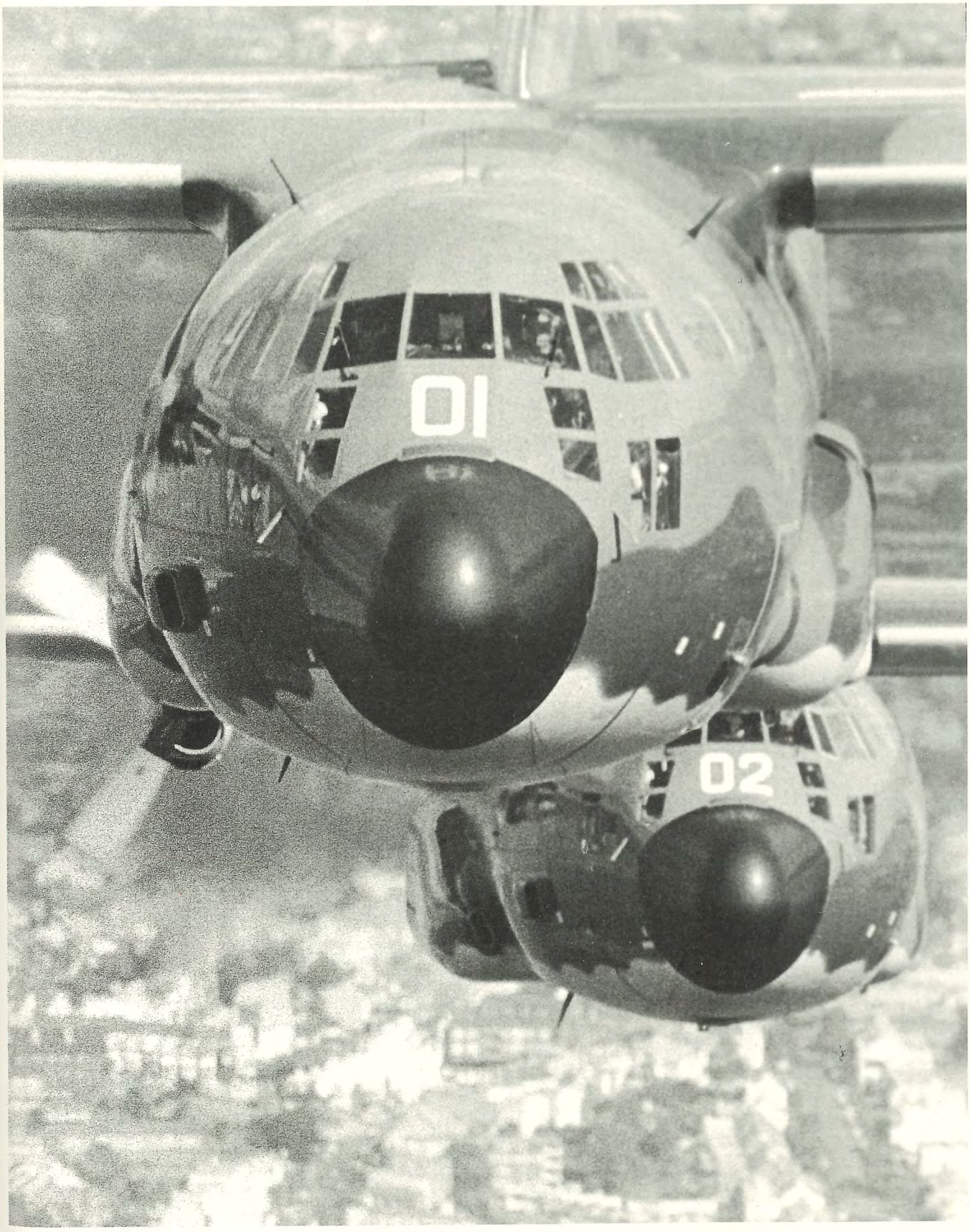
In its way and for its day, the Hercules had several radical features, not the least of which was its overall configuration. Its all metal structure made extensive use of integral machining of aluminium stock to produce upper and lower wing skins and cargo floors; metal to metal bonding was extensively used as was a then new high strength aluminium alloy, while titanium was employed for the wing flap skins and engine nacelles.

Also unusual in military transports of the time was the fact that the entire fuselage was pressurised (to 7.5psi) and although this feature would normally have dictated a cylindrical fuselage shape, Lockheed opted for a flatter cross section in order to achieve the maximum cubic capacity and floor width. The result was a passenger/freight compartment (excluding the area aft of the base of the loading ramp) 41ft 5in (12.6m) long, 10ft 3in (3.12m) wide at the floor, 9ft 2.75in (2.81m) high and with a floor area of 425sq ft (39.5m^2). The total volume of the cabin was 4,300cu ft (121.7m^3) including the area above the ramp. This was sufficient to accommodate 92 equipped troops, 64 paratroops or 70 casualty litters with six attendants.

The flight crew consisted of four – two pilots, flight engineer and systems manager, all of them housed in a spacious cockpit which offered superb visibility thanks to the incorporation of no fewer than 23 transparencies at, above and below eye level.

The heart of the Hercules was its four Allison T56 turboprop engines, each producing 3,750eshp in the form fitted to early aircraft. Under its civil designation (Model 501) the same engine later powered the Lockheed Electra airliner, while as the T56 it has remained the Hercules' powerplant to this day as well as that of the Orion maritime reconnaissance aircraft, itself a derivative of the Electra.

The T56's power section rotates at a constant 13,820rpm; this is connected to a large two stage reduction gearbox which reduces the propellers' rpm to more appropriate levels. The propellers rotate at a constant speed, power changes being achieved by the pitch of the propeller blades automatically adjusting to throttle input. This system caused some problems in the Hercules' early days due to deficiencies in both the reduction gearing and the Curtiss-Wright three bladed electric propellers which were fitted to the prototypes. At one stage, after production was underway, Lockheed had numerous airframes ready for delivery but for a lack of propellers. Instead, more reliable Aero Products three bladers of 15ft (4.57m) diameter were fitted or retrofitted to production C-130As while 'B' and all subsequent models have been fitted with Hamilton Standard four blade pro-



One of the Hercules' nicknames is 'Fat Albert'. This shot shows why!

pellers of 13ft 6in (4.11m) diameter. All three types of propeller were of course fully feathering and reversible.

The Hercules' main systems comprised two independent high pressure hydraulic systems operating at 3,000psi and controlling the primary flight controls, undercarriage, loading ramp and doors and brakes and four AC generators which looked after the elevator trim tabs and general electrical requirements. A fifth auxiliary generator was driven by the AiResearch gas turbine auxiliary power unit which was used for engine starting, engine pre-heat and ground air conditioning. Fuel capacity of 'A' model Hercules was 4,370imp gal (19,870 l) housed in integral tanks in the wing torsion box. This could be supplemented by a pair of 375imp gal (1,705 l) underwing tanks mounted on pylons outboard of the engines.

Into the Air and Production

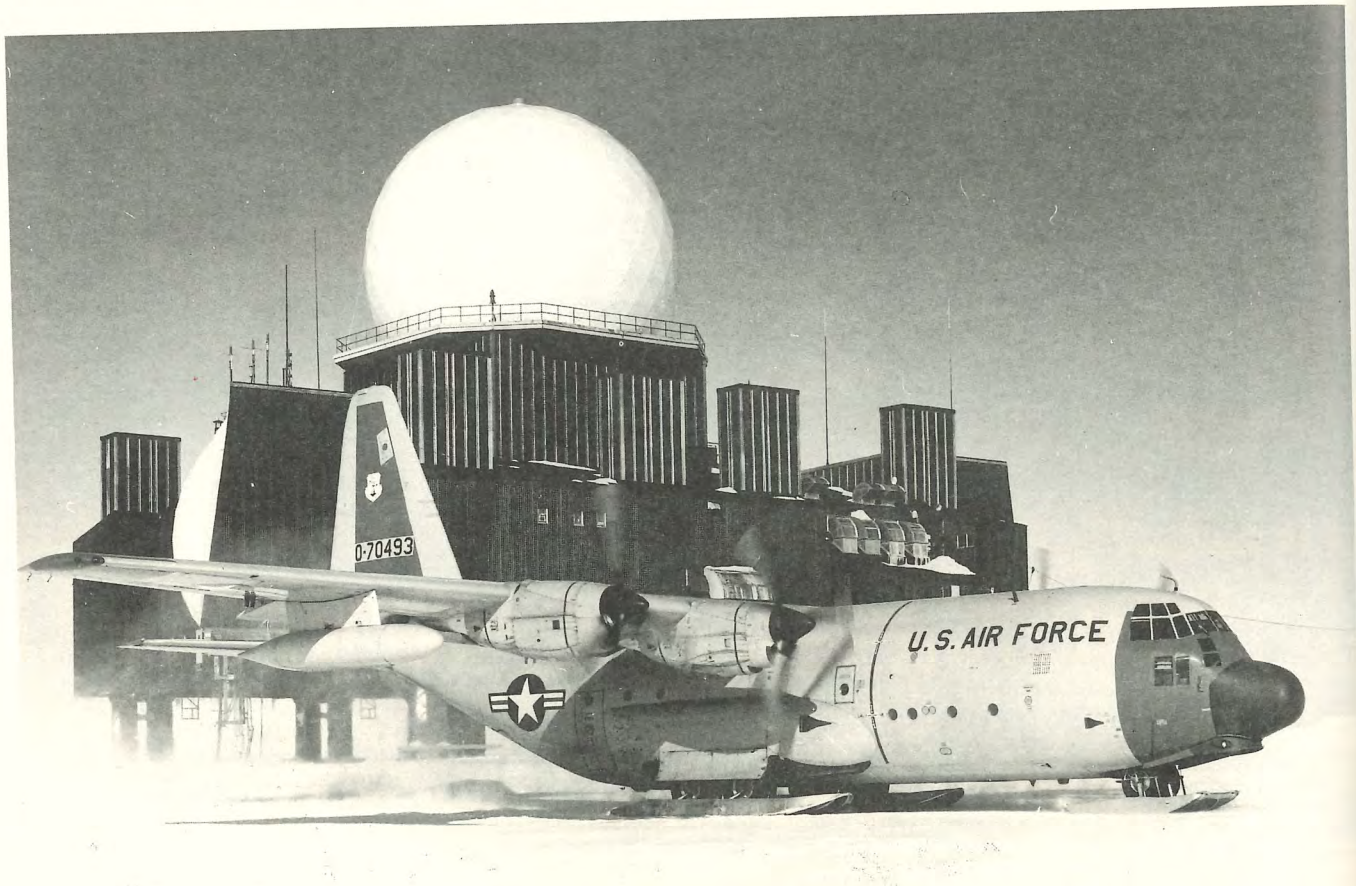
Although series production of the Hercules would be undertaken at Lockheed's Marietta, Georgia plant, design work and construction of the two prototypes (designated YC-130A) was performed at the company's Burbank, California headquarters. While detail design continued and the manufacturing process set up to cope with the expected large orders from the USAF, a full scale wooden mock up with functioning features for engineering evaluation was built in 1952. Weighing 100,000lb (45,360kg), this mock up was only 8,000lb (3,629kg) lighter than the maximum all up weight of the production C-130A as it was initially presented! Later, the A's MTOW was increased to 124,200lb (56,335kg) for operation from hard runways or 116,000lb (52,616kg) from soft fields.

The prototype YC-130A Hercules (USAF serial 53-3387) recorded its first flight (from Burbank) on 23 August 1954 in the hands of Stanley Beltz (pilot), Roy Wimmer (co-pilot) with Jack Real and R E Stanton acting as flight test engineers. The flight was uneventful and began with a sprightly 855ft (260m) takeoff run followed by a 30 degree initial climb and checks of the undercarriage, control surfaces, flaps and stalling characteristics at a height of 10,000 feet. The 61 minute flight ended as planned at Edwards Air Force Base in the Mojave Desert near Los Angeles, from where further testing was carried out. For its earliest flights, the prototype was fitted with development standard 3,250eshp YT-56 engines.

The first production C-130A was rolled out of the Marietta plant in March 1955, whereupon it was suitably christened by the Georgia State Governor with a bottle of water from a local river at the fourth attempt. He was moved to remark on the toughness of the aeroplane as a result! This aircraft recorded its maiden flight on 7 April 1955.

Before the Hercules entered service with Tactical Air Command's 463rd Troop Carrier Wing at Ardmore, California in December 1956, testing revealed the necessity for some changes. The major one was of course the propeller/reduction gearbox problem mentioned above which took considerable time and effort to solve and for a brief period looked as if it might threaten the whole programme. Some structural redesign of the fin, rudder and rear fuselage became necessary after a load survey indicated they might not be strong enough to withstand the most critical engine out control situation, while the Hercules' profile changed considerably with the fitting of new radar in the nose.

The prototypes and very early production C-130As featured the distinctive flat 'Roman' nose with APS-42 radar housed in its lower section. Introduction of the much larger AN/APN-59 radar from the 20th or so production aircraft necessitated the fitting of the now familiar extended nose radome.



An early specialist version of the Hercules was the C-130D, twelve examples of which were converted from C-130As to operate from skis in the Arctic Circle in support of the vital DEW-line (Distant Early Warning) radar stations on the Greenland ice cap. (Lockheed)



Dramatic wet night-time shot of C-130A Hercules A97-212 (top) contrasts with more placid study of A97-207. Both shots were taken at Richmond in 1963. (Neil Cook/R Maxey-Fisher)





C-130A Hercules of the RAAF's No 36 Squadron: A97-212 at an airshow at Williamtown in April 1976 (top) and A97-208 executing a short field departure at Fairbairn ACT a year earlier. (Eric Allen)





All the gauges are in the right place as a C-130A descends at just over 1,000 feet per minute (top). C-130A A97-206 (bottom) taxies past one of its Lockheed stablemates at Fairbairn in 1975. (Neil Cook/Eric Allen)





Photographed 12 years apart are C-130As A97-212 (top) at Richmond in 1961 and A97-205 (bottom) at Williamtown NSW in 1973. '205' remains in RAAF hands, lying stripped and derelict at Laverton. (Eric Allen)



Combat Hercules. The AC-130 gunship variants were developed for use in Vietnam, a total of 24 being converted from C-130As and Es. In their definitive form the AC-130s carried two 40mm and two 20mm cannon and a digital computer fire control system. The result was devastating and accurate firepower against personnel and equipment on the ground.

Finally, mention should be made of the Hercules' remarkable performance for its time, even in its earliest versions. As the detail design progressed and the estimates began to firm, it became obvious that the performance required by the GOR was going to be easily exceeded on all counts. Airfield performance was exceptional, the C-130A requiring only 3,720ft (1,335m) to reach 50 feet from a standing start on takeoff at maximum weight while the maximum cruising speed of more than 300 knots (555km/h) was better than the vast majority of airliners in service at the time.

Marks and Models

Despite the large number of Hercules sub-variants which have been developed over the years including the RC-130 photo survey aircraft, HC-130 search and rescue, KC-130 tanker, LC-130 skiplane, AC-130 gunship, EC-130 electronic countermeasures, WC-130 weather reconnaissance and DC-130 drone launching variants, just four major versions form the basis of the military variants of the Lockheed Models 182, 282 and 382, the C-130A, B, E and H.

The initial production version, the C-130A, has already been described except for variations in powerplant which were fitted. All were powered initially by the 3,750eshp T56-A-1 or -1A versions of Allison's turboprop but were later fitted with T56-A-9s which offered similar power but different gearbox reduction ratios. In its early design stages the Hercules had provision for the installation of eight 1,000lb thrust Aerojet assisted takeoff rockets, four of which could be fitted on each side of the fuselage behind the undercarriage blisters. These rockets were jettisonable after takeoff.

C-130A production amounted to 231 aircraft between 1956 and early 1959, all but 12 of which were delivered to the USAF. The remainder went to the Hercules' first export customer, the RAAF.

The C-130B followed, the first of 209 examples flying in November 1958 and deliveries beginning the following June. Of the C-130B production tally, the USAF received 140, the US Coast Guard 12, the US Navy 11, the US Marine Corps 46 and the armed forces of Canada, Indonesia and South Africa four, seven and ten, respectively. C-130Bs were also delivered to Iran and Pakistan from US stocks while other nations acquired second hand examples later on.

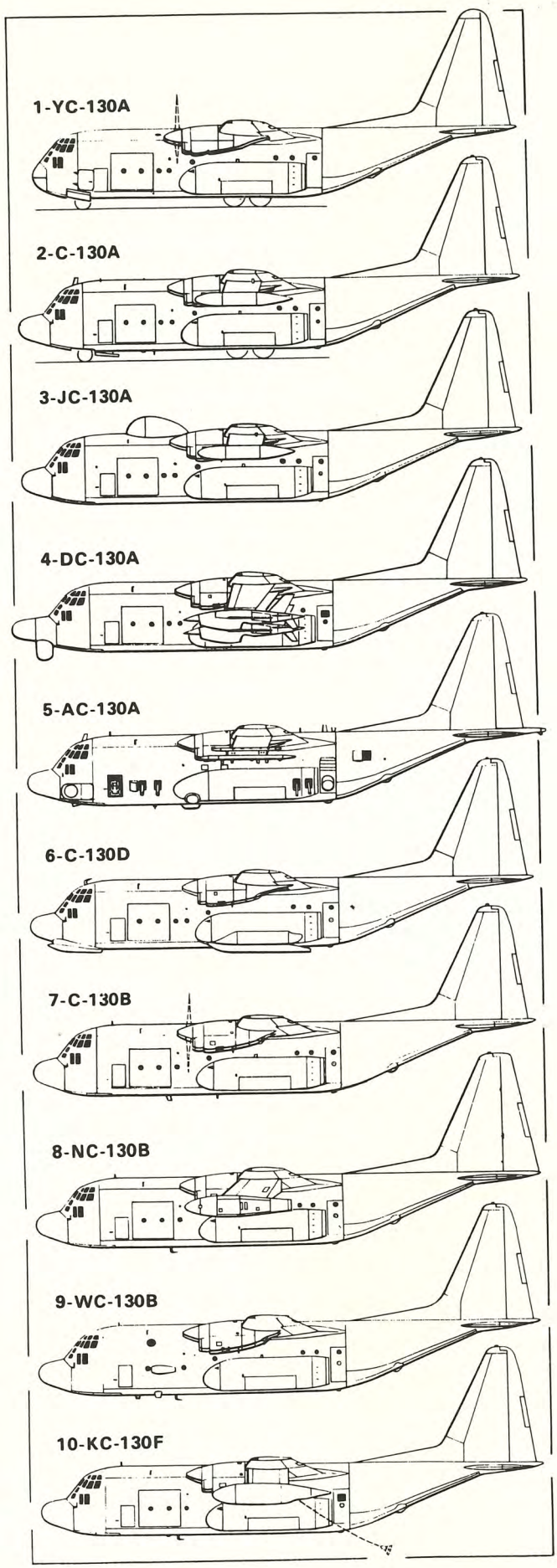
The C-130B offered several improvements over the original model including more powerful 4,050shp T56-A-7 engines driving four bladed Hamilton Standard propellers and increased internal fuel capacity of 5,795imp gal (26,346 l), achieved by installing bladder tanks in the wing centre section. As a result of this, the C-130B did not use underwing external tanks. The C-130B's maximum takeoff weight was increased to 135,000lb (61,236kg) and although a substantial increase in empty weight meant its maximum payload of 35,700lb (16,193kg) was actually marginally less than its predecessor, it was capable of carrying that load over a greater distance. The 'B' also featured a stronger undercarriage to cope with the higher operating weights.

The next major variant was the C-130E, the first example of which flew in August 1961 followed by a further 487 from April 1962 including 86 for export to half a dozen countries. Twelve examples entered RAAF service in 1966. Although using the same powerplants as its predecessor, the 'E' could be operated at much higher weights, allowing a greater payload and/or payload range capability for longer range strategic missions without sacrificing its tactical abilities at lower weights. Even at its much higher maximum takeoff weight (as noted below), the C-130E still only required a modest takeoff to 50 feet distance of 5,600ft (1,707m).

The standard maximum takeoff weight of the C-130E was 155,000lb (70,308kg), a 15 per cent increase over the C-130B. Maximum payload went up by 30 per cent to 45,000lb, while under certain conditions an overload maximum weight of 175,000lb (79,380kg) was permitted. Internal fuel capacity remained as before, but the addition of a 1,132imp gal (5,146 l) pylon mounted tank under each wing (mounted between the engines this time) brought the total fuel load up to 8,059imp gal (36,636 l). The payload



Rocket assisted takeoff (RATO) was provided for early in the Hercules' career, a battery of eight 1,000lb thrust Aerojet units being fitted behind the wheel housings. They were jettisonable after takeoff and although not widely used, did find some application. This is an Israeli Hercules getting the 'big shove'. (IDF)



LOCKHEED C-130A HERCULES

Powerplants: *Four Allison T56-A-1A or -9 turboprops rated at 3,750eshp; three bladed Aeroproducts constant speed, feathering and reversing propellers of 15ft 0in (4.57m) diameter; internal fuel capacity 4,370imp gal (19,870 l), two optional underwing tanks each of 375imp gal (1,705 l), total fuel 5,120imp gal (23,280 l).*

Dimensions: *Wing span 132ft 7in (40.41m), length 97ft 9in (29.79m), height 38ft 3in (11.66m), wheel track 14ft 3in (4.35m), wheelbase 32ft 0.75in (9.77m), wing area 1,745sq ft (162.1m²).*

Weights: *Empty equipped 63,000lb (28,577kg), max payload 36,600lb (16,601kg), max takeoff 124,200lb (56,337kg).*

Performance: *Max cruising speed 370mph (595km/h), range cruise 335mph (539km/h); initial climb (at 100,000lb) 2,400ft (731m)/min; service ceiling 34,000ft (10,363m); takeoff over 50ft obstacle 3,720ft (1,134m); range with max payload 1,830mls (2,945km), range (max internal fuel, 27,000lb payload) 2,760mls (4,441km), range with external tanks and 20,500lb payload 3,350mls (5,391km).*

LOCKHEED C-130E HERCULES

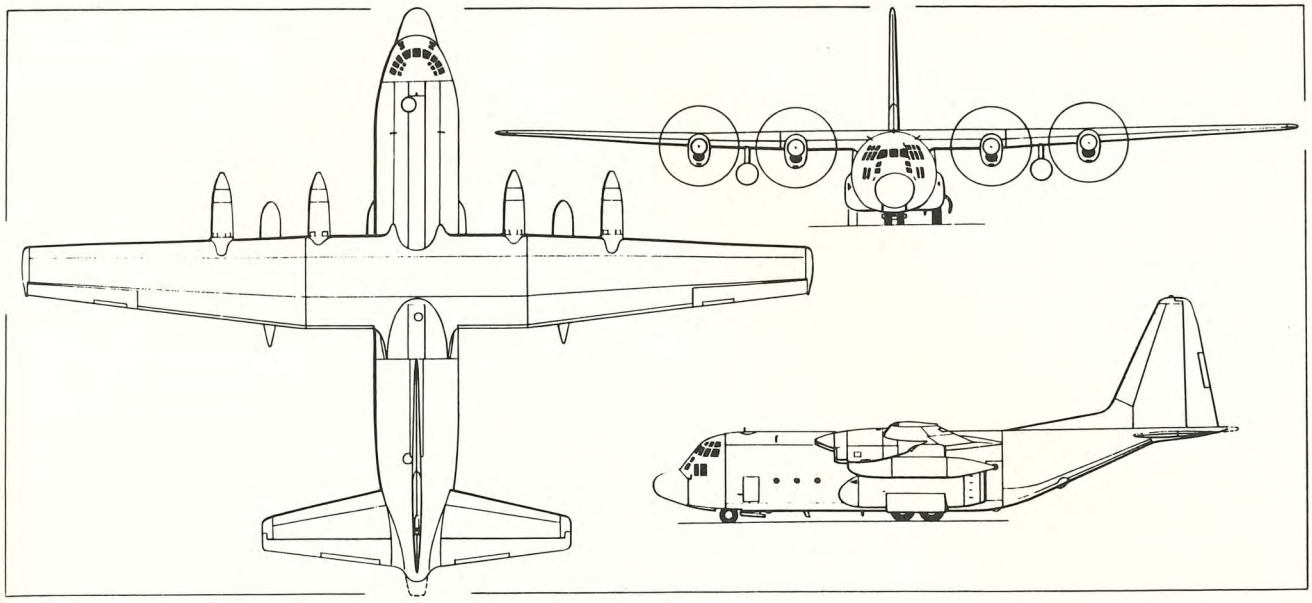
Powerplants: *Four Allison T56-A-7 turboprops each of 4,050eshp; four bladed Hamilton Standard constant speed fully feathering and reversing propellers of 13ft 6in (4.11m) diameter; total fuel capacity 8,060imp gal (36,636 l) including two underwing tanks each of 1,132imp gal (5,146 l).*

Dimensions: *Wing span 132ft 7in (40.41m), length 97ft 9in (29.79m), height 38ft 3in (11.66m), wheelbase 32ft 0.75in (9.77m), wheel track 14ft 3in (4.35m), wing area 1,745sq ft (162.1m²).*

Weights: *Operating empty 72,892lb (33,064kg), max payload 45,000lb (20,412kg), normal max takeoff weight 155,000lb (70,308kg), max overload takeoff weight 175,000lb (79,380kg).*

Performance: *Max cruise 368mph (592km/h), econ cruise 340mph (547km/h); initial climb 1,830ft (558m)/min; service ceiling 23,000ft (7,010m); takeoff over 50ft obstacle 5,580ft (1,700m); range with max payload 2,420mls (3,894km), range with max fuel and 20,000lb payload 4,700mls (7,563km).*

(left) Various stages in the evolution of the Hercules and its many roles: 1. the prototype YC-130A; 2. C-130A with the AN/APN-159 radar nose; 3. JC-130A missile and spacecraft tracking aircraft; 4. DC-130A drone launcher with underwing Ryan QM-34 Firebees and extra radome housing microwave guidance equipment; 5. AC-130A gunship; 6. C-130D skiplane for the USAF; 7. standard production C-130B; 8. NC-130B boundary layer control test aircraft with underwing YT-56 engines in pods; 9. WC-130B weather reconnaissance aircraft; 10. KC-130F tanker for the USMC.



The standard production 'basic' military Hercules for more than two decades, the C-130H.

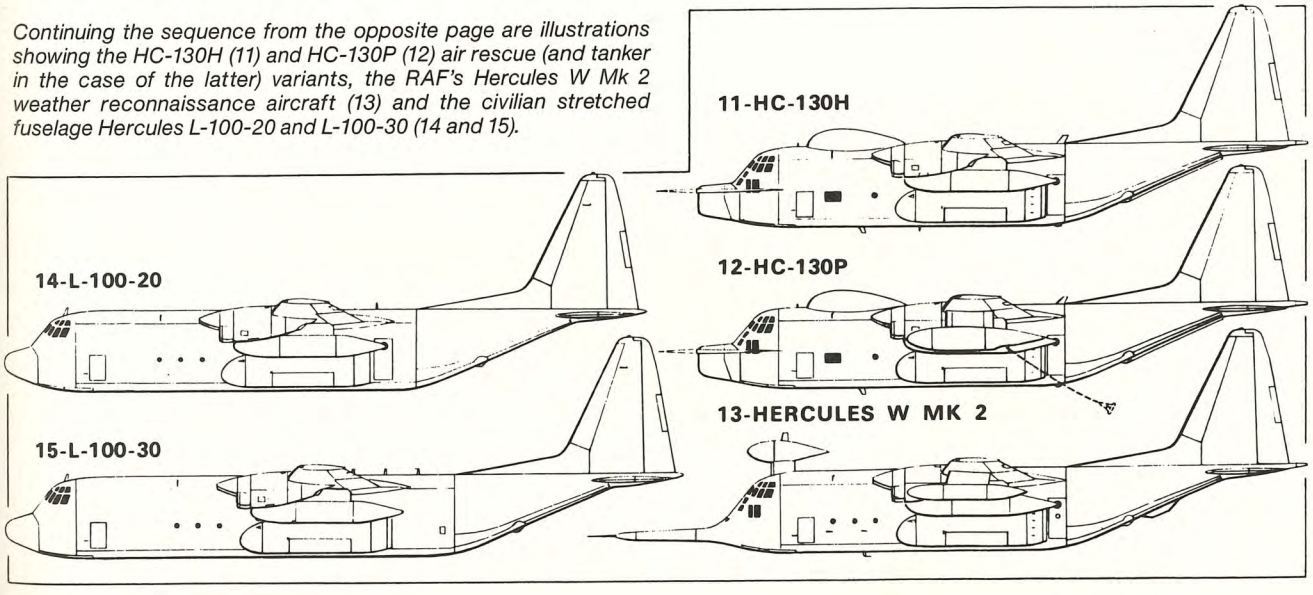
range characteristics of the C-130E improved accordingly. Carrying a 20,000lb (9,072kg) payload or the equivalent of 92 equipped troops, the C-130E could travel 4,000 nautical miles (7,400km) with reserves or 2,000nm (3,700km) with its maximum payload.

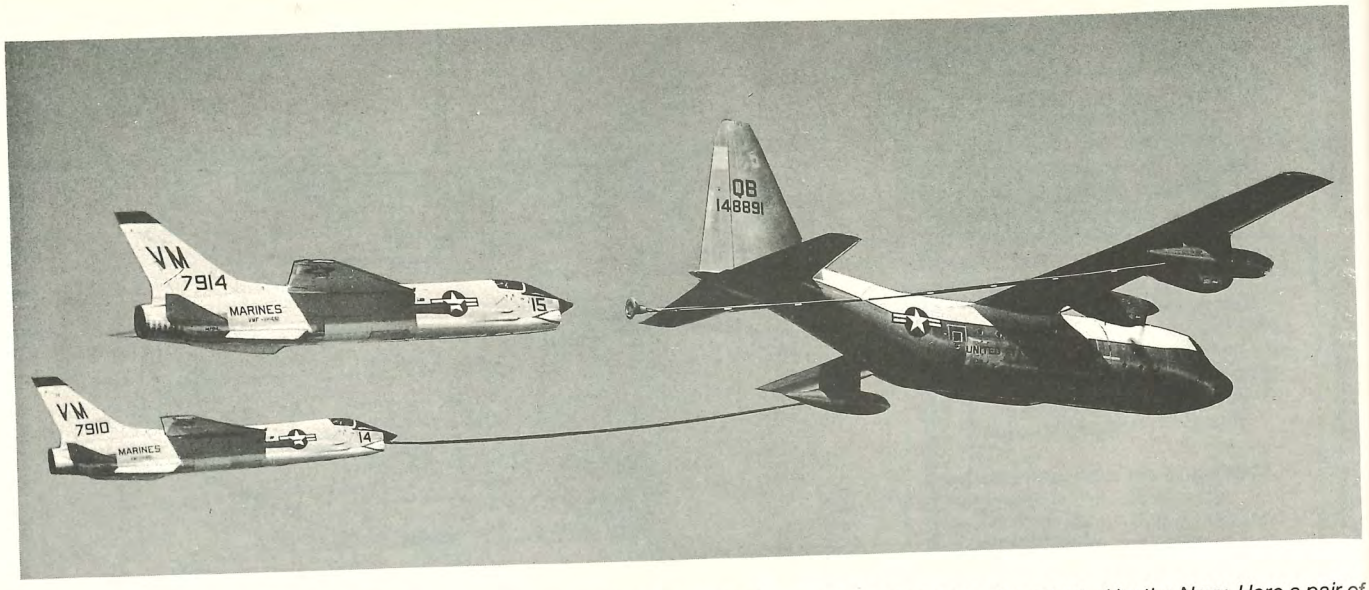
The fourth major Hercules variant is the C-130H primarily tactical transport, a model originally developed for export in the mid 1960s while the C-130E remained the standard production model for the US services. The 'H' has subsequently become the basic model for military use, and as such has itself been available for nearly a quarter of a century by 1990. In simple terms the 'H' is basically a more powerful version of the 'E' featuring T56-A-15 engines rated at 4,910eshp but derated to 4,508eshp and therefore offering improved takeoff and climb performance as the operating weights remain as before, as does the fuel capacity.

The latest versions offer slightly less maximum payload than the C-130E due to the inevitable basic weight increases which have come with improvements and development over 25 years, but at 42,700lb (19,370kg) this is still far more than the standard Hercules' fuselage volume will allow it to carry under most circumstances. Structure, avionics, systems, brakes, wheels and a multitude of small components have all benefitted from the C-130H's lengthy development and technological advances which have occurred during its lifetime. A C-130H delivered today is in many areas very different to the first examples handed over to New Zealand in 1966. Subsequently, the 'H' has been exported to nearly 50 countries (including Australia) and has also been purchased in large quantities by all the US services.

A major early customer was Britain's Royal Air Force which ordered 66 C-130H variants in 1965 under the US designation C-130K and British Hercules C Mk 1. These aircraft were delivered between late 1966 and mid 1968 and featured numerous items of British equipment installed in lieu of the standard American gear including radio, radar, autopilot, loading equipment and external fuel tanks and pylons manufactured by Scottish Aviation.

Continuing the sequence from the opposite page are illustrations showing the HC-130H (11) and HC-130P (12) air rescue (and tanker in the case of the latter) variants, the RAF's Hercules W Mk 2 weather reconnaissance aircraft (13) and the civilian stretched fuselage Hercules L-100-20 and L-100-30 (14 and 15).





KC-130 tanker versions of the Hercules were originally developed for the US Marine Corps but were also adopted by the Navy. Here a pair of USMC F-8 Crusaders hook up to their 'mother ship' for a drink.

The 'C', 'D', 'F' and 'G' model Hercules were experimental, limited production or specialist versions of the C-130. The C-130C was a one off experimental development of the C-130B used for testing a boundary layer control (BLC) system in an attempt to improve the Hercules' takeoff performance. First flown in 1960, the C-130C featured a pair of underwing pod mounted YT-56 engines set up to drive air compressors rather than propellers. The BLC system used in this conversion consisted of a series of slots from which high pressure air blew over the control surfaces and flaps.

Twelve C-130A Hercules were modified to C-130D configuration for the USAF for Arctic duties, the aircraft operating from wheel/ski undercarriages and featuring two 416imp gal (1,892 l) fuel tanks in the cargo compartment for ferry flights in addition to the C-130A's normal integral and underwing tanks.

Several variants under the designation C-130F were produced from 1960. The first was the KC-130F assault transport with air to air refuelling capability, 46 of which were built for the US Marine Corps with the powerplants and operating weights of the C-130E. The KC-130F's refuelling equipment was quickly removable from the cabin if the aircraft was to be used as a transport. The model designated simply C-130F was a straight transport built for the US Navy (seven only) and was similar to the USMC's KC-130F but lacked the air-to-air refuelling capability. It also operated at a lower maximum takeoff weight of 135,000lb (61,236kg). The LC-130F was a ski equipped conversion of four C-130Bs for the US Navy.

The first Hercules variant to carry the 'H' suffix in its military designation was the HC-130H extended range air search, rescue and recovery aircraft built for the USAF and first flown in December 1964. Using the more powerful T56-A-15



One of the more remarkable Hercules was the HC-130H for the USAF's Air Rescue Service. The 'vee' forks on the aircraft's nose extended outwards and allowed personnel or equipment in the sea (or on the ground) to be literally scooped up via a cable held aloft by a balloon attached to a 500ft (152m) line.

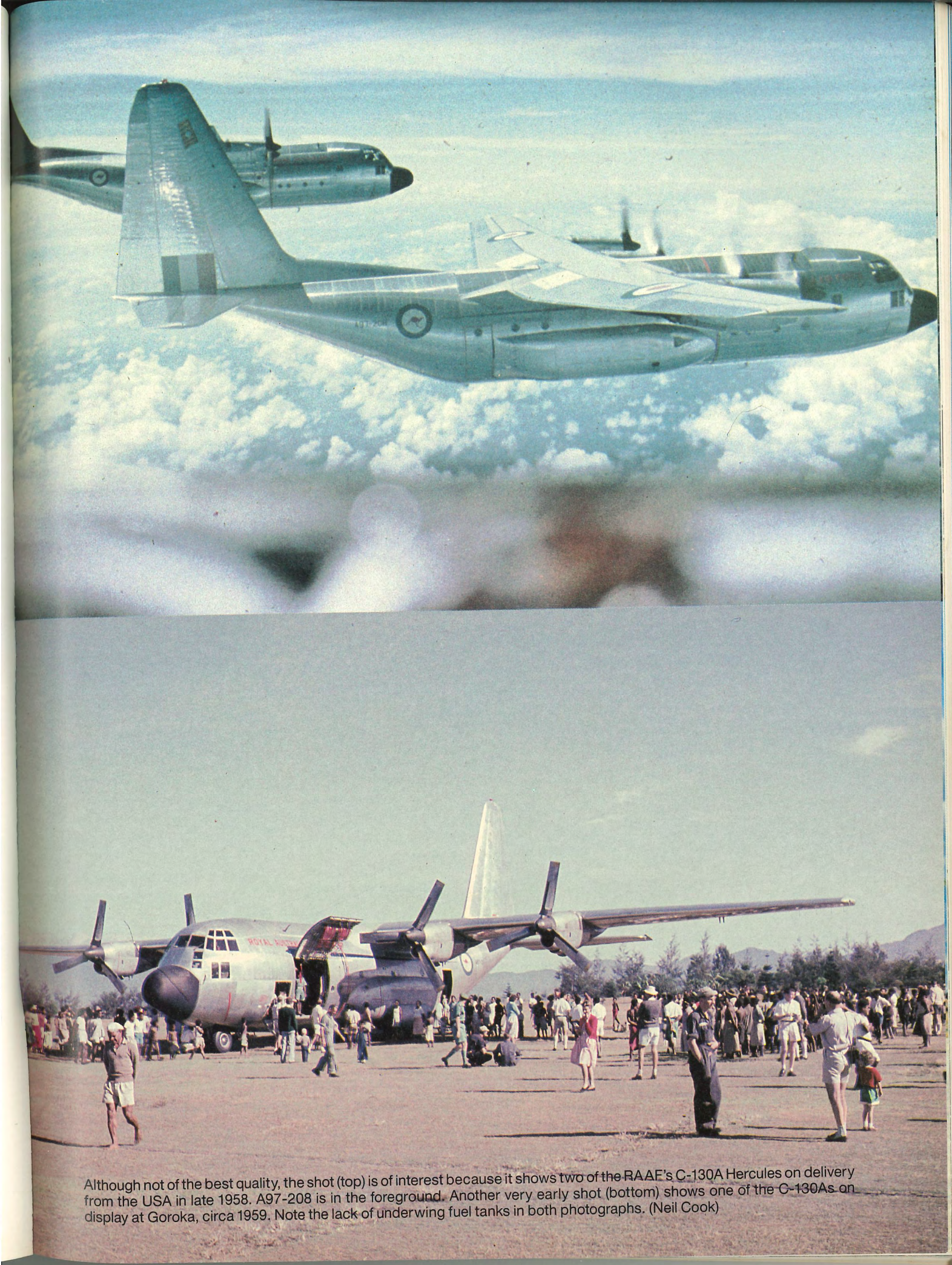
LOCKHEED C-130H HERCULES

Powerplants: *Four Allison T56-A-15 turboprops each rated at 4,910eshp but flat rated to 4,508eshp; Hamilton Standard four bladed, feathering and reversing propellers of 13ft 6in (4.11m) diameter; total fuel capacity 8,060imp gal (36,636 l) including two underwing tanks each of 1,132imp gal (5,146 l).*

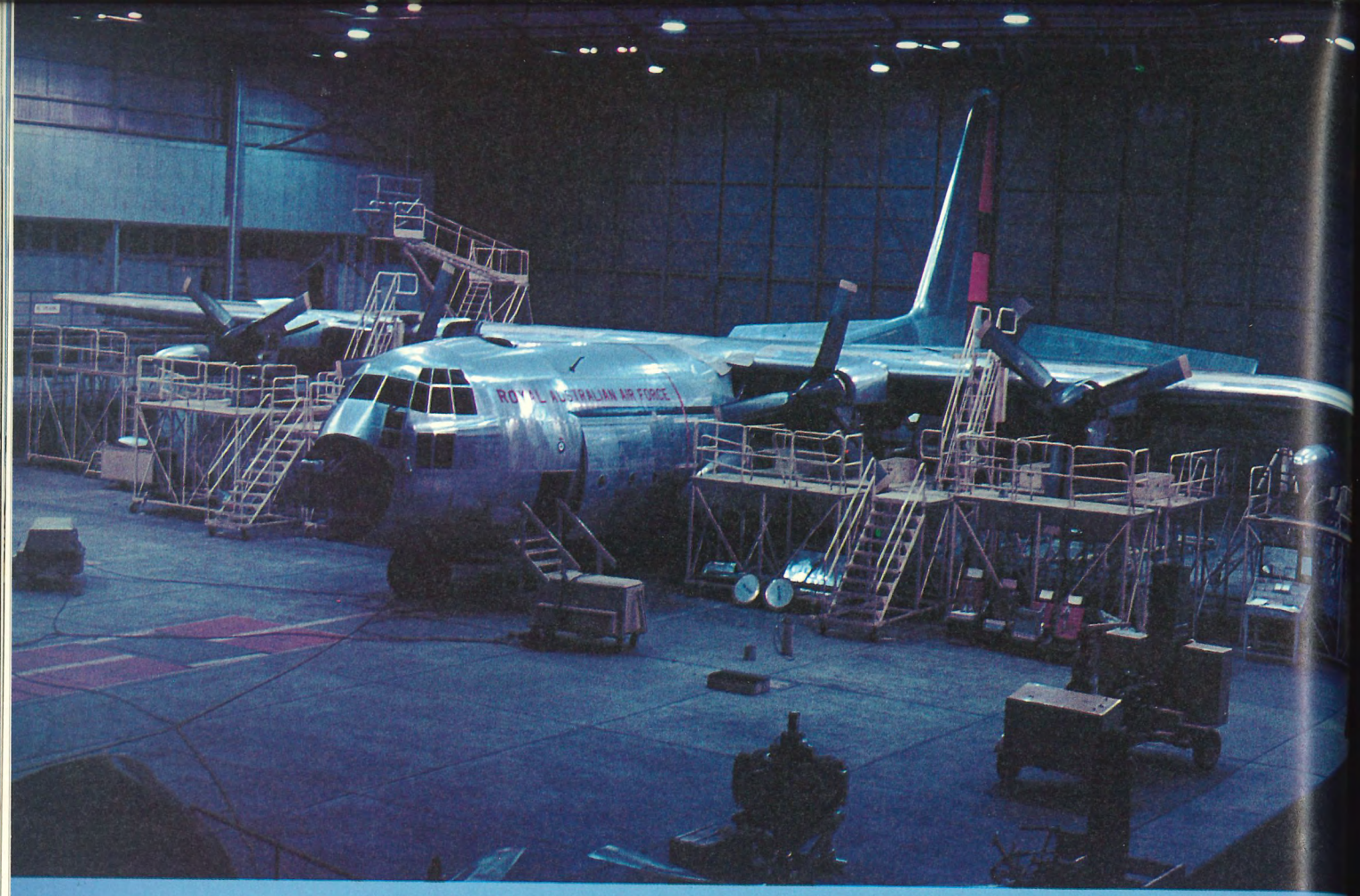
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Weights: *Operating empty 76,000lb (34,473kg), max payload 43,000lb (19,505kg), normal max takeoff 155,000lb (70,308kg), max overload 175,000lb (79,380kg).*

Performance: *Max cruise 374mph (602km/h), econ cruise 345mph (556km/h); initial climb 1,900 ft (579m)/min; service ceiling 26,500ft (8,077m); takeoff over 50ft obstacle 5,160ft (1,573m); range with max payload 2,356mls (3,791km), range with max fuel and 15,600lb payload 4,894mls (7,876km).*



Although not of the best quality, the shot (top) is of interest because it shows two of the RAAF's C-130A Hercules on delivery from the USA in late 1958. A97-208 is in the foreground. Another very early shot (bottom) shows one of the C-130As on display at Goroka, circa 1959. Note the lack of underwing fuel tanks in both photographs. (Neil Cook)





A spot of maintenance for A97-214 at Richmond (top) and the Hercules graveyard at Laverton (bottom), where the C-130As were stored for some years awaiting disposal. (Neil Cook)





The RAAF's No 37 Squadron took delivery of its first C-130E Hercules in August 1966 and still operates them. A97-177 (top) and A97-180 (bottom) were both photographed at Richmond but 17 years apart, in 1984 and 1967, respectively. Note the 'natural metal' finish of the aircraft in the earlier shot and the fully painted finish of the other aircraft. (Eric Allen)



37 Squadron C-130E A97-167 at Richmond in April 1973 (top) and a mass departure for the squadron from the same base (bottom).





A US Coast Guard HC-130 on ice patrol duties over the North Atlantic. Equipped with side looking airborne radar (SLAR), this HC-130H can see through a dense cloud cover and detect icebergs. (Lockheed)

engines which would later power the 'standard' C-130H transport versions, this Hercules was intended initially to recover downed aircrew and/or pieces of equipment whilst flying. It was fitted with the Fulton Recovery System comprising two aluminium forks mounted on the nose which formed a vee when extended and literally scooped up any item or items weighing up to 500lb (227kg) attached to a line held aloft by a small balloon. The idea was successfully tested and in conjunction with a re-entry tracking system on the aircraft, could be used for recovering the crews of space capsules returning to earth.

The responsibility for this task ultimately fell to the US Navy, but 20 of the 43 HC-130Hs were converted to aerial refuelers for the Sikorsky HH-3 'Jolly Green Giant' helicopter and redesignated HC-130P. Other Hercules variants with different designation suffixes were the USAF's RC-130S (converted from C-130As) and HC-130N, the USN's LC-130R (an 'H' on skis), EC-130Q (based on the 'E') and EC-130G (converted from 'E' models) and the USMC's KC-130R tanker based on the 'H'.

Civilians and Stretches

Lockheed began examining the possibilities of commercial variants of the Hercules early in its career and in 1964 built a civilian C-130E under the marketing designation L-100. Powered by 4,050shp Allison 501-D22 engines (the commercial equivalent of the C-130E's T56-A-7), certification of the L-100 was achieved in February 1965 and a small number of orders were placed by operators such as Continental Air Services, Zambian Air Cargoes, Delta Airlines, Alaska Airlines and Airlift International.

The basic production L-100 was given the Lockheed model number 382B and versions fitted with 4,508eshp Allison 501-D22A engines (equivalent to the C-130H's T56-A-15s) were marketed as the L-100-10.

The more than 47,000lb (21,320kg) maximum payload of the L-100 in combination with the original Hercules fuselage length often meant that the full lifting capability of the aircraft was not being used due to the relatively limited cubic capacity of the cabin – to use an American term it was 'cubing out' well before any weight limits were reached.

The obvious solution was to offer a longer fuselage and from 1968 the Model 382E or L-100-20 was offered complete with an 8ft 4in (2.54m) fuselage 'stretch' which increased the gross cabin volume (including the loading ramp area) by 18 per cent from 4,500cu ft (127.4m^3) to 5,307cu ft (150.3m^3) and the aircraft's overall length to 106ft 0.5in (32.32m). Maximum takeoff weight remained as for the standard C-130E/H and L-100 at 155,000lb (70,308kg) and the powerplants were Allison 501-D22As although two examples featured lower rated 501-D22 engines and were dubbed Model 382F by Lockheed. Civilian operators of the L-100-20 include Southern Air Transport, Trans America, Interior Airways, Flying W, Echo Bay Mines, Philippine Aero and Pacific Western.

The extra capacity offered by the stretched Hercules found some appeal with military operators as well, the air arms of Gabon, Kuwait, Peru and the Philippines among them.

The thus far ultimate stretch of the Hercules also found a market within the military and the civilian operators for whom it was originally developed during



A US Coast Guard HC-130 on ice patrol duties over the North Atlantic. Equipped with side looking airborne radar (SLAR), this HC-130H can see through a dense cloud cover and detect icebergs. (Lockheed)

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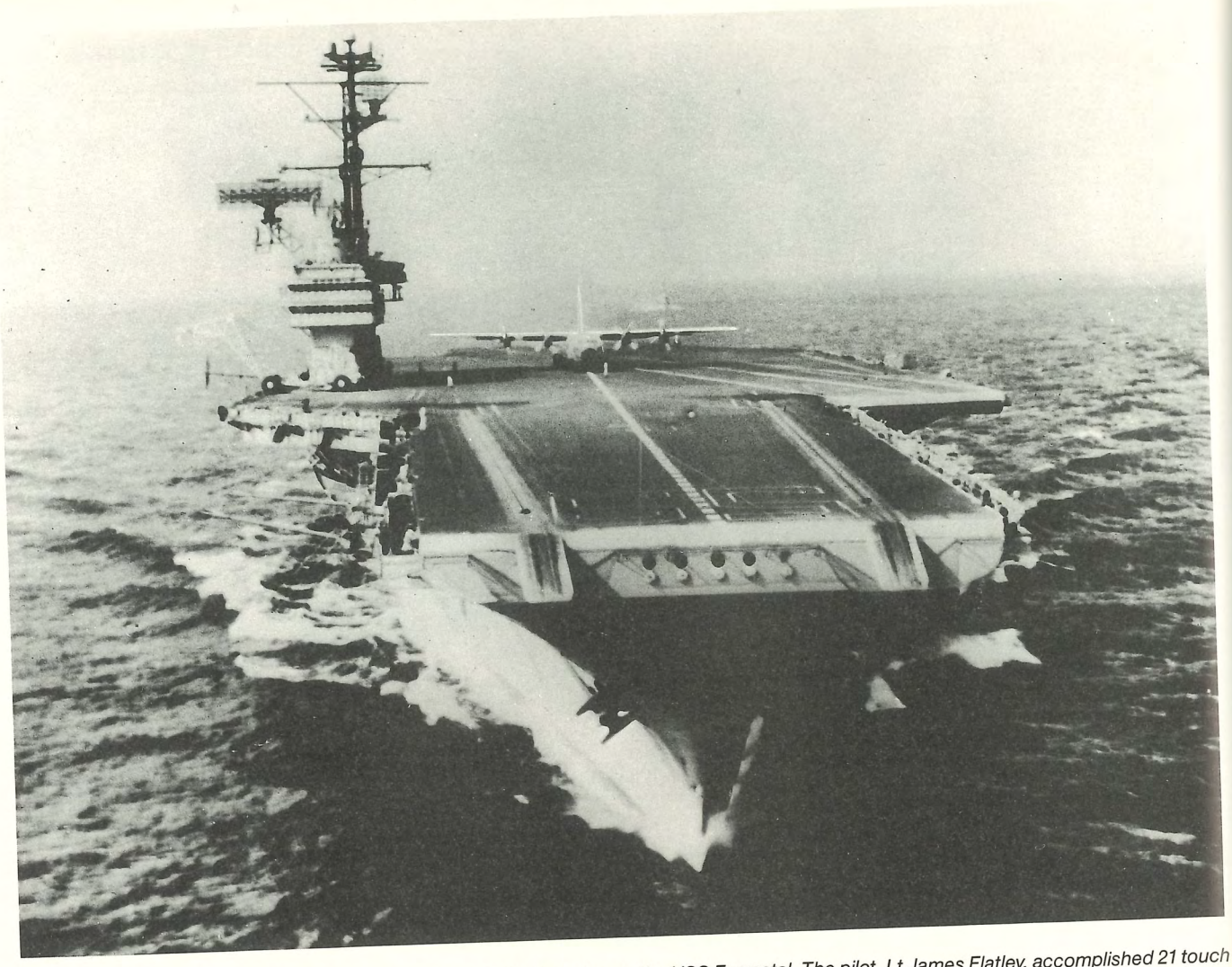
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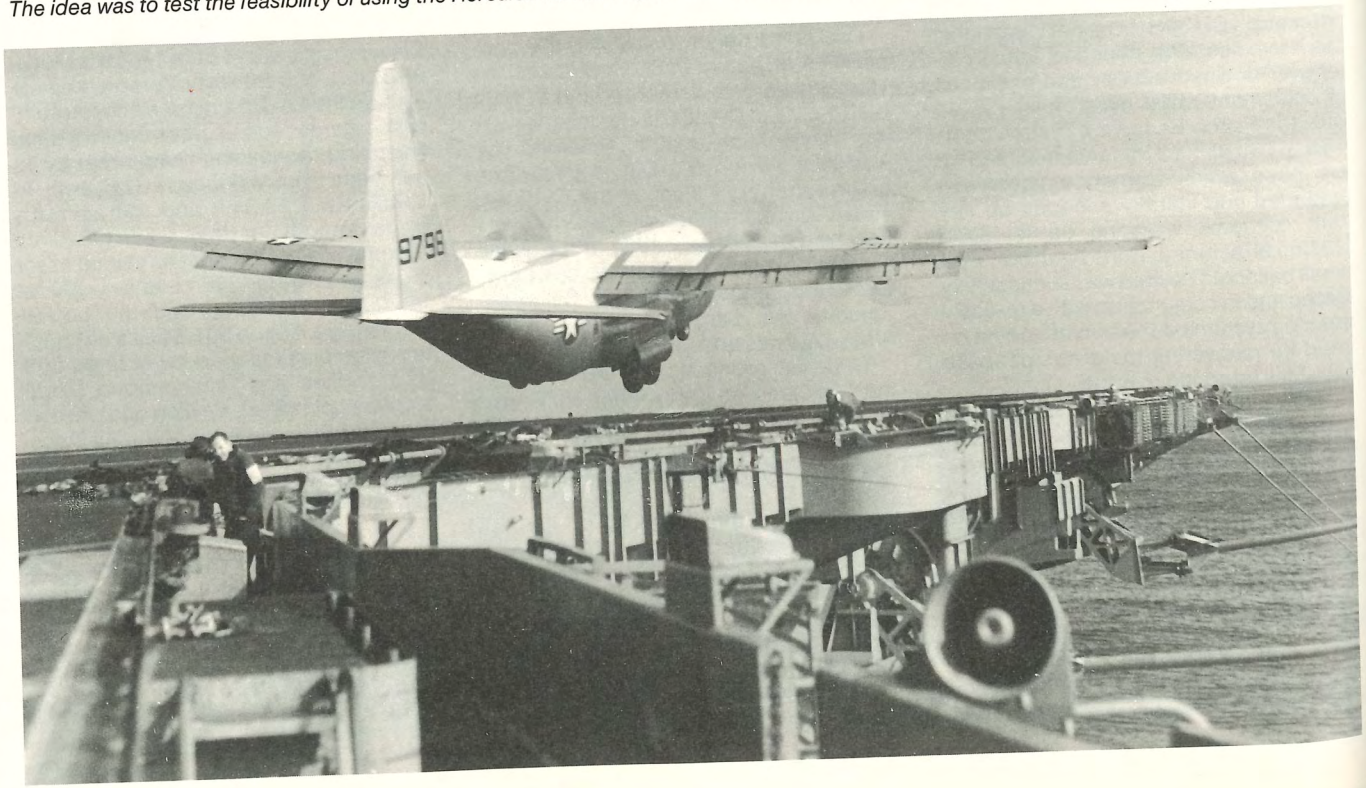
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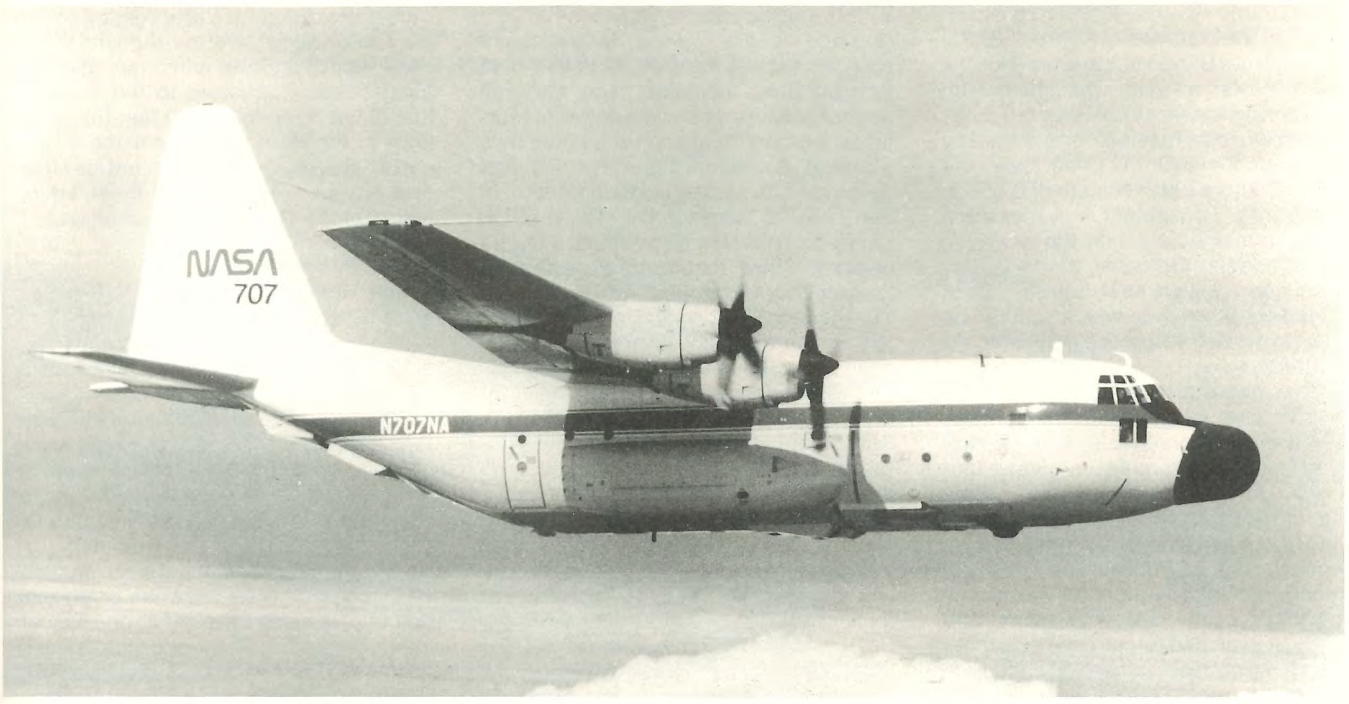
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The US Navy set a world record in 1963 when it landed this Hercules on the USS Forrestal. The pilot, Lt James Flatley, accomplished 21 touch and go landings, 21 unarrested full stop landings and 21 unassisted takeoffs at weights between 85,000lb and 121,000lb. At full load (and with a 40 knot wind-over-deck) the Hercules needed only 745ft to takeoff and 460ft to stop, the pilot selecting reverse pitch just prior to touchdown. The idea was to test the feasibility of using the Hercules for fleet replenishment duties and operating from carriers.





The former boundary layer control test NC-130B in NASA colours and used as a flying laboratory. Equipped with advanced airborne remote sensing gear, its duties included ocean waves research in the Pacific. (Lockheed)



The Hercules doing what it was originally designed to do - supporting the troops in the field. In this case the LAPES (low altitude parachute extraction system) technique is being used to deliver 16,000kg Sheridan tank.

1970. Saturn Airways (which had a contract to deliver Rolls-Royce RB.211 engines from Britain to Lockheed for the L-1011 TriStar airliner) was the driving force behind the Model 382G or L-100-30, which featured a fuselage lengthened by a further 6ft 8.5in (2.04m) over the L-100-20 and a cabin volume of 6,057cu ft (171.5m³). Powerplant and maximum weight remained as per the previous L-100 models but now the Hercules could carry seven 463L cargo pallets instead of the five which could be accommodated within the original fuselage length.

Apart from Saturn, civilian users of the -30 Hercules include Safair Freighters, Alaska International Air (one of several operators using Hercules to good effect in the USA's last wilderness), Transamerica and Uganda Airlines. As had been the case with its immediate predecessor, the L-100-30 found favour among military operators as well, some purchasing the civilian version and putting it to armed forces use and others using a purely military version called the C-130H-30.

Britain's Royal Air Force was the first to use such a variant, modifying 30 of its fleet of C Mk 1s to C Mk 3s in a programme starting in 1979. The first conversion was performed by Lockheed; subsequently they were undertaken by Marshall's of Cambridge in England. The C-130H-30 is capable of carrying up to 128 equipped troops, 92 paratroops and 97 casualty litters plus attendants.

There have been several other proposed Hercules variants which have not achieved production, among them the L-100-40 and -50 civil variants with further increases in fuselage length plus more power and weight. In 1977 Lockheed proposed the C-130SS (for 'Stretch STOL'), a version combining the L-100-20's fuselage length with a strengthened wing permitting increased weights and incorporating modified flaps and roll control spoilers along with larger tail surfaces (both vertical and horizontal) plus a beefed up undercarriage. The 'SS' was developed as an unofficial competitor in the USAF's advanced military STOL transport (AMST) competition, the idea being to show that such a developed Hercules could compete with the Boeing YC-14 and McDonnell Douglas YC-15 jets (which were flown in prototype form only) and complete all but a fraction of the tasks demanded in the AMST at considerably lower cost. Ultimately, the AMST competition along with the C-14, C-15 and C-130SS fizzled out, although the STOL Hercules idea was revived a decade later with the HTTB test aircraft.

Also in 1977, a twin engined Hercules was proposed for both civil and military use as a short haul cargo replacement for aircraft such as the DC-3/C-47, C-54, C-119 and C-123. Dubbed the L-400, the 'Twin Herc' would have retained the same fuselage length as the standard four engined models but lower operating weights, less maximum payload, reduced wing span and of course much lower operating and purchase costs. A pair of T56s would have provided the power but the 30 firm orders Lockheed needed to launch the L-400 were not forthcoming and the project progressed no further than advanced design.

Even in 1990 the company announced it was planning a new version of its venerable transport, this time in the form of the C-130J, intended to capture a USAF requirement to replace nearly 200 C-130Es and early model C-130Hs. If built, the 'J' will have more powerful T56 engines installed along with six bladed propellers, a state of the art digital cockpit which will reduce the required flight crew from four to two and reduced operating costs. Compared to the C-130E, the 'J' will climb to 18,000 feet from sea level in ten minutes (23 minutes in the earlier model), burn five per cent less fuel at a given cruise speed or fly 40 knots faster for the same fuel consumption.

War and Peace

The Hercules' long service life has seen it performing its vast repertoire of roles in both war and peace. Mercy missions such as those which followed earthquakes, volcanic eruptions, cyclones and other natural disasters all over the world come to mind, while a relatively recent example is the Ethiopian famine relief operation in 1986-87 following a world wide appeal headed by stars of the international rock music industry.

Almost every conflict between nations over the past three decades or so has had the Hercules involved in one way or another, whether it be in the Middle East, Africa, the Near East, the Indian sub continent, South East Asia, Central America or the South Atlantic.

For the United States military, Vietnam was the Hercules' war, and it has been written – without too much exaggeration – that America could not have participated without Lockheed's 'trash hauler' as it was described. You name it, the Hercules did it in Vietnam – moving men and supplies often out of ridiculously short and unprepared strips, flying as a tanker, a gunship, a paratroop dropper, a drone launcher, an airborne electronic surveillance and countermeasures base, an airborne command post, an ambulance, a rescue vehicle, a weather reconnaissance station, a LAPES (low level parachute extraction) delivery truck, a



A C-130H of the US Air National Guard hooked up to a ground tug with a UH-1 Iroquois helicopter in the air behind it.

Hercules A97-159 (top) was the RAAF's first 'E' model, delivered in August 1966. No 36 Squadron replaced its C-130As with C-130Hs (bottom) in 1978 and with them came a camouflage colour scheme indicative of the squadron's basically tactical role. A97-006 is seen during field exercises with the Army in 1981. (RAAF/Eric Allen)







Nice portrait of C-130H A97-010 (top) at Baradine in 1980 during exercises, while A97-012 (bottom) has Ayer's Rock as its backdrop. Note variations in the camouflage schemes. (Eric Allen/RAAF)



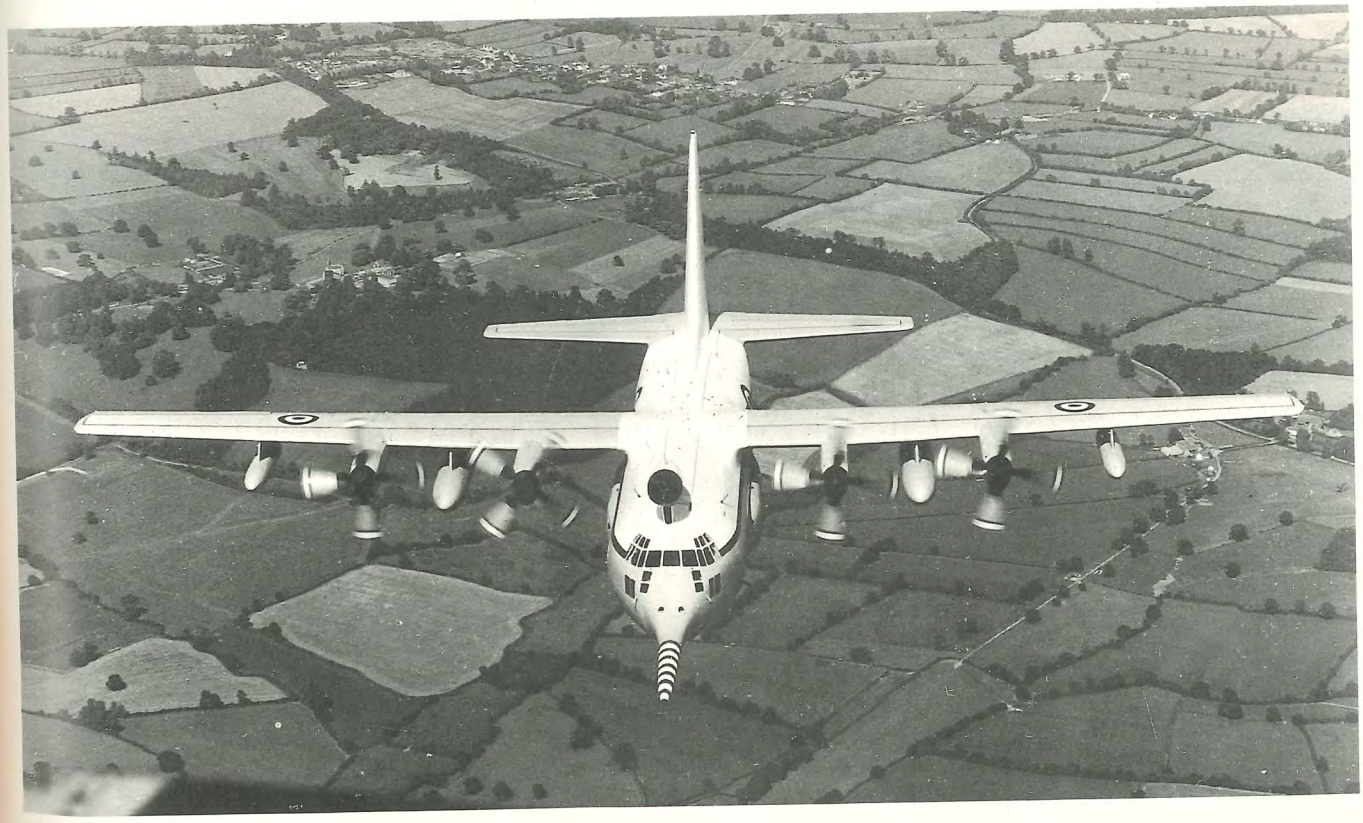
refugee evacuation bus, a propaganda distributor, even as a stage for entertainers (on the ground, hopefully!), using the rear loading ramp.

The Hercules' achievements in Vietnam were notable, especially considering the conditions under which they usually had to operate. Sustained airlifting records were shattered and some three dozen aircraft were lost and many more badly damaged during the conflict. In addition, the pounding they took from the rough fields from which they usually had to operate resulted in no fewer than 513 C-130Bs and Es being given strengthened wing centre sections and other modifications to enhance their structural life.

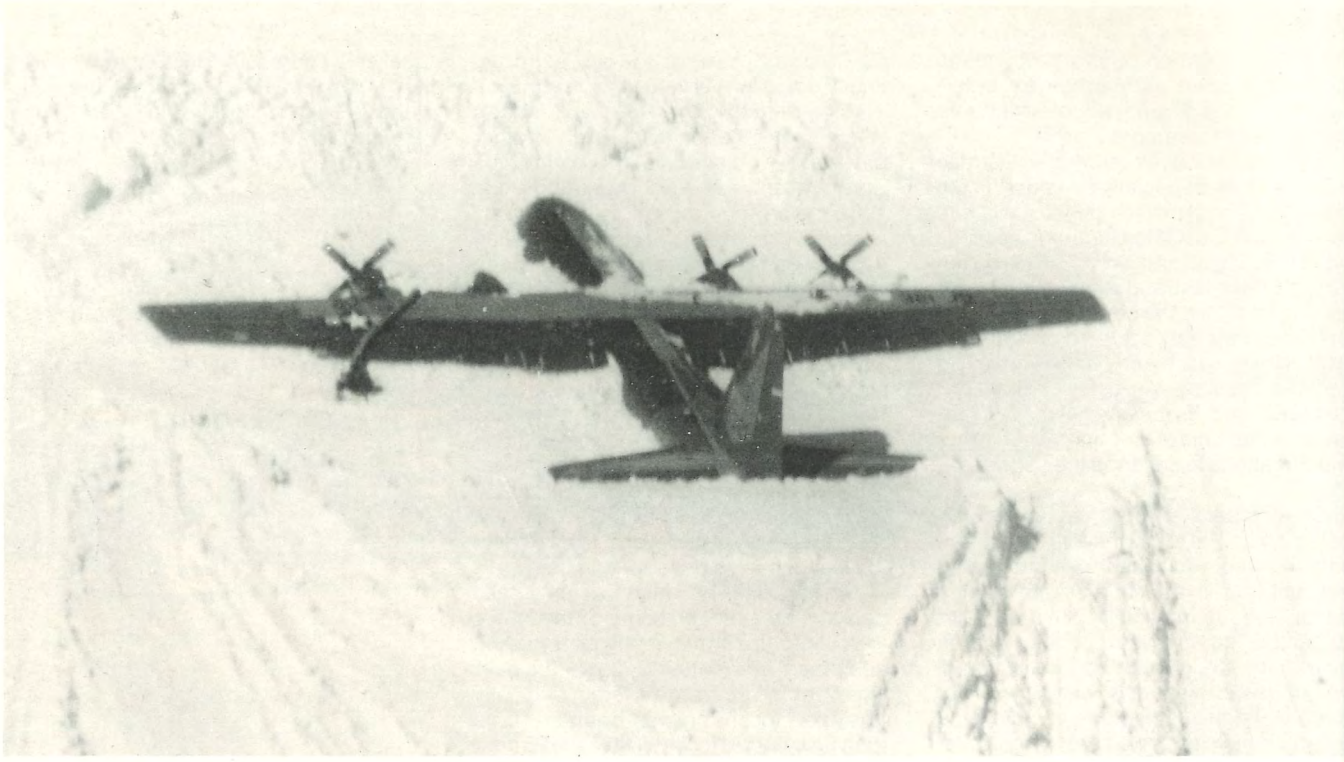
One incident tested a particular Hercules' structure to the limit. In April 1975, with the war in its final throes and during evacuations in the face of the rapidly advancing communists, this aircraft departed Tan Son Nhut air base with an incredible 452 people on board, 32 of whom were crammed onto the flight deck. A single Vietnamese pilot flew the aircraft which was about ten tonnes over its maximum takeoff weight. It required more than the available 10,000 feet (3,000m) of runway to get airborne, finally doing so well into the overrun!

More recently, the Royal Air Force's Hercules have been involved in another battle at the other end of the world in the South Atlantic in April, May and June 1982 when control of the Falklands Islands was wrested from the invading Argentineans. Once again, it has been written that this action – Operation Corporate – could not have taken place without the Hercules. The problem facing the RAF in supplying the Falklands by air was the fact that the nearest base from which they could operate was Ascension Island, some 3,400 nautical miles (6,300km) away. Obviously no refuelling on the ground was available near the battle zone and the 6,800nm round trip was well beyond the range of the Hercules.

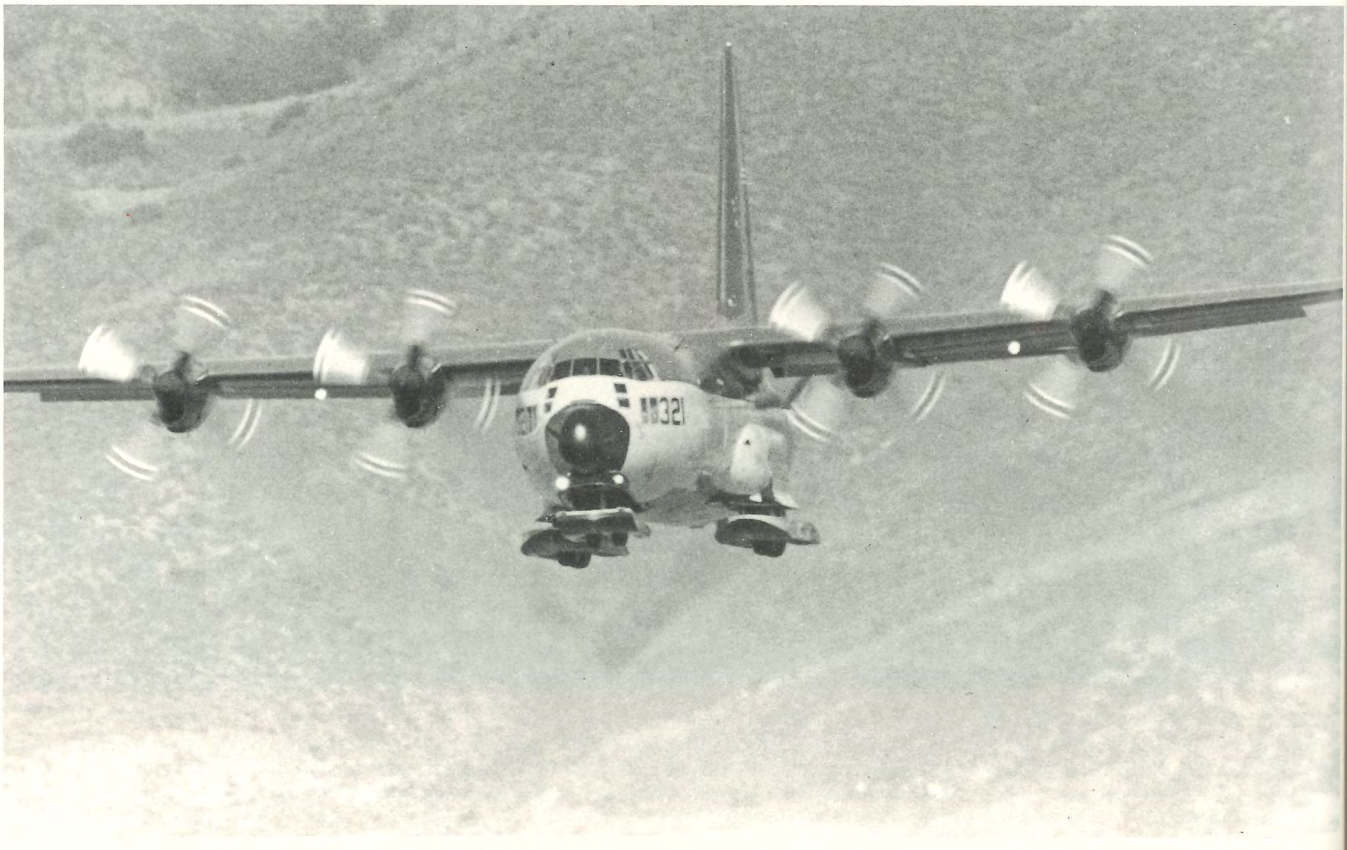
With an alacrity which can only happen at a time of war, some of the RAF's Hercules were fitted with flight refuelling equipment in a matter of days – the gear was cobbled up from a system originally designed for the Vulcan bomber – and then proceeded to undertake 24-26 hour non stop round trips from Ascension to the battle area, refuelling from Victor tankers. There is a touch of irony in the fact that the last flight out of the Falklands' Port Stanley airstrip by an Argentinean aircraft near the end of the conflict was ... a Hercules.

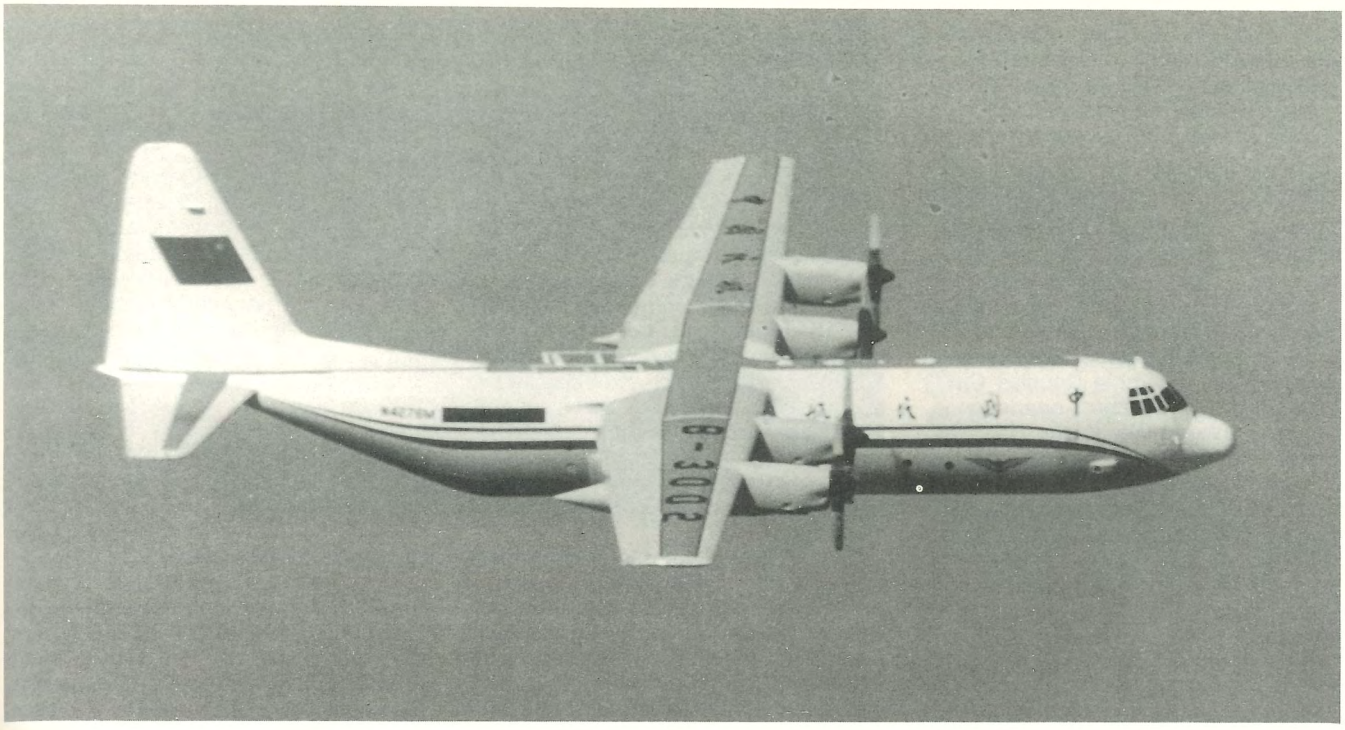


One of the strangest looking Hercules is the W Mk 2 weather reconnaissance aircraft operated by the RAF's Meteorological Research Flight at Farnborough. The 26ft (8m) long nose probe houses a pitot head, yaw and pitch detectors and temperature sensors. Its installation necessitated moving the Hercules' normal nose radar into a pod above the cockpit, while underwing pods carry weather measuring equipment and the interior houses various items of special equipment. (British MoD)

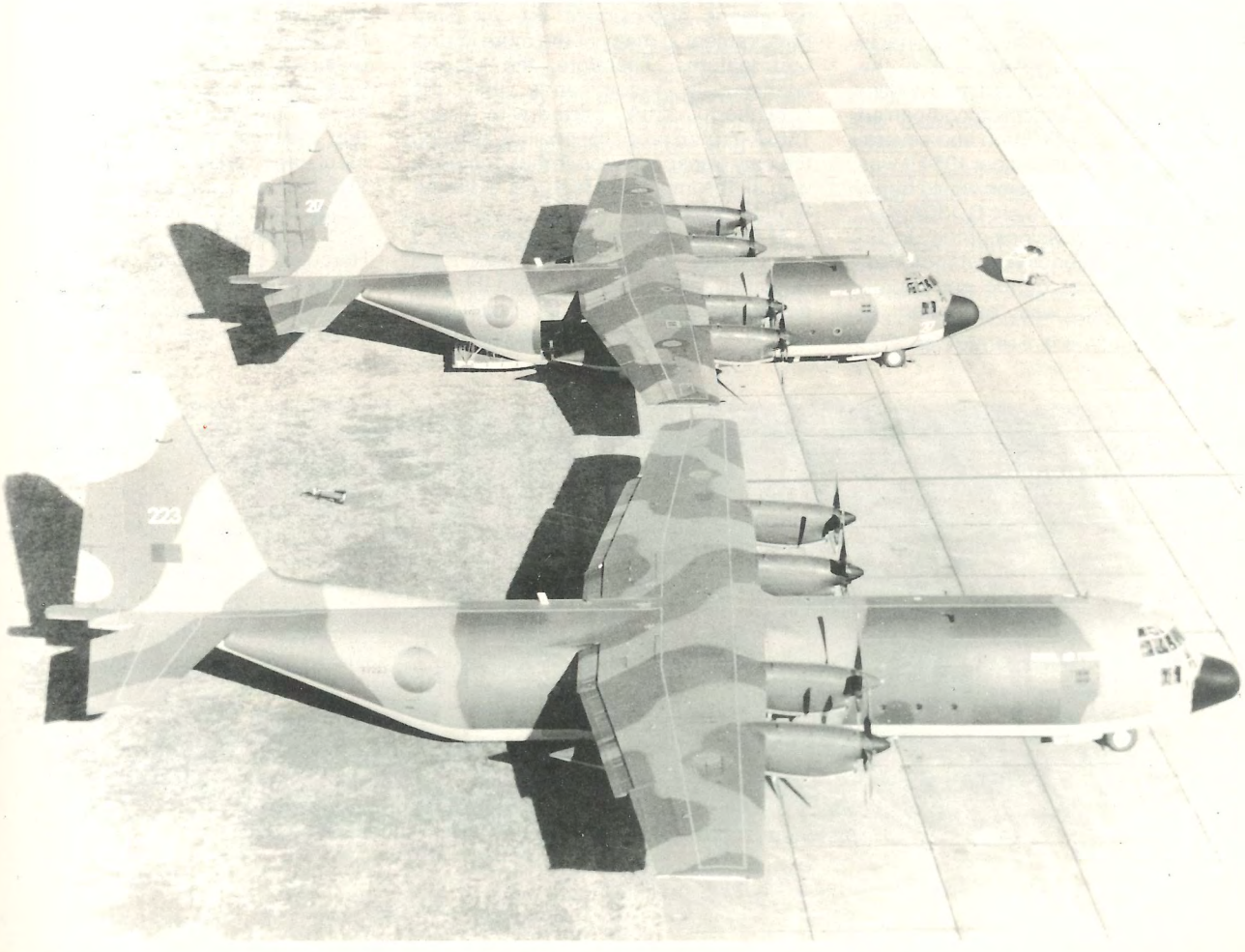


A remarkable recovery was achieved with this US Navy/National Science Foundation LC-130F ski equipped Hercules. The aircraft aborted its takeoff run in Antarctica in 1971, coming to rest on an ice sheet. The passengers and crew walked to safety but the Hercules remained there (above) for 16 years before an attempt to recover it was made. All but the top three feet of the fin was covered by snow when recovery was attempted, and after repairs were made, the Hercules was successfully flown out. The lower photograph shows the aircraft on short finals into its Californian base after the flight from Antarctica via New Zealand. Not surprisingly, the Hercules is now known as 'The Phoenix'. (Lockheed)





Civil Hercules have contributed more than 100 sales to the Hercules' tally of over 1,900. This L-100-30 is in the colours of China Air Cargo. (Lockheed)



The Royal Air Force took delivery of 66 Hercules C Mk 1s (designated C-130K by the Americans) in the 1960s, 30 of which have subsequently been 'stretched' to what is now called C-130H-30 standards and redesignated Hercules C Mk 3. The difference in fuselage lengths is obvious here. (RAF)

AUSTRALIA'S HERCULES

While the Hercules represented a substantial step for the USAF's Tactical Air Command when it first entered service in late 1956, for Australia and the RAAF the aircraft provided nothing short of a revolution in its transport capabilities. Like so many other air arms around the world, Australia had relied almost exclusively on the venerable Douglas C-47 Dakota to fill its transport needs since the end of World War II; the Hercules therefore represented a quantum leap in all areas. Considering that leap in terms of aircrew, in that they went directly from the C-47 to the much more complicated Hercules, emphasises the achievement of the RAAF in operating the Hercules without a single major accident for more than three decades. By mid 1990 the RAAF had logged nearly 500,000 safe flying hours on the type.

The process which ultimately led to the delivery of the first of 36 Hercules operated by the RAAF in December 1958 began just over four years earlier. In October 1954, a Defence Air Mission left Australia for a tour of the United States and Great Britain, its purpose being to study fighters, jet bombers, transports and trainers for the RAAF to fulfil the RAAF's future needs. Heading the Mission was AVM A M Murdoch accompanied by Gp Capts E Hay, B Eaton and several civilian officials. In December 1954 it was announced that the Mission would begin negotiations to acquire six C-130A Hercules under the provisions of the United States Mutual Defence Assistance Programme. The cost of the six aircraft including spares was estimated at $US25m.

The Mission's brief for evaluating the relative virtues of the various transport aircraft was: "Transport force – to provide transport support to our forces in Malaya and at home and for operations between Australia and Malaya. The aircraft must be capable of carrying military equipment (Navy, Army and Air Force) including heavy and bulky items, economically and quickly between Australia and Malaya without intermediate stopping points. Dakotas should be progressively replaced commencing 1957. New type estimated life 12 years, 65,000 flying hours."

Several aircraft were looked at apart from the Hercules including the Blackburn Beverley, Bristol Models 179B and 195, Fairchild C-119G Flying Boxcar, Fairchild C-123B Provider and the Shorts PD 16/1 project. The Mission quickly decided that the Beverley, C-123 and Hercules "... could possibly conform to the Air Staff Requirement ..." but on its return to Australia it heartily recommended the Hercules: "The Fairchild C-123 and the Blackburn Beverley by no means approximate the Air Staff Requirement in many of the more important features. Therefore, the Mission unanimously recommends that the Lockheed C-130A ... fitted with Allison T56-A-1 turbo propeller engines as being the only transport aircraft that conforms with all the important features of the Air Staff Requirement ..."

At that stage (early 1955) deliveries of the C-130A to the RAAF could have begun as early as May 1957 but the proposed schedule for the 12 aircraft now subject to negotiations stretched delivery of the aircraft over three years with one aircraft per month entering RAAF service in May and November 1957; February, May, August and November 1958; February, May, August and November 1959; and February and May 1960.

The estimated cost of each of the 12 aircraft was $US2,749,355 comprising $US1,492,323 for the airframe, $US589,000 for 'aircraft equipment' including engines and propellers, $US2,708 for the use of USAF facilities, $US125,000 for operational equipment and $US540,000 for spares. This brought the total estimated cost of the package to $US32,992,260.

The question of placing a firm order for the Hercules was then delayed for two years during a period of vacillation from the government of the day on the subject of re-equipment of the RAAF generally. Decisions on not only the Hercules but also a replacement for the Avon-Sabre fighter and other projects were delayed.

Hercules for Australia

Finally, in July 1957, definitive negotiations which would result in 12 C-130A Hercules being ordered for the RAAF got underway with Lockheed, the manufacturer announcing in October that deliveries would begin the following year and that including spares, support equipment and crew training would cost $US36m, or about £16m ($32m) in Australian currency. The Australian contract was significant for Lockheed and the Hercules programme in that it constituted the first of more than 50 export orders for the aircraft. Australian C-130As were similar to their USAF counterparts



Fresh from the USA and lacking its underwing fuel tanks, C-130A A97-211 taxies in after its delivery flight in January 1959. (CPE)



'Cleaning up' immediately after takeoff, C-130A A97-212 displays its natural metal finish and the dayglo stripes applied to the RAAF's Hercules' tail surfaces early in their career. (RAAF Museum)

except that the usual T56-A-1 or -9 engines were replaced with -11 variants which offered similar power but featured some modifications so as to comply with Australian fuel requirements.

Preparations for the Hercules entering RAAF service included the usual sending of appropriate air, ground and administrative personnel to the USA for training on the type – in the first case 76 personnel arrived there from July 1958 for training at Lockheed's Field Service School at Marietta and at Stewart Air Force Base, Nashville Tennessee – and the preparation of RAAF Base Richmond NSW for the new arrival. The latter included shipping a large hangar intended for servicing the Hercules from Rathmines NSW by barge and re-erecting it at Richmond.

Some reorganisation of the RAAF's transport units also came about as a result of the Hercules order. No 36 Squadron was the unit chosen to receive the new aircraft, replacing its Dakotas and precipitating a move from Canberra to Richmond. The intensive training programme on the Hercules stripped 36 Squadron of virtually all its aircrew during this period, the pilots beginning their training in the USA at the Mobile Training Detachment Ground School and then onto three USAF troop carrier squadrons – the 50th, 61st and 62nd – for flying transition training. Three Australian crews were attached to each of these units initially, although the sudden deployment of the 50th to an overseas posting meant the RAAF personnel attached to it had to then go to the other two.

Navigators and loadmasters also underwent training in the USA and by the end of October all training and simulator courses had been completed, including the opportunity for navigators to experience some long range flying of USAF Hercules from the USA to Britain, Europe and the Far East.

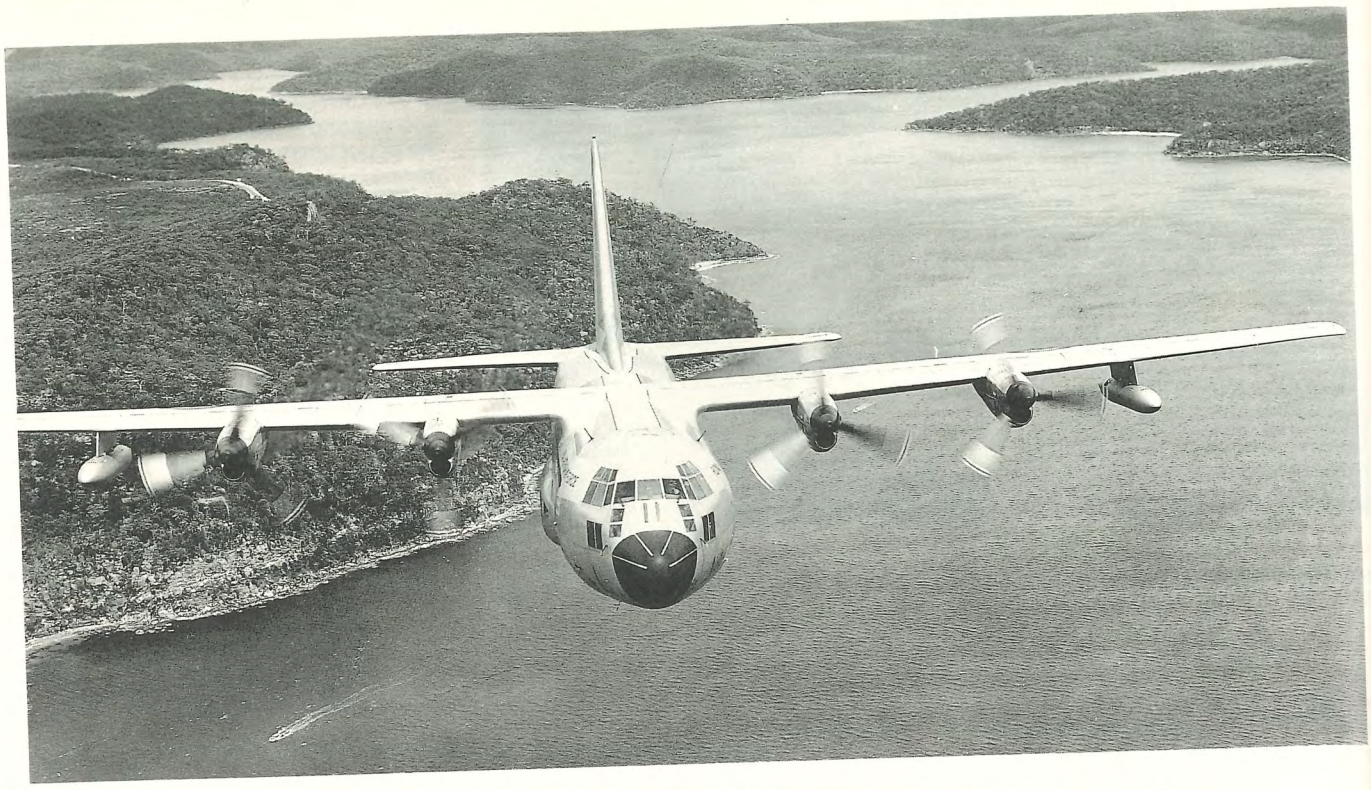
The RAAF's Hercules were allocated serial numbers in the A97 range, the 12 C-130As receiving the serials A97-205 to 216, the suffixes reflecting the last three digits of the manufacturer's constructor's number, beginning with 182-3205 for A97-205 and ending with 182-3216. In addition, and for administrative reasons, the aircraft were also allocated USAF serials, although these were not worn. These were 57-0498 to 57-0509.

The first 12 RAAF Hercules were from the final batch of C-130As manufactured by Lockheed. When the first example was formally handed over to the RAAF on 5 December 1958, the first flight of the prototype C-130B was exactly a week away. At the handover ceremony conducted at Lockheed's Marietta plant, the first Australian Hercules was accepted by the Hon Howard Beale QC, the Australian Ambassador to the USA. With him were Air Vice Marshall W L Hely CBE DFC, the Australian Defence Representative in Washington, Group Captain K S Hennock DFC, Australian Air Attache in Washington and various other senior Australian and American personnel including Major General David Hutchison, Commander of the USAF's 9th Air Force.

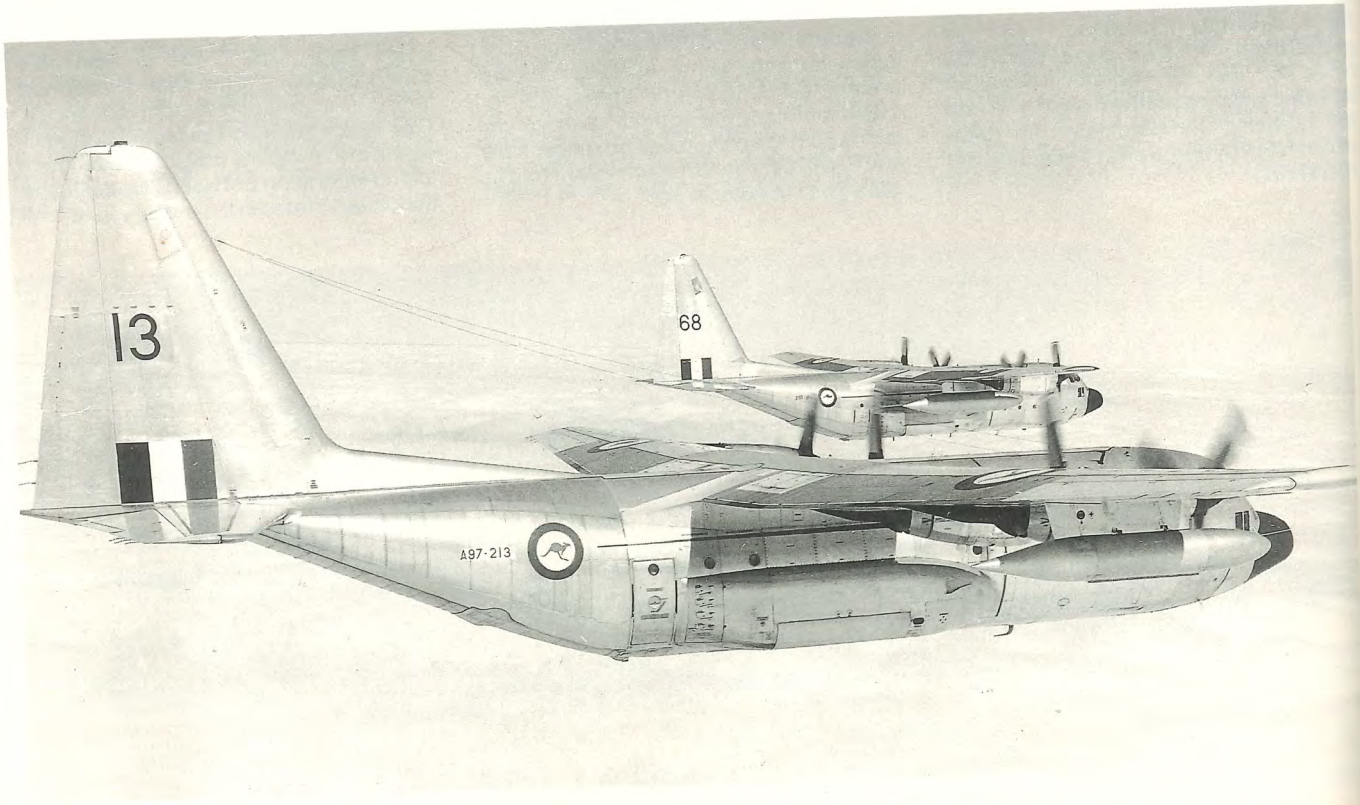
In his address at the ceremony, Mr Beale said: "The C-130 is admirably suited for the use of the Australian armed forces as a transport for long distances. This is an occasion of special significance in that it gives tangible evidence of the co-operation between Australia and the United States in the military field". All



Three of 36 Squadron's C-130As on the ramp at Richmond in 1959. Note the partially obliterated signwriting on the forward fuselage behind the cockpit windows. (CPE)



C-130A A97-211 head on over what looks to be the Hawkesbury River in NSW. (RAAF Richmond)



Interesting shot of C-130A A97-213 (foreground) and the newly delivered C-130E A97-168 late in 1966. Some rear fuselage and undercarriage fairing detail is visible.

12 Hercules had been formally handed over to the RAAF by 18 December.

All that was left now was for the C-130As to be ferried to their base at Richmond NSW. The first five aircraft (A97-205 to 209) departed on 6 December and travelling via Hawaii, Canton Island and Fiji, arrived at Richmond exactly one week later when the flight's commander, Wing Commander I R Olorenshaw and his crews were greeted by the just retired Vice President of Lockheed, Mr Carl Squire, the Minister for Air, Mr Osborne and the Chief of Air Staff, Air Marshall Sir Frederick Scherger.

The second group of four Hercules (A97-210 to 213, Sqdn Ldr W R Berriman in command) departed the USA on 29 December and arrived at Richmond on 5 January 1959, while the final batch of three (A97-214 to 216) arrived at 36 Squadron's new base on 3 March.

RAAF LOCKHEED HERCULES
Summary of Deliveries

Model	Serial Nos	Qty	Delivery
C-130A	A97-205/216	12	12/58-03/59
C-130E	A97-159/160	2	08/66
C-130E	A97-167/168	2	09/66
C-130E	A97-171/172	2	10/66
C-130E	A97-177/178	2	11/66
C-130E	A97-180/181	2	12/66
C-130E	A97-189/190	2	01/67
C-130H	A97-001/012	12	07/78-10/78

Expanding the Capability

November 1964 was a good month for the Lockheed company as far as receiving orders from the RAAF is concerned. In that month the Australian government announced it would purchase 10 Lockheed P-3 Orions and 12 C-130E Hercules for the RAAF along with the first eight of ultimately 12 Hawker Siddeley HS.748s which would serve with both the Air Force and Navy and 14 Grumman Trackers for the senior service.

The contracts for the Lockheed types were signed on 9 February 1965 and the cost of the Hercules acquisition put at £14.732m ($29.464m). Australia's involvement with the war in Vietnam played a significant part in the decision to purchase more Hercules at that time, the RAAF finding itself with insufficient long range transport aircraft (36 Squadron's C-130As only) to support Australian forces in the area and to satisfy requirements at home.

No 37 Squadron was the unit chosen to fly the new model from its base at Richmond. The squadron had previously been a basically wartime unit, formed at Laverton Victoria in July 1943 and subsequently operating a variety of types including the Lockheed Lodestar, Stinson Reliant, Northrop Delta and Douglas Dakota. It operated regular transport flights to Western Australia, the Northern Territory, Tasmania and New Guinea during World War II and courier flights to Japan and New Guinea afterwards. It was disbanded in February 1948, reforming at Richmond in February 1966 in preparation for the arrival of the C-130E.

These aircraft followed the example set by the RAAF's 'A' model Hercules in that their serial number suffixes reflected the last three digits of the manufacturer's constructor's number. The serials allocated were A97-159, 160, 167, 168, 171, 172, 177, 178, 180, 181, 189 and 190; the constructor's numbers were 382-4159 and so on. As had been the case with the RAAF's C-130As, the C-130Es were also allocated USAF serials for paperwork purposes: 65-12896 to 65-12907.

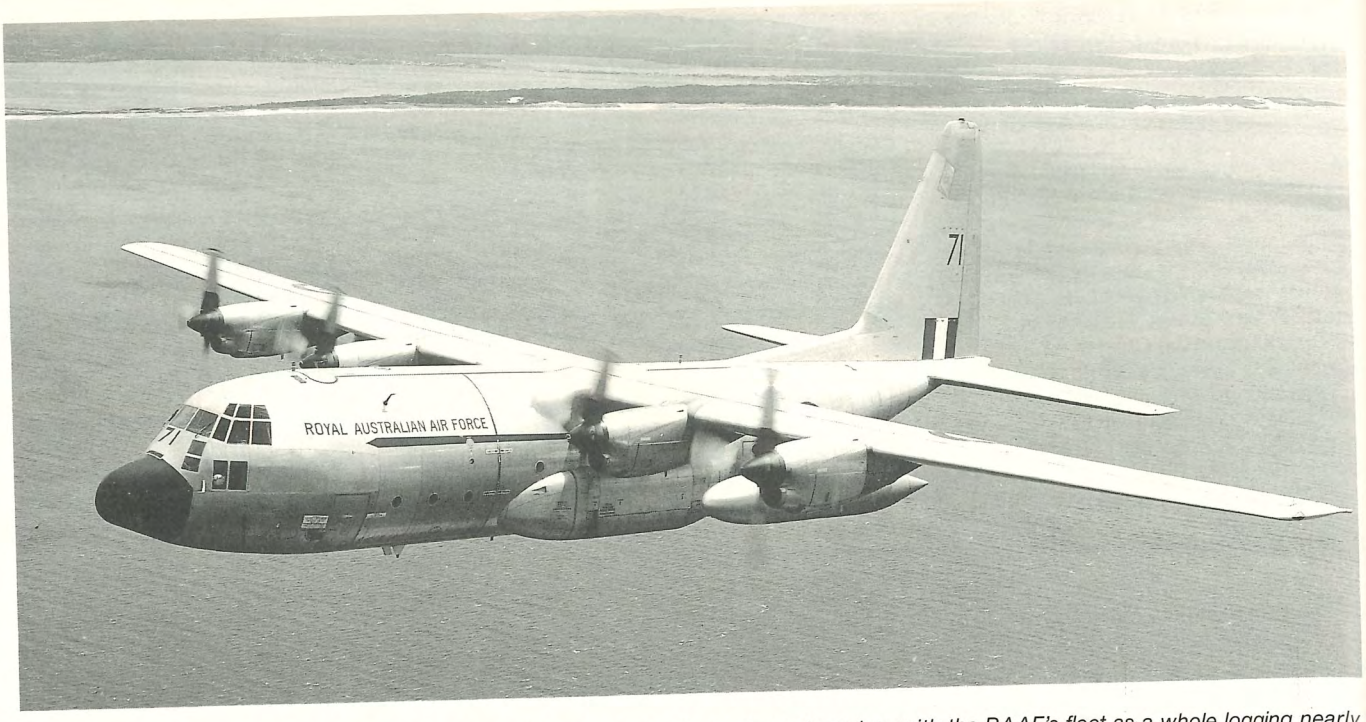
Deliveries began in August 1966, A97-159 arriving at Richmond on the 24th of that month followed three days later by A97-160. The remainder followed at regular intervals, September, October, November, December 1966 and January 1967 each witnessing the arrival of two examples for 37 Squadron which quickly settled into its basically 'strategic transport' role within the RAAF.

Australia's so far final purchase of the Hercules was allowed for in the 1975-76 Australian defence budget, 12 C-130Hs being planned for delivery in 1978 to replace 36 Squadron's C-130As, which would be twenty years old by the time the new aircraft entered service. In October 1975 a team led by Air Vice Marshall G J Cornish left Australia for discussions on the matter with Lockheed and the United States Department of Defence and on 30 June 1976 a contract was signed for the 12 Hercules at a cost of $86m. The original estimate (as included in the 1975-76 defence budget) had been $73m.

Deliveries of the new Hercules began on schedule in July 1978 when A97-001 and 002 arrived at Richmond on the 28th of that month to be accepted by the Chief



A97-160 was the second C-130E Hercules to be delivered to 37 Squadron, arriving at Richmond on 27 August 1966. The first aircraft (A97-159) arrived three days earlier. The major external differences between the 'E' and 'A' model Hercules are well shown here, namely the four bladed propellers and the underwing tanks mounted between the engines. (CPE)



By mid 1990, 37 Squadron's C-130Es were approaching a quarter of a century of service, with the RAAF's fleet as a whole logging nearly 500,000 flight hours free of major accident. (RAAF Richmond)



The RAAF's C-130Es started their lives in basically natural metal finish but with some areas subject to wear and abrasion painted. In recent years the aircraft have been operating with a light grey (lower fuselage) and white (upper fuselage) scheme, as displayed here by A97-160 and 177. (RAAF)

of Air Staff, Air Marshall Sir James Rowland. The remaining ten aircraft were delivered over the following three months, the last on October 19.

RAAF C-130H serial numbering differed from the method used for the A and E model aircraft. The new transports were allocated A97-001 to 012, reflecting not the constructor's numbers (382-4780 and 382-4782 to 4792) but Lockheed's 'line numbers', which were 7T-0001 to 7T-0012. Additionally, and for the first time in the case of Australia's Hercules, the C-130Hs were delivered in a grey/olive/tan camouflage colour scheme, indicative of their primarily tactical role within the RAAF.

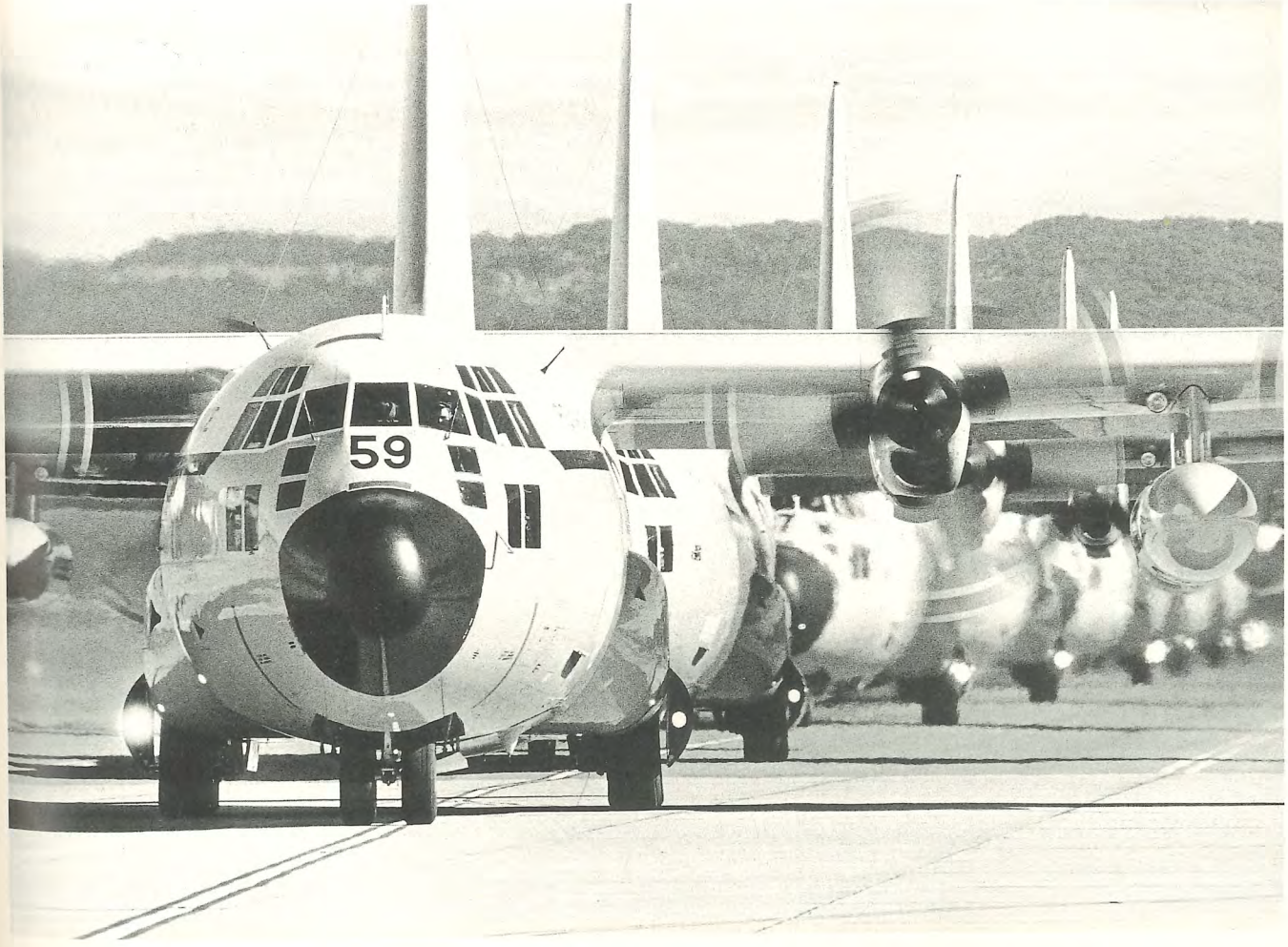
The Great Disposal Saga

With the arrival in Australia of the new C-130Hs for 36 Squadron, the C-130As were rendered surplus to requirements. The aircraft were withdrawn from use and ten of them flown to RAAF Laverton, Victoria, where they were placed in open storage awaiting disposal. Two aircraft remained at Richmond (A97-209 and 211) and the last four aircraft (A97-207, 208, 212 and 215) arrived at Laverton in late September after a 'farewell' flight over Melbourne. All 12 had meanwhile been offered for sale by tender, an act which started a remarkable series of events resulting in civil and criminal litigation, an administrative debacle of the highest order and the painfully slow disposal of the aircraft.

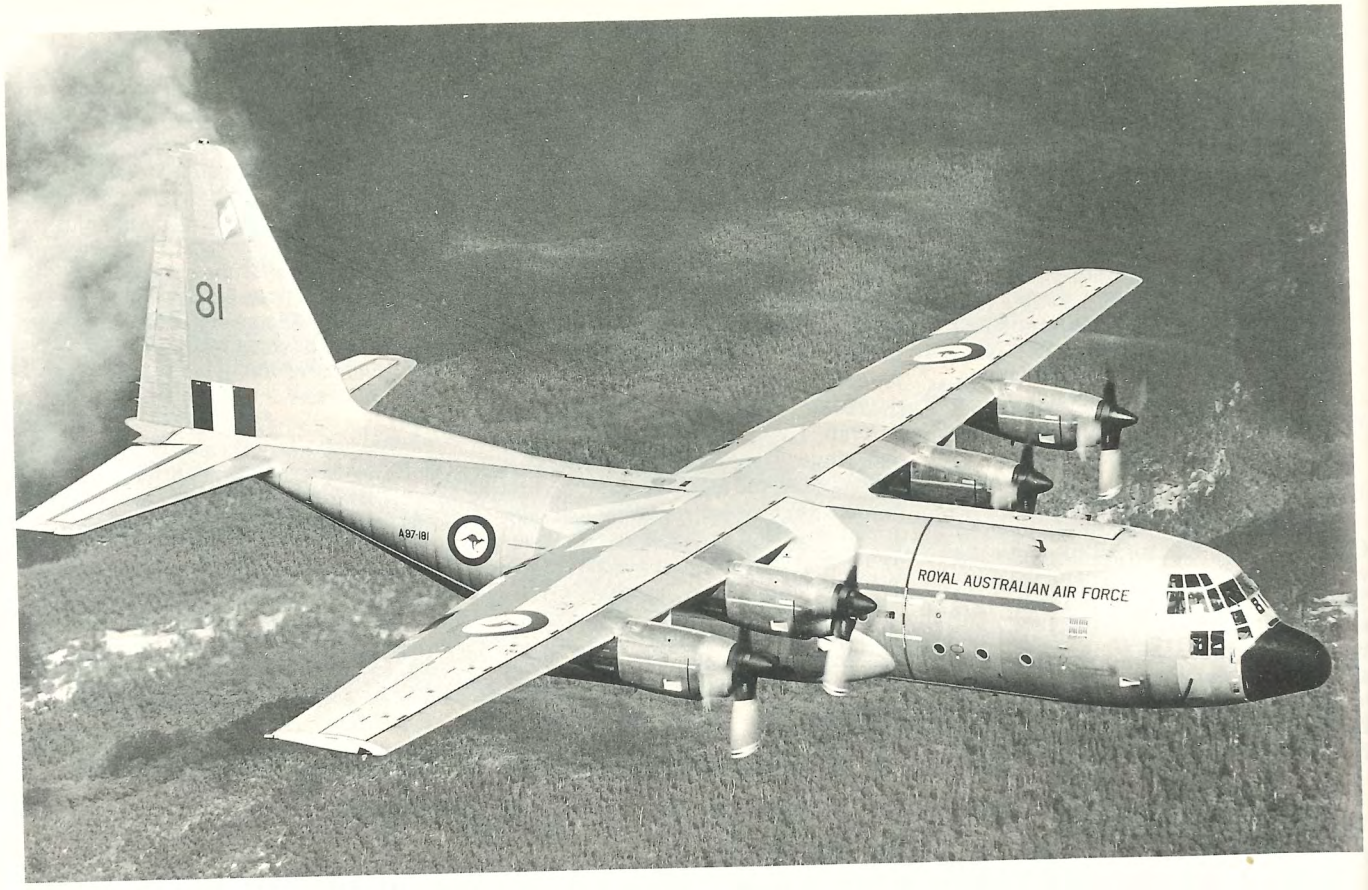
In January 1978 tenders were invited by the Department of Administrative Services for "the purchase and removal of 12 C-130A aircraft ex Department of Defence (Air) no longer required for government use". For the record, the tender was given schedule number TV 540/9/194 and the closing date was 2.00pm, Thursday 9 February 1978. At this stage the aircraft were still at 36 Squadron's base at RAAF Richmond and all but A97-209 (which had been withdrawn from use in December 1977 and was not airworthy) were still in use with 36 Squadron.

The tender documents note that the airframes had accumulated between 11,000 and 14,000 flying hours each, the engines had flown approximately 2,400 hours since overhaul and that the aircraft would be stripped of survival equipment such as parachutes, life rafts, rescue beacons and so on. The 11 airworthy Hercules would be available in 'flyaway' condition but only with sufficient hours remaining to ferry them to a new owner before overhaul of major components and systems would be required. A97-209 was listed separately due to its non-flying status and the document notes its total flying time as 12,238 hours, time since Anti Deterioration Services 2,790 hours, time since 'D' Overhaul (the six months or 500hr check) 498 hours and engine hours which were approximately the same for all four and averaged 8,600 since new and 2,300 hours since overhaul.

Three important clauses were included in the tender documents. Firstly, US Government consent had to be obtained before the sale of any of the aircraft could be finalised due to the terms of the USA's Arms Export Control Act; secondly, under the heading "Restrictions of Sale" it was noted that the aircraft must be exported from Australia and its Territories or be scrapped (this also applied to resales); and thirdly, "End Use", a clause which required tenderers to disclose their ultimate intention in purchasing the aircraft.



Two thirds of 37 Squadron's strength of 12 C-130Es on the move at the same time with A97-159 leading.



A 1975 portrait of 37 Squadron's A97-181, at which time the aircraft was a youthful nine years old. A proposed life extension programme could see it retiring at the ripe old age of 44 in the year 2010! (RAAF)



From some angles the Hercules could almost be described as elegant. Perhaps this is one of them. (RAAF Richmond)

It should be noted that after initial attempts to dispose of the Hercules had failed, only 10 of the 12 C-130As were made available. A97-209 remained at Richmond for use in loadmaster/airborne load training – it is still there less outer wings, tail and engines – while A97-211 was flown from Richmond to RAAF Wagga Wagga in August 1980 for apprentice training.

Fun and Games

What followed could easily be the subject of a book in its own right, but in abbreviated terms the sequence of events went something like this. After the original tender had been issued, it was decided in July 1978 that none were acceptable, so the tender was re-issued in November of the same year. This time a tender of $10.212m from Texas based firm Parmax Global Jet was accepted (in March 1979) but in April 1980 it was announced that Parmax was in default (it couldn't raise the necessary capital) and the $500,000 deposit it had paid would be forfeited.

The process was again delayed in early 1981 while a request from the Victorian government for the aircraft to be converted to fire bombers was investigated. In the meantime several offers from various sources had been made, including the Mexican Air Force and the United Nations World Health Organisation. In March 1981 it was somewhat surprisingly announced that the Californian law firm, Ford and Vlahos, had been appointed sales agents for the Commonwealth Government to handle not only the disposal of the Hercules but also the Royal Australian Navy's surplus Grumman Trackers which even today sit unsold and rotting at their New South Wales base.

Australian Aviation magazine takes up the story: "Ford and Vlahos had as its directors John Ford of San Francisco and Canberra lobbyist Peter Hocking and his offsider Ken Oliver. That the important tender was given to a firm of attorneys rather than qualified practising aircraft brokers with a proven track record for credible business dealings caused more than a little disquiet within the industry.

"Not readily appreciated at the time was that Peter Hocking had been the personal secretary for Senator Reg Withers when he headed Administrative Services – Hocking knew how government worked and who made the decisions. Across the Pacific, John Ford smelled a windfall. Though the government of the day had no reason to suspect his credibility, Ford had a 30 year history of bad business dealings. In fact he had been litigated against 21 times for breach of trust, professional negligence, fraud, misrepresentation and conspiracy. He had even served time in gaol.

"Ford and Vlahos then began to market the aircraft on the basis that the Australian government would receive a flat $1m for each aircraft sold with the firm retaining the rest.

"However, little happened and when only one aircraft was sold to the French government (A97-208 for use in Chad and registered N4445V) in 1983 for $3m, Ford and Vlahos pocketed a net return of more than $1.5m after claimed expenses and French agency commissions. The French purchase was to include a large quantity of spares which, needless to say, did not arrive.

"Onto Bogota, Colombia, drug capital of the world. In 1984, charter company Aviaco wanted two of the Hercules for



The RAAF's first C-130H on the production line at Lockheed's Marietta, Georgia, plant in 1978. This aircraft became A97-001 and was delivered to 36 Squadron on 17 July 1978. (DoD)



The final touches are applied to C-130H A97-001 (above) including painting the words "Royal Australian Air Force" on the forward fuselage. With everything complete, the aircraft is rolled out (below) and ready to be handed over to its new owner. (RAAF)

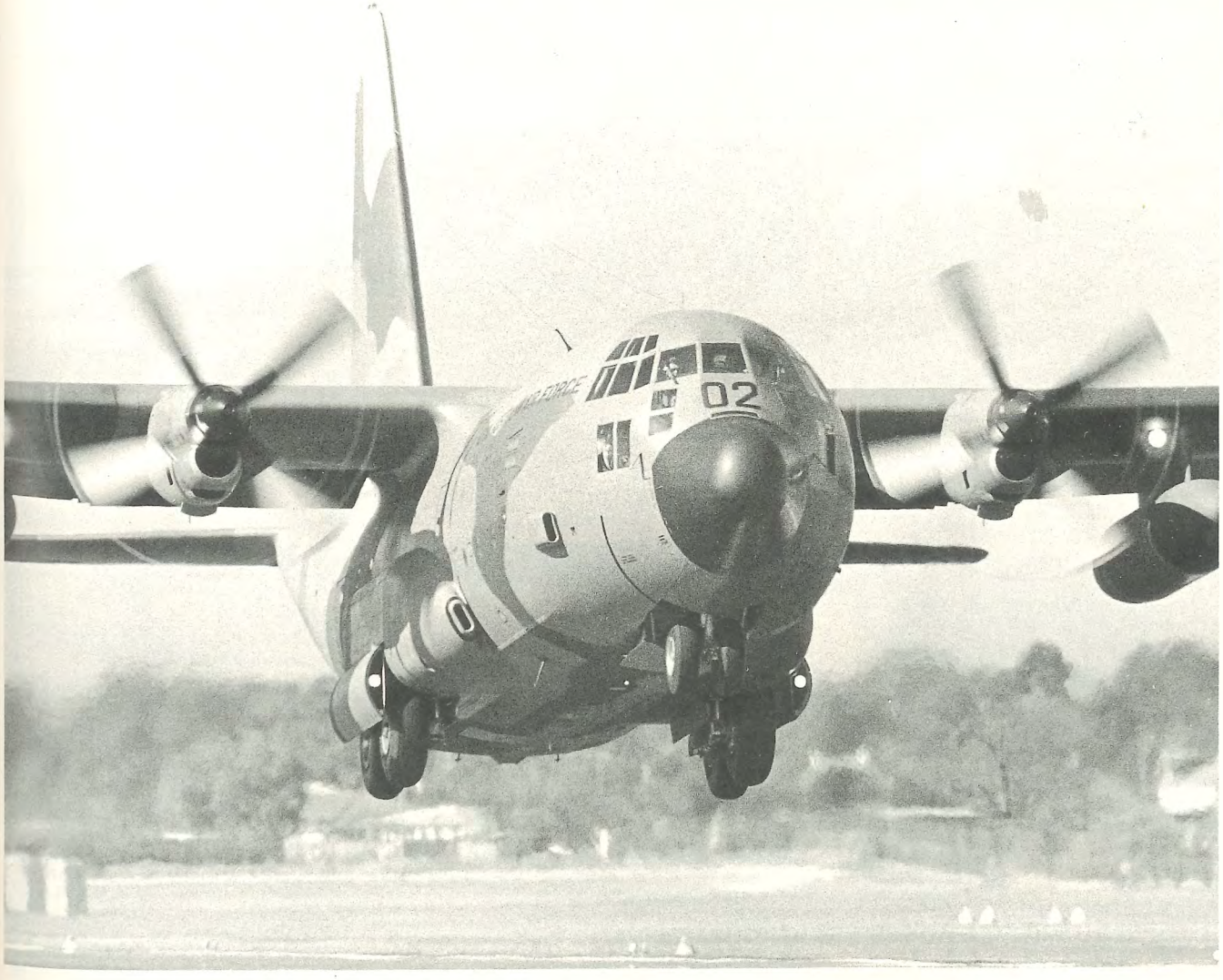


(right) C-130H A97-005 undergoes some pre delivery testing in the USA. This Hercules arrived in Australia in August 1978.

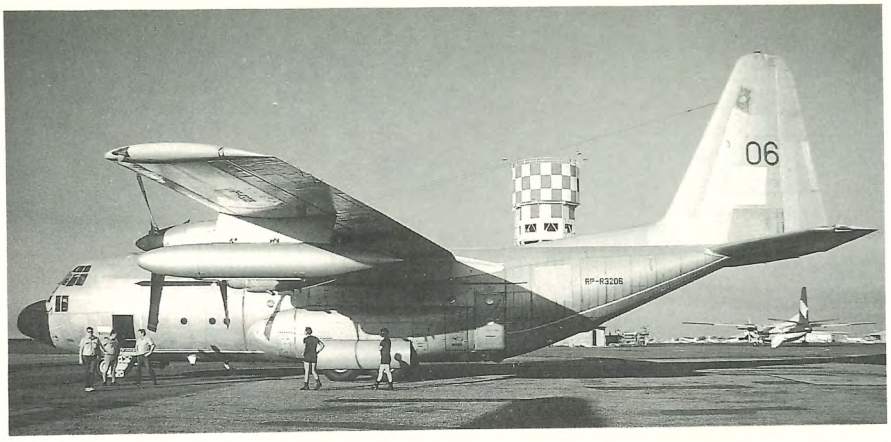


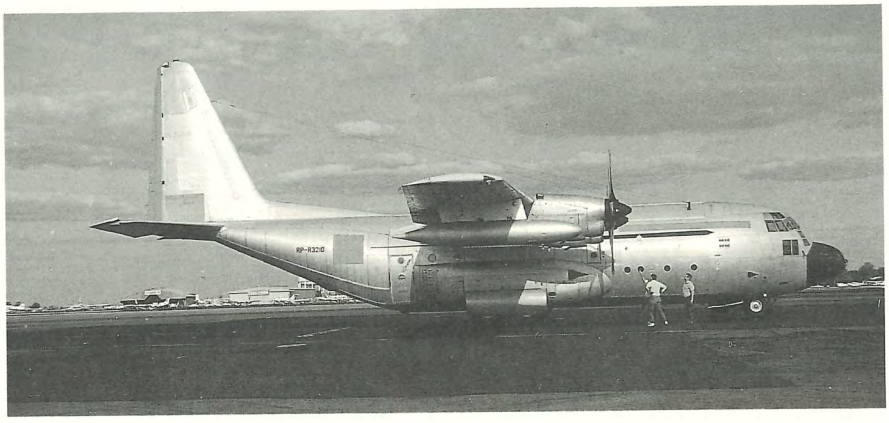
what they described as internal freight work. US State Department approval to sell the aircraft was withdrawn at the last minute when it was discovered on the operator's insurance application that they were going to be flying into unapproved airstrips in the southern USA. Smelling a drug run, the US properly denied sale approval and the deal fell through. (Note: the two Hercules were A97-212 and 216 – both were in the USA when their sale was cancelled).

"In the meantime, although Aviaco had paid Ford and Vlahos $985,000 in deposit, that money was never seen again by them. One (Hercules) made it to Dothan in Alabama and the other to Oakland, California. They still lie there to this day, parked, like their southern cousins, in the backblocks of an aluminium graveyard



Just off, C-130H A97-002 departs Richmond on another 36 Squadron sortie.





(left) The great Hercules disposal saga finally started to sought itself out in 1988 with the sale of four ex RAAF C-130As to Aboitiz Air Transport in the Philippines. The aircraft are used on freight services. These are two of them: A97-206 (which became RP-R3206) and A97-210 (RP-R3210). The others were A97-211 and 213. (W N Lines)



The Hercules 'graveyard' at Laverton, Victoria, with four of the retired C-130A Hercules visible. The series of events which followed the offering of these aircraft for sale by tender could make an excellent adventure novel!

accruing parking fees in the process. Not only are we liable for them but Aviaco sued the Federal Government for $1m.

"In this period it is worth noting that the Ford and Vlahos contract was renewed no fewer than 11 times and that through his physical involvement as an approved agent of the Australian government, John Ford was able to extend his own, often dubious, business dealings.

"At this stage, things began to get sticky in Canberra and the name Ford and Vlahos was beginning to get mentioned a little too often for comfort within the corridors of power. They lost the contract (in June 1986) and in its place came a new firm, Defence Equipment. What was noteworthy about Defence Equipment was that it was given exclusive sales rights without a tender even having been called and that – you guessed it – the directors were none other than Peter Hocking and Ken Oliver.

"Along came the Ethiopian famine and Australia was swept up in an international desire to assist. With full government backing, $1.7m was given to Defence Equipment for the refurbishment of two Hercules as Australia's contribution to famine relief. (Incidentally, the relief effort's organiser, Bob Geldorf, had originally asked for seven!) At the same time a large number of airline, RAAF and ex-RAAF aircrew and ground support personnel, backed also by IPEC, volunteered to prepare, operate and crew the aircraft at a minimal charge to ensure the relief mission was effective.

"Instead, their generous plan was scuttled, and a new company, International Air Aid, won the $1.5m contract to refurbish and ferry (one aircraft only due to increased costs) the aircraft on behalf of the government. And the directors of this new company? Peter Hocking and Ken Oliver!

"Onto Ethiopia, and the aircraft (A97-207/EL-AJM) became the operational responsibility of the International Red Cross. But to operate the Hercules the IRC signed up another firm and paid them $4m in the process. Integral Air Aid, registered in Cyprus, was the company and its directors were none other than Peter Hocking and Ken Oliver!

"From then on the aircraft flew *ad hoc* missions and was fraught with crew and support problems as money was not spent on servicing or proper contract crew reparations. After only four months, Ken Oliver was accused of taking photographs of a sensitive military area in Ethiopia and was expelled from the region. The IRC cancelled the contract and the Herc was finally withdrawn with Australia's international image badly tarnished in the process."



A97-207 was operated on Ethiopian famine relief flights during 1986 following a request from 'Band Aid/Live Aid' driving force Bob Geldorf. With the Liberian registration EL-AJM and operating on behalf of the International Red Cross, the aircraft operated the relief flights only briefly before returning to Australia. Its acquisition, refurbishment and operation were also subject to scandal, something which did Australia's international reputation little good. The forward fuselage close up shot shows some of the special artwork applied.



The Wash Up

The Ethiopian Hercules returned to Australia in December 1986 to be stored once again, while Peter Hocking and another of his associates, Peter Commins, were arrested in May 1989 and charged with 15 counts of defrauding the Commonwealth and conspiracy following various government and Federal Police investigations plus some close attention by the news media.

As for the real 'stars' of this black comedy, the aircraft, those still available for sale were finally disposed of by mid 1989 with the sale of four examples to Fowler Aeronautical Corporation of the USA for $5.2m including a large spares holding. In May 1988 four others were sold to Aboitiz Air Transport Corporation for $2.86m where they are used for scheduled cargo flights from Manilla to destinations around the Philippines. Between then and their retirement from RAAF service, more than a decade had passed since the aircraft were first offered for tender with many questions still unanswered. Why was Ford and Vlahos appointed in the first place? Why did Hocking and Oliver continue to have such influence on the matter? Why were the several legitimate and reasonable offers on the aircraft rejected without proper examination?

The saga only began to take on some degree of sense in October 1987 when the Minister of Administrative Services finally decided that a new policy for the disposal of ex military aircraft was necessary. From then on, private companies would no longer be engaged to handle them and the Commonwealth would look after the matter on a competitive basis. Although disposing of such aircraft through private agents is not a problem in itself, it becomes one when the agent is less than honest in his dealings!

As of June 1990, three of the C-130As remain in Australia, A97-209 at Richmond, wingless and enginless for training purposes and A97-205 and 214 at Laverton. '205' is bare and derelict, it's intended fate on the fire dump for the moment postponed. '214' is to go to the RAAF Museum or the proposed National Air and Space Museum at Laverton.



Dramatic shot of C-130A A97-210 departing Laverton for the Philippines in July 1988. Underneath sits the forlorn, rudderless and engineless A97-205. (RAAF Museum)

HERCULES IN SERVICE

The Royal Australian Air Force's has operated two Hercules squadrons since the C-130Es supplemented the 'A' models in 1966, these aircraft in turn being replaced by C-130Hs in 1978. Both squadrons – Nos 36 and 37 – have been based at Richmond, west of Sydney, since the aircraft first entered service with them and have evolved into performing very different roles. No 36 Squadron, equipped with C-130Hs, performs mainly short and medium range tactical missions in support of the troops on the ground, its flying often involving speeds of more than 200 knots in combination with heights above ground level as low as 250 feet using terrain masking techniques as the drop zone is approached. It's exciting flying, more akin to a fighter-bomber than a heavily laden transport. 37 Squadron's C-130Es fly somewhat more sedate, but no less important tasks, the unit forming what could be described as the RAAF's 'airline', flying longer range strategic missions, many of them routine, scheduled flights moving men and equipment from point to point.

Both squadrons have been called upon to perform civil aid missions on a fairly regular basis, usually as the result of some kind of natural disaster (Darwin's Cyclone Tracy in late 1974 and the western New South Wales floods in 1990, for example) but sometimes due to human induced emergencies. 'Operation Immune', the performing of civil airline duties as a result of the Australian domestic pilots' mass resignation in 1989 is one such case.

The RAAF's Hercules squadrons fly approximately 18,000 hours per annum between them, 36 Squadron accounting for about 8,500 hours and 37 Squadron 9,500 hours, the latter's higher figure due to the nature of most of its flights. Both squadrons base their operations on a 'standard' daily strength of seven available aircraft out of their compliment of 12. For 36 Squadron, the seven comprise five for operations, one for tactical training and one for pilot training while 37 Squadron uses six for operations and one for pilot training. The number of flying hours available is of course a function of the available budget, and when extraordinary utilisation is called for (for example during 'Operation Immune') more money has to be allocated from those in Canberra who control the purse strings. This unplanned high utilisation also usually results in a lower availability for a time after things get back to normal due to the maintenance burden resulting from it.

The aircraft not accounted for in the



No 37 Squadron has has been operating its C-130E Hercules in the basically strategic transport role since 1966. This is A97-171 over the alpine region in southern New South Wales.



The RAAF's first C-130H Hercules, A97-001 displaying the camouflage scheme indicative of its tactical role with 36 Squadron. (DoD)

'standard daily strength' figures noted above would be assumed to be undergoing some kind of maintenance, whether it be of the basic 'line' type performed by the squadron or heavier work. In the case of the latter this is performed by Richmond's resident maintenance squadron, No 486.

The servicing of the RAAF's aircraft is based around three levels of complexity. Operating Level (OL) Maintenance is carried out by the squadron operating the aircraft – Nos 36 and 37 in the case of the Hercules. Intermediate Level (IM) Maintenance is usually performed by the appropriate maintenance squadron (No 486 at Richmond), and Depot Level (DL) Maintenance which is heavy work allocated to either an RAAF Aircraft Depot (AD) or to a civilian contractor with the appropriate level of equipment and expertise. Richmond has No 2 AD within its boundaries, while civilian organisations such as Qantas have contributed to the Hercules' heavy maintenance over the years.

In mid 1990 it was announced that Air New Zealand had been awarded a four year contract to perform depot level maintenance on the RAAF's Hercules. Interestingly, Australia's Qantas was unable to bid for the work, primarily due to a lack of engineering staff.

Early Hercules Operations

With the delivery of the 12 C-130A Hercules from December 1958, No 36 Squadron spent the early months of 1959 training and working up to operational readiness. A Training Flight was established within the squadron in January 1959, the first ground course being followed in February by the start of flying training based on an eight air lesson plan providing 24 hours of flying before a pilot would go 'solo' on the Hercules.

These and other activities ensured a busy first year for the C-130As, jobs performed including support of the second part of Operation Sabre Ferry in February 1959 when two Hercules joined Canberra 'mother ships' and Neptune search and rescue aircraft in escorting 77 Squadron's 18 Sabre fighters on the long and potentially hazardous journey to Butterworth, Malaya, from Williamtown in New South Wales. The Sabres from 3 Squadron had made the journey



With its starting trolley in place, a 37 Squadron C-130H shares the ramp with a pair of Canadian Armed Forces Boeing CC-137 (707) tanker/transports.

the previous October but without the benefit of the Hercules' long legs and large carrying capacity.

The usefulness of the Hercules and its versatility soon became apparent as 36 Squadron was called upon to perform anything from inter squadron support, Army co-operation, freight and medical evacuation (Medevac) missions to supporting SEATO (South East Asian Treaty Organisation) exercises and providing courier flights to Malaya, at that time and for many years later a vital part of Australia's strategic planning.

Of interest is the following document, issued by the Chief of Air Staff, Air Marshall Sir Frederick Scherger, to his Minister in April 1959. Entitled "HERCULES AIRCRAFT – POLICY FOR THE USE OF", it spells out the intended roles of the aircraft in RAAF service, partly to answer some criticism which had suggested the aircraft might be used in competition with Australia's airlines, which at that time carried the vast majority of military personnel around the country:

"The Hercules aircraft were purchased as military transports, not as troop carriers. Their freighting capacity is vastly superior to any current civil aircraft. On the other hand, large civil passenger aircraft such as the Constellation, DC-6, Electra etc, are greatly superior to the Hercules as troop carriers. The total capacity of the 12 Hercules aircraft is not sufficient to enable us to meet, in peace, the total requirement of all the Services for the movement of both personnel and military freight.

"In war, the Hercules would obviously have to be used in the forward fighting zone for the transport of both troops and freight. For this reason it is essential, in peace, that soldiers be trained in the most effective use of the Hercules for their particular purposes. It is planned that this will be done with members of the permanent brigade; the first move in this direction is to provide two Hercules for full time service with the permanent brigade during its exercises which are about to commence at Mackay in Queensland.

"It must be clear that we have no intention of competing with civil airlines in the carriage of military passengers. The RAAF will continue to plan to move all personnel to and from Malaya, and within Australia, by civil aircraft. However, when freight loads carried do not consume the total capacity of the aircraft, and operating conditions permit, personnel may be carried on a fill up basis. Normally, those personnel who must accompany specialised equipment to ensure its operation immediately on arrival at the destination will be carried with the equipment.

"It can be said therefore that the Hercules aircraft's task is to do the jobs which civil airlines cannot do, whether by reason of capability or capacity. This argument applies equally in peace or war.

"Viewed in this light, the RAAF's policy for the employment of Hercules in peace time, in order of priority, is:

(a) Carriage of military equipment, and where necessary, operating personnel for the three Services.

(b) Training for war, including aircrew training, air movements personnel training (Army personnel included), paratroop training and training in tactical air supply.

(c) Any other essential military tasks which civilian aircraft are unable to undertake.

"In war, the Hercules' tasks would be:

(a) Ferrying of heavy equipment, together with the opportunity to appropriate crews, to the theatre of operations.

(b) Casualty evacuation and return of repairable equipment to the main base.

(c) Movement of troops and equipment within the operational theatre".

Sir Frederick went on to offer some background to the status of the RAAF's Hercules at that time, apparently in answer to some media criticism of 36 Squadron's state of readiness, criticism which was obviously based on a limited knowledge of how things work and how much preparation is required to get a



Reflections on a Hercules' tail! Three 36 Squadron C-130Hs prepare for departure on what has apparently been a wet day.

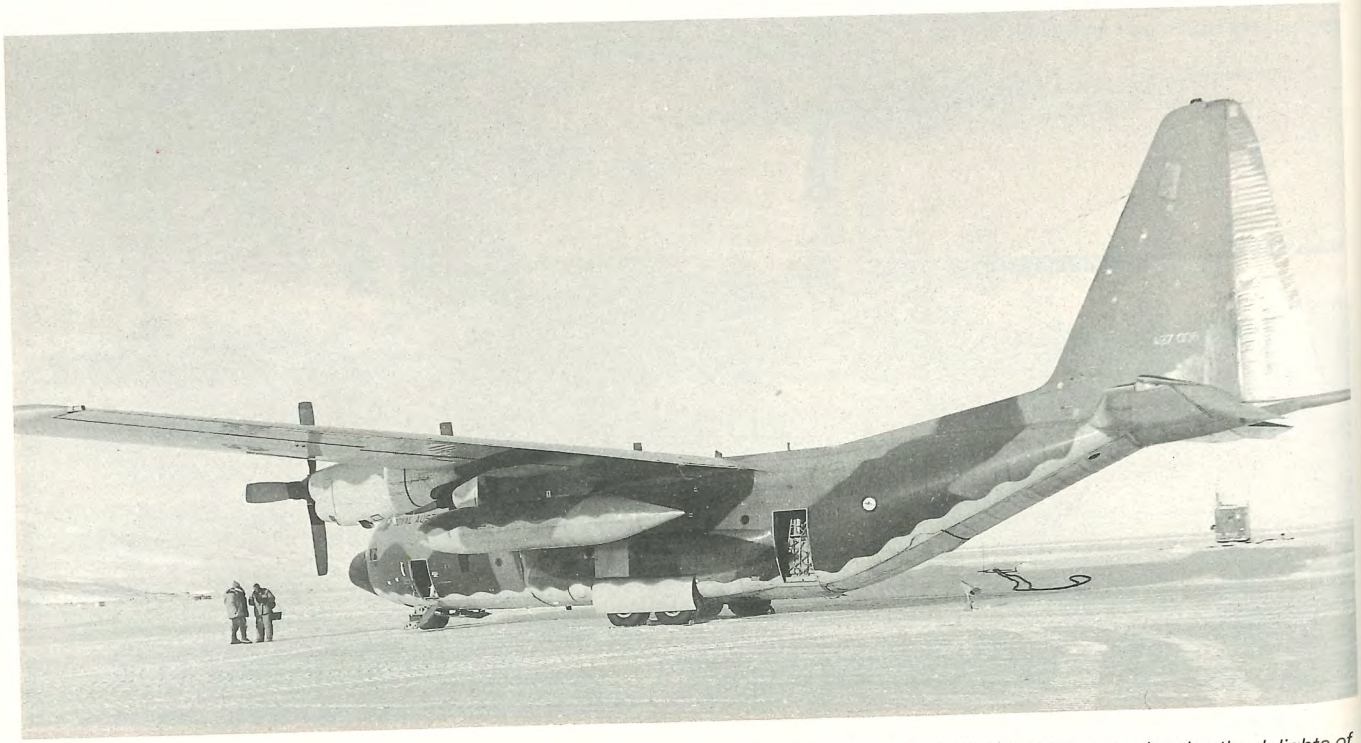


(left) Against an imposing backdrop, 37 Squadron's C-130E A97-190 departs on another of its regular transport flights. (DoD)

new aircraft type into full service. He pointed out that 36 Squadron was due to be fully operational by 1 May 1959 (just two weeks after his document was issued) and some of the achievements already recorded by the aircraft during what was its working up period. Remember, the final Hercules had only been delivered the previous month:

"... the support of Sabre Ferry has been accomplished; Hercules aircraft participated in the SEATO exercise 'Air Progress' in Thailand, and support has been provided for Army exercise 'Grand Slam'. In the circumstances, this is a most creditable achievement. All of the Army's formal requests for transport air support, using Hercules aircraft for exercise 'Grand Slam' are being met. 200 tons of troops and equipment were moved from Brisbane to Mackay in four days, as compared with Army's request for 170 tons in seven days. Further lifts of troops and equipment will take place in April, May and June. A total of 175 Hercules flying hours will be expended during this exercise, equal to the complete effort of three Hercules for one month, ie, 37 per cent of the squadron's effort for one month".

A creditable performance indeed, and one duplicated many times over in the following years by 36 Squadron's Hercules and later 37's. In the meantime, 36



Regular supply flights to Australian Antarctic Territory are part of the RAAF Hercules' duties, C-130H A97-006 is experiencing the delights of very low temperatures in this case.

Squadron remained the sole operator of the type until 1966 when the C-130Es arrived, a full range of activities in the interim years keeping the squadron busy with duties ranging from routine supply flights to more tactical army support missions. Some of the squadron's notable 'special' activities in the following years included flying a mission to Marauke on a cholera relief mission sponsored by the United Nations in November 1962, the moving of Royal baggage and special equipment (including cars and the RAAF Band) during the March 1963 visit by Her Majesty, Queen Elizabeth II and HRH the Duke of Edinburgh and in late 1963 the transport of the first Mirage III fighter fuselage from France for local assembly by the Government Aircraft Factory.

The squadron's achievements were formally recognised in November 1962 when it was awarded the coveted Duke of Gloucester Cup for being the most efficient squadron of the year. When announcing the award, the Minister for Air, Mr Fairbairn, said "throughout the year, 36 Squadron, based at Richmond NSW, has carried out its assigned tasks with 100 per cent success. Apart from scheduled courier flights and many unscheduled freight specials, the squadron has provided a high standard of transport for numerous Army, mobility and SEATO exercises ..." The Cup was presented by His Excellency the Governor General, Viscount de L'Isle and Dudley, to Wing Cdr H W Connolly.

Problems and Modifications

Despite the Hercules' generally excellent record of reliability and maintainability during its service with not only the RAAF but also the 50 or so other operators of the type, one or two problems have needed rectification over the years. An early one was the discovery of corrosion in the wing tanks of the RAAF's C-130As and other Hercules operated in a tropical or sub-tropical environment. By association, the corrosion also affected some of the aircrafts' lower wing panels.

In April 1961, following the discovery of corrosion in one RAAF Hercules during a routine inspection, X-Ray examination of all 12 C-130As was ordered. Other aircraft were found to have the same problem and over a two year period beginning in June 1961, the RAAF's Hercules were all flown to the USA for rectification work by Lockheed.

The problem was caused by certain bacteria and fungi – "glotus borum" – which have an affinity with kerosene type fuels and are capable of multiplying in the presence of water, something which always exists to a greater or lesser extent in aircraft fuel tanks. The bacteria lives in between the layer of residual water in the bottom of the tank and the fuel itself. Factors encouraging the growth of these 'bugs' included tropical storage and extreme temperature changes between the ground and aircraft operating altitudes.

Lockheed developed a patch to repair the damaged wing panels. These were fitted at the factory while the integral fuel tanks themselves were resealed, a substantial job. At the same time, scientists began working on a fuel additive which would kill bacterial growth within the tanks. Interestingly, and unrelated to the above, two of the RAAF's C-130As – A97-207 and 214 – earned something of a reputation as 'jinxed' aeroplanes during their 20 years of service. It seemed there was always something wrong with them! Ongoing and constantly recurring problems with the C-130As included those associated with the powerplants' turbine inlet temperatures, the torque meters and the Sperry E-4 autopilot pitch control.

Another structural problem affecting the 'A' model Hercules required analysis and rectification, and this time much of the investigative work was carried out by the Melbourne based Commonwealth Aircraft Corporation (CAC) in conjunction with the Aeronautical Research Laboratories (ARL) and Lockheed.

Operational experience with the RAAF's C-130A fleet had shown that the aluminium alloy integrally machined skin stringer panels ('planks') covering the upper surfaces of the wing centre section had been assembled without adequate protection. This resulted in corrosion, the deterioration eventually reaching the stage where continued patching by repair became impractical.

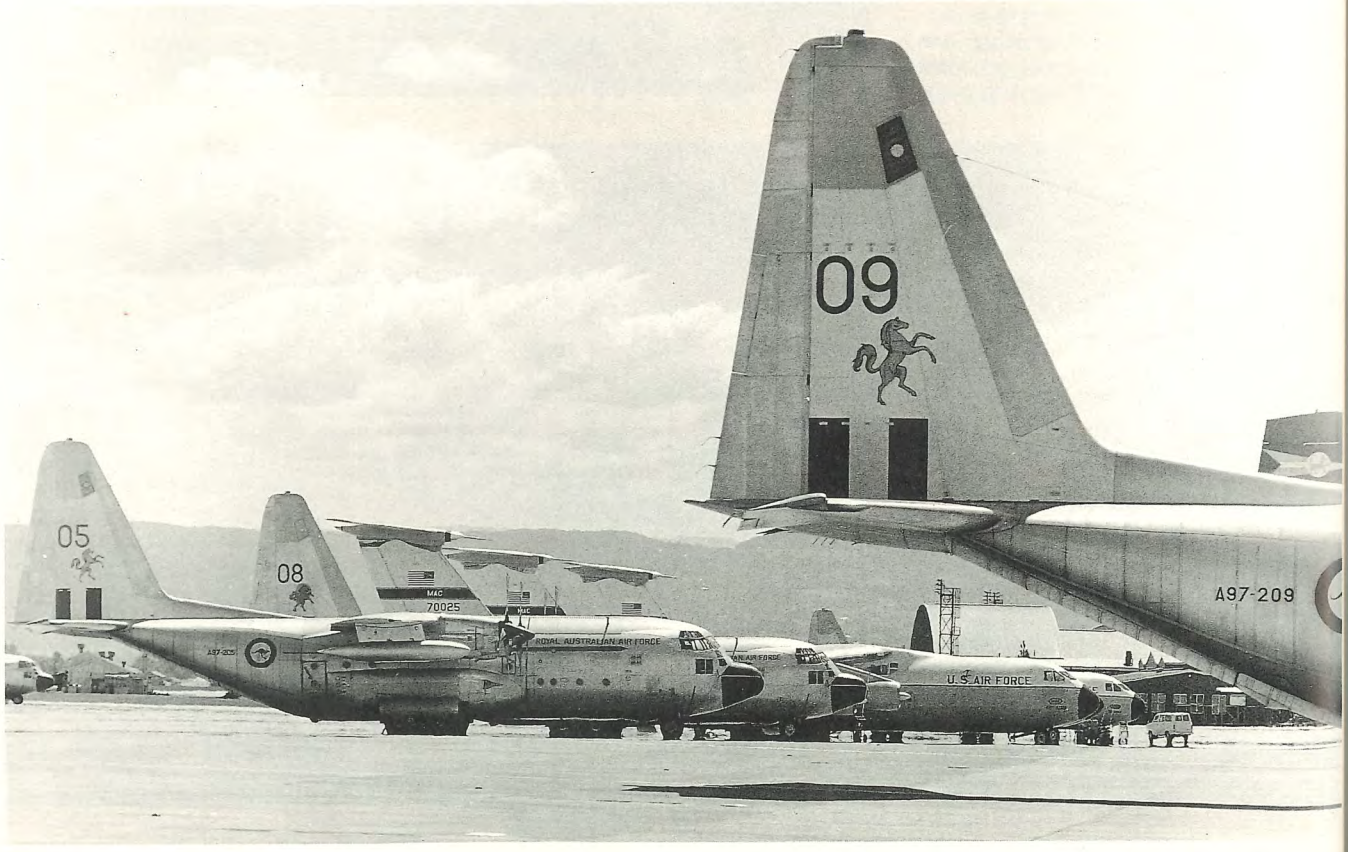


36 Squadron was the RAAF's first Hercules unit and in fact the first export user of the type, its 12 C-130As arriving in late 1958 and early 1959. All were retired from RAAF service in 1977-78, A97-207 later on performing famine relief work in Ethiopia on behalf of the International Red Cross. (RAAF Richmond)

In 1967 the RAAF introduced Modification 131, which basically consisted of replacement of the upper planks with new items while at the same time paying more attention to corrosion protection. When the upper planks were removed from the first aircraft to be modified (A97-216), the corrosion was found extending intermittently over the entire length of the front spar cap flange.

From that discovery, the possibility of internal corrosion starting from within the rivet holes was suspected and an ultrasonic probing technique was used to examine all the accessible spar flanges within the wing structure. This revealed the expected signs of extensive corrosion starting from rivet holes, corrosion which occurred intermittently over the entire length of the centre section spar caps, both upper and lower as well as the front and rear spars. Sample sections were cut from the defective areas and sent to the ARL and Lockheed.

Detailed examination by the ARL indicated that the rivet holes from which the cracks had started were slightly oval in section, entered the surface at oblique angles and had non parallel sides. As a result, gaps occurred between the rivet shanks and the hole surfaces during the



Lockheeds dominant at Richmond with 36 Squadron's C-130A Hercules sharing the ramp with three C-141 Starlifters of the USAF's Military Airlift Command. 36 Squadron's 'prancing horse' insignia is well shown. (RAAF Richmond)



C-130A A97-211 over the NSW coast. This aircraft was one of four sold to Aboitiz Air Transport in 1988 for freight operations in the Philippines. (RAAF Richmond)

riveting operation and as the rivets were assembled dry, moisture collected in the gaps forming natural corrosion cells. Additionally, drilling had exposed the end grain of the material, rendering the hole surface particularly vulnerable to corrosion. In association with the corrosion, extensive cracking was found just under the surface of the component in question, initiating from the rivet holes. Removal and replacement of rivets contributed to this process, and that is exactly what had been happening with the fitting of repair patches to the upper wing patches and of course their replacement under Modification 131.

CAC was therefore approached to act as a Design Authority for the RAAF's C-130As, the object being to keep all technical aspects within the control of a single local contractor. Personnel at the RAAF's No 2 Aircraft Depot at Richmond had meanwhile discovered that replacement of the top planks by re-riveting gave



Power to the people! A spot of bother for 36 Squadron's A97-213 in Papua New Guinea is solved with the help of a few hundred local volunteers. (RAAF Richmond)



Illustrating one of 36 Squadron's tactical roles within the RAAF, C-130H A97-001 disgorges a load of paratroops during a training exercise. The Hercules can carry up to 64 paratroops. (DoD)

indications of further cracking of the spar flanges. Two aircraft were checked, A97-201 (which had just completed Mod 131) and A97-213 which had Mod 131 installed four months earlier and had flown 420 hours since. Both aircraft revealed extensive cracking, A97-213's in fact being noted as 'very severe' and extending along the entire area of plank attachment flanges.

As it became obvious that attachment of new planks resulted in a serious increase in spar cap cracking, it was decided to cease Mod 131 work until further investigations had been carried out. By the end of June 1968 five of the RAAF's C-130As had been fitted with new plates under Mod 131. One aircraft (A97-210) had not been reflown while the other four had flown between 80 and 440 hours since modification. The high time aircraft was A97-216, which had been the first modified in November 1967.

An extensive investigation followed, resulting in the introduction of a repair scheme for the faulty spar caps and ultimately a replacement programme. This was just one example of the several investigations into Hercules fatigue life and structural aspects conducted by CAC over the years. The company was also involved in the general fatigue life programme of the Hercules in conjunction with Lockheed and the ARL, the object being to substantiate by analysis and tests the design goal 30,000 hours and 12,000 landings life of the wing and empennage, 15,000 landings for the undercarriage and 20,000 flights for the fuselage.

As a result of the USAF's high utilisation of the Hercules in Vietnam, its extensive operation from rough fields during that conflict and the fatigue cracking which resulted, Lockheed's engineers in the late 1960s performed an analysis of the extensive stress the aircraft had been subjected to. As a result, an improved wing centre section box was designed for the C-130E and equivalent variants, not only to reduce the Hercules' susceptibility to airframe fatigue whilst performing such missions, but also to improve its life generally. The new centre wing structure was tested in a fatigue rig to 40,000 simulated flight hours, the results being encouraging enough to provoke the USAF to fit the new centre section box to no fewer than 594 of its Hercules. The work was performed at Lockheed's Marietta plant from early 1969 and was spread over several years.

From late 1970 the modification was also offered to other Hercules operators, including Australia. Even though the RAAF's C-130Es were at that stage only four years old and not expected to reach their existing 'life of type' limit until 1986, it was acknowledged that the original centre sections would probably have to be changed before that date as USAF and RCAF experience had shown the cracks tended to appear after about 5,500 flying hours. By then the RAAF's C-130Es had an average 3,000 hours in their log books.

Lockheed's proposal included modifying the RAAF's 12 C-130Es over a period of five months beginning in April 1972. The total cost was quoted at $A2.4m, and in January 1971 the Air Board decided "It will be necessary to replace RAAF C-130E centre wing sections to achieve current aircraft life of type. Although there is no guarantee, the engineering confidence that adoption of the new design wing centre section is acceptable as a minimal risk ... it is recommended that the Air Board agree to accept the USAF Letter of Offer to replace the existing centre wing section in each of the 12 RAAF C-130E aircraft with a new design item at a total estimated programme cost of $A2.4m."

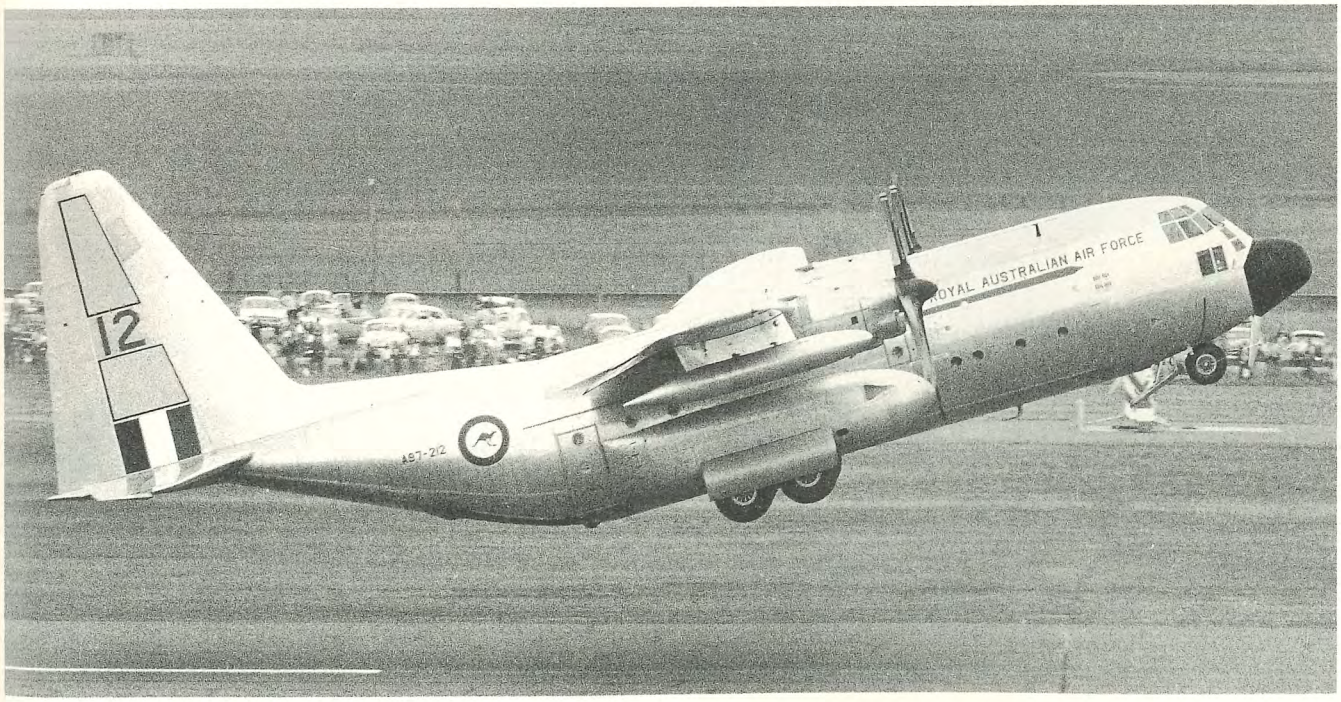
Although the RAAF's Hercules have been subject to a number of other minor airframe and equipment updates and modifications during their service lives, major changes have been made to the avionics fit, designed to improve navigation accuracy and ease of operation. The first occurred in 1964 when 36 Squadron's C-130As were fitted with a new Doppler navigation system at a cost of over $800,000 for the fleet. The new



C-130A A97-211 departs Richmond during the 1960s. The RAAF's main transport base has a single basically east-west runway with a length of 7,000ft (2,133m). (RAAF Museum)

system provided an accurate indication of the velocity of an aircraft by electronically measuring the change in frequency of radio waves transmitted from the aircraft and reflected back from the earth's surface. This information was then fed to a computer which automatically and continuously calculated the aircraft's position.

A quarter of a century later, in 1989, it was announced that 37 Squadron's C-130Es would be fitted with Litton Ring Laser Gyro Inertial Navigation Systems (the LTN 92) at a cost of $6.2m. The LTN 92 saves time and improves the navigational accuracy of the aircraft as they perform their usually medium/long range strategic transport tasks. It has the capability to display drift and ground speed information at the touch of a button to not only the navigator but also to the pilots. It also provides storage for nearly 3,000 items in its custom data base allowing preset navigational waypoint information instead of having to punch the waypoints in manually as with the C-130E's original INS. Additionally, the LTN 92 can be coupled to the Hercules' autopilot and it can receive information from the Global Precision System (GPS), a network of satellites in geostationary orbit above the earth which provide precise navigation information anywhere in the world.



C-130A A97-212 demonstrates its short field capabilities during an air display. The dayglo patches on the aircraft's tail and the cars in the background date this photo to probably 1961.

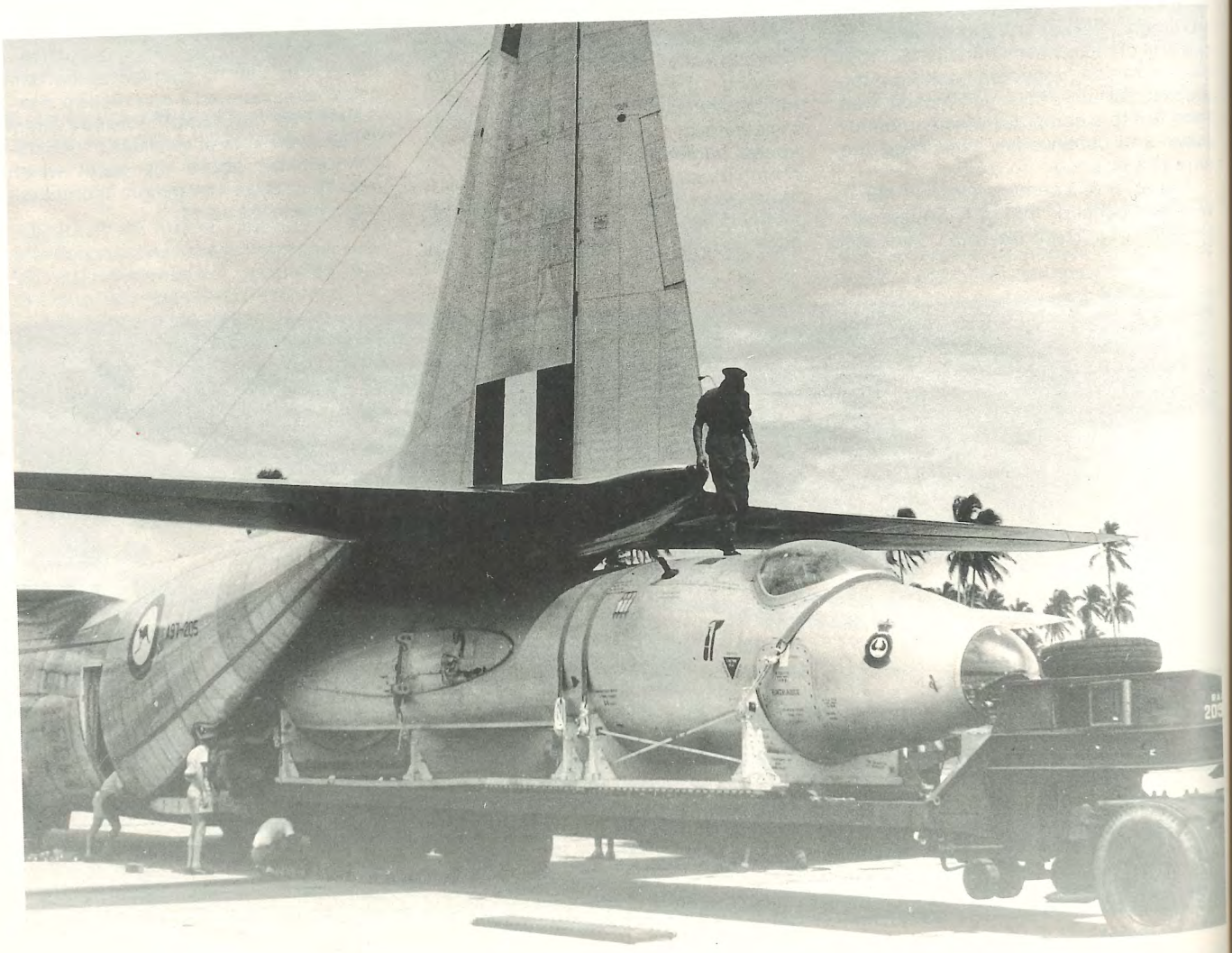


Some Hercules loads are mundane, routine ones, witness this batch of electrical appliances bound for RAAF Laverton in Victoria. (RAAF Museum)

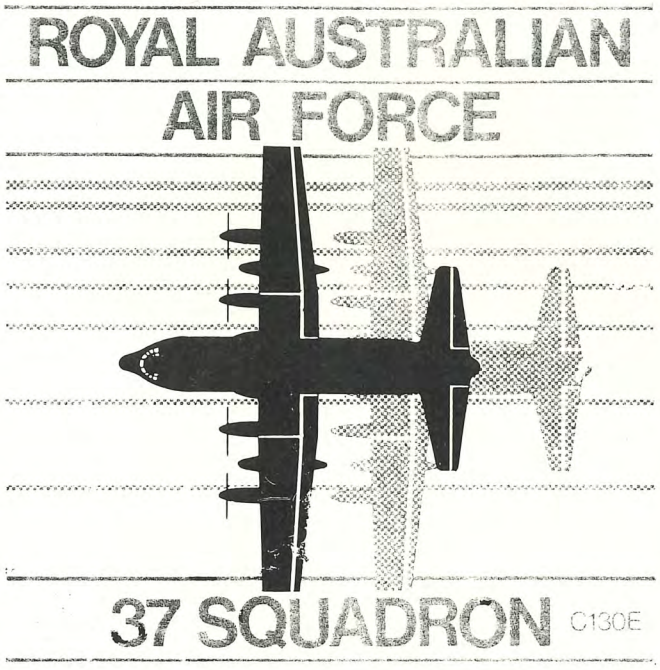
Vietnam Airlift

The Royal Australian Air Force had a long and early involvement in the Vietnam war, an involvement which saw three squadrons operating from bases in South Vietnam, the first of them nearly a year before a regular body of soldiers (the 1st Battalion, Royal Australian Regiment) was sent there in 1965. The RAAF's first contribution was the Vietnam Transport Flight's (later 35 Squadron) Caribou tactical transports which arrived in the war zone in mid 1964. At this stage the Caribou was newly introduced to RAAF service and in fact the first six aircraft to serve in Vietnam were diverted to that country from their delivery flight to Australia. No 9 Squadron's UH-1 Iroquois helicopters followed in 1966 and in April 1967 No 2 Squadron's Canberra bombers joined the fray.

Although not based in Vietnam, the Hercules of No 36 and from late 1966 No 37 Squadrons were an equally important factor in Australia's operations in Vietnam, providing as they did substantial airlift capability to and from that country, and what became a specialised service



A tight fit but a successful one as a 36 Squadron C-130A takes on the fuselage of a 2 Squadron Canberra bomber. (CPE)



bringing home the wounded of all three Services and, unfortunately, the dead. As a result of this activity, the Hercules' base at RAAF Richmond became the focal point of what was then Australia's largest air freight operation.

36 Squadron's Hercules began flying to Vietnam from mid 1964 following the establishment of the Caribou Flight at Vung Tau and increased with the level of Australian involvement in the conflict. Vung Tau, on the coast in South Vietnam's Phuoc Toy Province, remained the usual destination for Australian Hercules during the time they were flying to and from Vietnam, an infrastructure being established there as time went on to handle the flow of cargo. In the early stages of the airlift the lack of suitable equipment made loading and unloading a tedious process, but speed pallets and fork lift trucks in conjunction with the C-130E's dual rail and conveyor system made things considerably more efficient after a short time. Later on, the Hercules also operated to Phan Rang (the base of 2 Squadron's Canberras), Bien Hoa and Tan Son Nhut.

Considering the fact that not only did the squadron have to supply transport needs for Vietnam but also Australia's ever increasing commitment to the South-East Asian region generally and the needs of the military at home, it's easy to realise it became somewhat hard pressed between 1964 and 1966.

In other words, Australia was short of air transport capacity, a fact fortunately realised almost as soon as its involvement in Vietnam began. As a result, 12 C-130Es were ordered in November 1964 for delivery from August 1966 to equip the newly reformed 37 Squadron.

The arrival of the C-130Es with their heavier payload and longer range transformed not only the Vietnam airlift operations themselves but also the RAAF's transport operations generally as an at least adequate number of aircraft were now available to satisfy considerable needs.

Some of the statistics of the Hercules' Vietnam airlift operations are impressive: in the first 18 months of operations into Phan Rang, the base's Air Movements Section handled over 1,000 tons



The return of wounded servicemen from Vietnam was a vital part of the RAAF's operations during that conflict and an efficient service evolved as the war went on. Here, a 37 Squadron C-130E is met by an ambulance bus. (RAAF)



A spot of refuelling and routine engine servicing for 36 Squadron's C-130A A97-216. '216' was one of two former RAAF Hercules subject to an aborted sale in 1983 due to the suspicion that the intended Colombian operator would be using the aircraft to carry cocaine. (CPE)

of freight and nearly 3,600 passengers; between April and June 1967 a detachment of three of 36 Squadron's C-130As flew 2,400 Australian Task Force soldiers between Darwin and Vung Tau as part of 'Operation Winter Grip', the relief of two battalions of the Task Force at Nui Dat by two battalions from home. Australia's domestic airlines moved the troops to Darwin from around Australia, while between them the three Hercules involved in the operation flew 37 flights each with 65 troops on board.

A fortnightly Hercules courier service between Richmond and Bien Hoa was established in November 1965, this service continuing until 1972 when all flights to Vietnam ceased. The courier flights concentrated on carrying priority cargo and passengers on a 'space available' basis, with top priority being given to replacement operational air crew, mail, essential operational spares, communications equipment, maintenance equipment, medical supplies and spare parts for aircraft and guns. Items deemed not of the higher orders of priority were sent by sea.

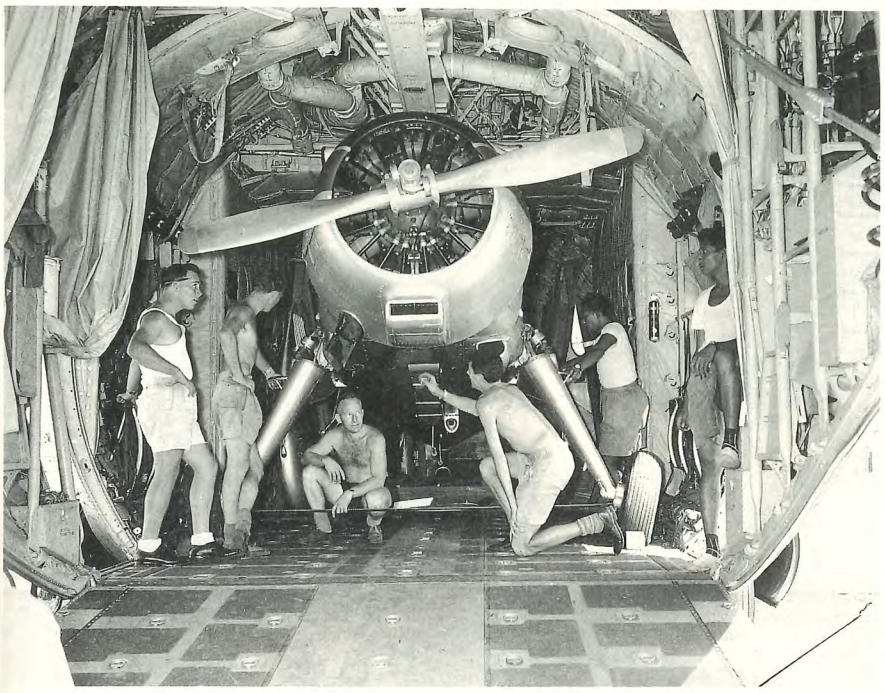
Bringing Them Home

The most emotive of the Hercules' Vietnam duties was undoubtedly flying wounded – or worse – soldiers, airmen and sailors home. The combination of the highest standards of flying and medical skills in this area of operations has been described as one of the finest achievements of Australia's involvement in Vietnam, and indeed it was as it involved the setting up of an extensive infrastructure at the 'hot' end of the operation and then the use of especially equipped Hercules to bring the personnel back to Australia. The result was a system based on providing the best possible care for the wounded, and a system which catered for not just Australians but New Zealanders and civilians as well.

Early medevac missions used 36 Squadron's C-130As on their regular flights to Australia, the first such flight taking place in July 1965. Over the next year the squadron's Hercules continued



When the Vietnam war came to its messy conclusion in 1975, the RAAF committed seven Hercules to the United Nations and Red Cross to help evacuate refugees (including many orphaned children) to safer places. Two of the Hercules wore United Nations' markings, 37 Squadron's C-130E A97-181 being one of them. (RAAF Richmond)



Not quite as tight a fit as the Canberra fuselage illustrated earlier, but there is not a lot of spare space when a Beaver fuselage complete with undercarriage and propeller is put inside a Hercules. (CPE)

to provide the service on that basis, although experiments with Douglas Dakotas and a Qantas Boeing 707 were also carried out. The slow, noisy, vibrating and short range Dakota was quickly found to be totally unsuitable, leading to the investigation of using chartered Boeing 707s for the task. Technical problems revolving around the fitting of litter racks into and the loading of them onto the aircraft contributed to this scheme being abandoned, as did the unsuitably short length of Vung Tau airfield in Phuoc Tuy province, the centre of the Australian Army's area of operations from March 1966 and the cornerstone of Australian medical facilities in Vietnam.

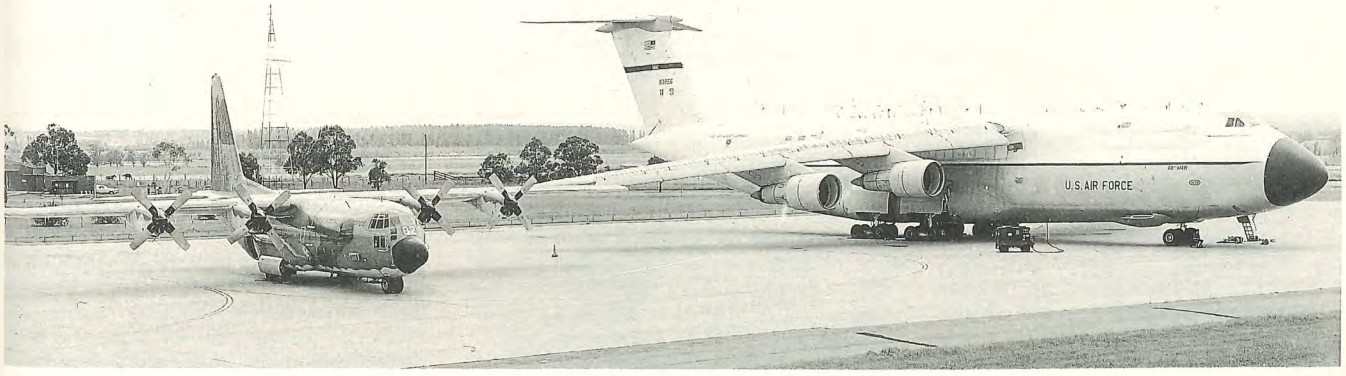
Some criticism of the Australian medevac process was made by the as usual basically uninformed mass media in 1967, the high noise level in the Hercules coming in for particular attention. While this aspect was true, other aspects criticised (including the level of medical care offered both on the ground and in the air) in no way had any justification. Typical of such things, those who complained the loudest had never been anywhere near a casualty evacuation flight from Vietnam, let alone experienced one.

The introduction of the C-130E to RAAF service and the decision to use only that type of aircraft for ferrying the wounded back to Australia allowed the operation to settle into the highly efficient levels it subsequently displayed. The C-130E was quieter than its predecessor (although still far from hushed) and had improved heating and facilities on board. A system which allowed the aircraft to be cooled by removable air conditioning ducting on the ground and the installation of galley units to provide hot meals in flight made life as comfortable as was possible for those on board, while specially equipped ambulance buses complete with air conditioning were manufactured in Australia and sent to Vung Tau.

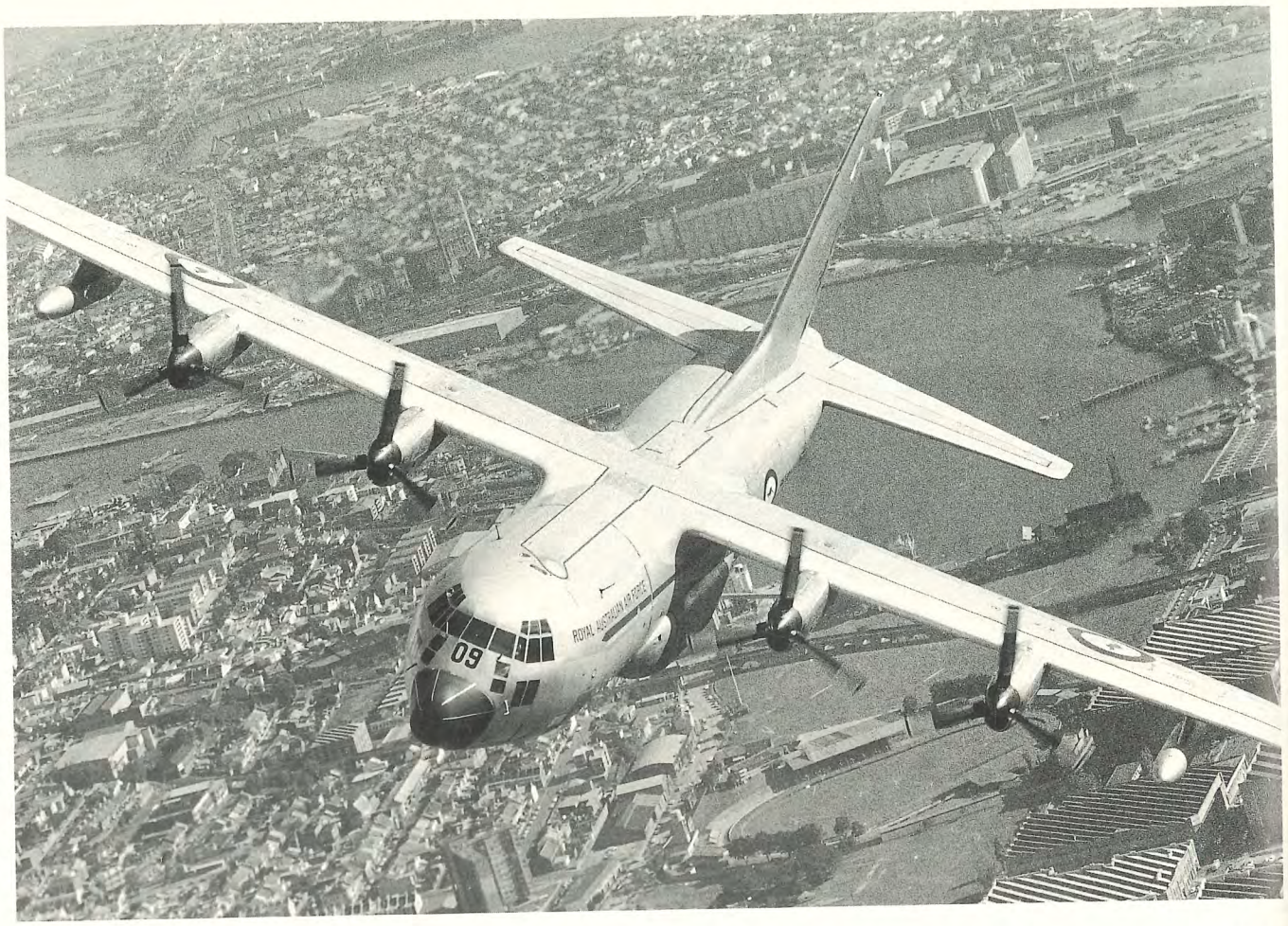
A total of 3,164 patients were carried from Vietnam to Australia by the RAAF, the vast majority of them by Hercules. Of that total 2,777 were Australian Army, 194 were New Zealand Army, 158 Royal Australian Air Force, 24 Royal Australian Navy, eight civilians and three Royal New Zealand Air Force.

The final 'regular' RAAF Hercules flight out of Vietnam departed Tan Son Nhut on 1 March 1972 bringing home the last of the bulk of the Australian forces still in the country. The Australian Army Training Team remained there until December 1972 until they were withdrawn on the orders of the newly elected Labour Government. Naturally, their means of departure was a pair of Hercules.

That wasn't quite the end of the RAAF's involvement in the Vietnam war, however. The early months of 1975 and the defeat of the South Vietnamese by the northern communists saw Australian Hercules performing numerous evacuation flights of Australians (including the Saigon embassy staff) and other nationalities. From April, seven Hercules were made available to the United Nations International Children's Education Fund and the International Red Cross for the evacuation of refugees. Two of the aircraft were painted in UN colours and during the chaotic April in which South Vietnamese resistance crumbled literally thousands of refugees (including



Big Brother, Little Brother. The Hercules is by no means a small aircraft but, when parked alongside a Lockheed C-5 Galaxy, it looks positively minuscule.



C-130A A97-209 was the first Hercules withdrawn from RAAF service, in late 1977 after logging more than 12,000 hours and serving for 19 years. The fuselage of the aircraft along with its undercarriage and wing centre section remains at RAAF Richmond as a training aid. (RAAF)

many orphans) were flown to safe places to await a final move to Australia. The country finally surrendered to North Vietnam on April 30.

At the same time RAAF Hercules also flew relief supplies into the collapsing nation, some 540 tonnes being transported and 250 flying hours logged. Four years later, in November 1979, RAAF Hercules began a two month operation flying food and medical supplies from Bangkok and Singapore into Phnom Penh on behalf of the Red Cross.

Protecting The People

One of the most important roles which critics of the armed forces conveniently tend to overlook is that of aid to the civil community. Obviously, air transport units of the Services – whether flying fixed or rotary wing aircraft – are best placed to help in areas of civil emergency. The RAAF's Hercules have a history of assisting in such situations as long as the type has been part of the inventory, participating in literally thousands of 'missions' of mercy ranging from the small and relatively insignificant to disasters on an enormous scale.

One episode which certainly fits into the latter category was the destruction of Darwin by Cyclone Tracy on Christmas Day 1974. The cyclone reduced Darwin to a pile of rubble, killed 49 of its citizens and rendered most of its 41,000 inhabitants homeless. A huge airlift was thus organised to evacuate Darwin's residents to other parts of Australia, an airlift involving the airlines and the RAAF, which contributed Hercules, Caribou, Neptune, HS.748, Iroquois, BAC One-Eleven, Mystere 20 and Dakota aircraft to the cause. The RAAF flew more than 1,600 hours during the Darwin relief operations and of the city's population, some 85 per cent had moved out by December 31, nearly 26,000 of them by air.

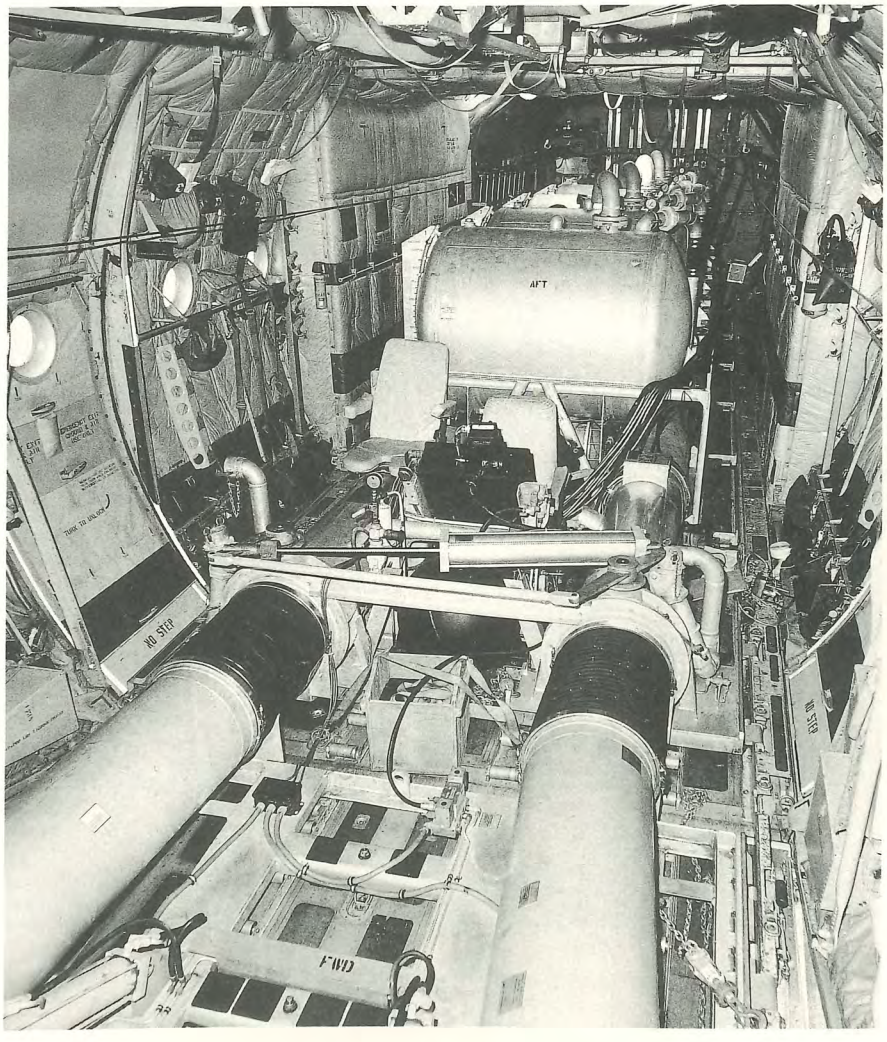
The Hercules took care of many of these, and 12 aircraft were available on one hour's standby at Richmond by Boxing Day. That day, the Hercules evacuated 680 people, on December 27 another 1,218 were evacuated in 22 sorties while on the 28th 27 sorties evacuated a further 1,771 people. Also involved was an RNZAF Hercules and a USAF C-141 Starlifter.

Getting people out of Darwin was just one side of the relief operation. Taking medical and other supplies to the scene of destruction was an equally important task. Here too, the RAAF's Hercules were heavily involved and one of them was the first to fly into Darwin on the night of the cyclone. Tasked with medical evacuation and carrying an RAAF medical team, the Hercules arrived at Darwin at 10.00pm and managed to land in extremely marginal and hazardous conditions using the aircraft's radar and kerosene flares on the side of the runway.

The list of civil emergencies in which the Hercules helped goes on – the inland floods of 1973-74, the Ash Wednesday bushfires of 1983 in Victoria, and most recently, the western NSW/southern Queensland floods of April and May 1990. From an RAAF press release pertaining to the floods: "RAAF Steps Up Emergency Flood Relief – The RAAF will continue special flood relief flights in south-west Queensland today, April 20. Three C-130 Hercules transport aircraft will airlift a total of 40 tonnes of food supplies to Longreach from RAAF Amberley this afternoon. Two of the Hercules have been involved in training flights in Amberley for the past fortnight and will deliver their much needed cargo before returning to Richmond air base later today. A third Hercules left Richmond this morning bound for Amberley to load sup-

(right) The use of water bombers against Australian bushfires has long been a subject of discussion and trial. In April 1982 and as part of the joint Victorian and Federal Governments' 'Project Aquarius', C-130H A97-001 was fitted with a Modular Airborne Fire Fighting System (MAFFS) obtained from the US Forestry Department. The interior shot shows the tanks and pumping equipment installed in the Hercules. Other Hercules were subsequently used in trials and real bushfire situations.





plies for Longreach. The supplies will be distributed to stranded families in the Longreach district by the State Emergency Service".

And on a slightly more cheerful note during the same emergency: "RAAF and Easter Bunny Combine Forces – The Easter Bunny will be flying with the RAAF tomorrow on a very special mission. An RAAF C-130 Hercules transport aircraft from Richmond air base will fly from Charleville in southwest Queensland to airlift 20 school students from Brisbane schools home for Easter to the small rural community of Quiplie which has been cut off by flood waters. Approximately 200 miles (300km) south-west of Charleville, Quilpie will also receive a special Hercules delivery of Easter goodies to be included in a 15 tonne load of fresh food and frozen supplies". Great stuff!

But more serious situations abound for the crews of the RAAF's Hercules, Some samples: 5 December 1989 – a Hercules is dispatched from Richmond to Bali to evacuate a 12 years old Australian boy suffering severe head injuries from a road accident; 17 August 1989 – a 36 Squadron Hercules evacuates two soldiers seriously injured in a road accident in the Northern Territory; 28 May 1989 – a 36 Squadron Hercules carries out a low level search over waters off Port Moresby for a missing small boat; 5 April 1989 – a 36 Squadron Hercules takes a load of generators to Amberley in Queensland to provide emergency power for homes in the Townsville area damaged by a cyclone; 18 July 1988 – a 37 Squadron Hercules evacuates an Australian woman from Rabual, PNG after suffering serious head injuries following an attack. Due to the nature of the injuries, the Hercules' cabin pressure was adjusted to sea level during the flight to Australia; 3 February 1989 – a 37 Squadron Hercules searches for survivors of a sunken Japanese trawler in the Tasman Sea; 13 January 1989 – a 37 Squadron Hercules carries out a search over the Arafura Sea for a missing Australian prawn trawler; 9 December 1988 – a RAAF Hercules conducts a search over the Coral Sea 300nm north-east of Cairns for a missing small civilian aircraft on a ferry flight from the Marshall Islands ... The list goes on and on just as it has for more than three decades.



RAAF Bell UH-1 Iroquois helicopters have twice been involved in peace keeping operations in the Sinai Desert, once between 1976 and 1979 and also for two years from 1986. On the first occasion the aircraft operated between Israeli and Egyptian forces on behalf of the United Nations Emergency Force. They were painted white and carried UN markings. In July 1976 the first 5 Squadron Iroquois departed Canberra for the Middle East in the hold of a 37 Squadron C-130E Hercules. (DoD)

RAAF Airlines

In September 1989, Australia's 1,600 domestic airline pilots resigned *en masse* in the wake of an ongoing dispute over – on the surface – a massive pay increase but equally importantly, an attempt to consolidate the power of their union, the Australian Federation of Air Pilots (AFAP) in the lead up to airline deregulation in Australia in November 1990. It was expected by the AFAP that the airlines would quickly capitulate to its demands but with the support of the Federal Government they held firm, ultimately forcing the AFAP into submission and leaving it with little or no power base at all.

The result of all this was chaos in Australia's domestic airline system and for a period of nearly five months a drastic reduction in the number of seats available. The situation was alleviated to some extent with the chartering of aircraft and crews from overseas airlines – fortunately, the dispute largely coincided with the northern hemisphere 'off season' – and the use of a couple of the



Here's cheers! 36 Squadron's C-130H fleet celebrated 100,000 accident free flying hours in 1990, a more than adequate reason for a spot of celebrating by Flt Lt Tony Kempnich, Flg Off Peter Budd, Flt Sgt Ron Muller and Sgt Alan White. As a whole, the RAAF's Hercules had flown nearly half a million hours without major accident by mid 1990. (RAAF)



RAAF transports in formation (top), a Boeing 707 of 33 Squadron, a C-130H of 36 Squadron and a C-130E of 37 Squadron. Two C-130Hs (bottom) formate over Ayer's Rock.





C-130Hs in publicity shot mode (top) and hard at work (bottom). In the latter photograph the aircraft is being used for fire bombing trials. (RAAF)

RAAF's Boeing 707s and Hawker Siddeley 748s plus the Hercules of Nos 36 and 37 Squadrons.

The nearly four month period during which 'RAAF Airlines' operated scheduled passenger services was dubbed 'Operation Immune' (immune from what? – trade union excesses perhaps?) and began on August 25, 1989. It ended on 15 December when a 37 Squadron C-130E Hercules touched down at Sydney Airport after a flight from Canberra and disembarked 40 passengers. In the meantime, RAAF aircraft flew 6,524 hours and carried 172,287 passengers, all but a small percentage in Hercules.

The whole affair provided both the RAAF crews and their passengers with something of a novelty situation. The RAAF crews' experience with civilian passengers was only slightly greater than the passengers' experience of military aircraft. Although the Hercules accommodation arrangement – usually carrying troops, not tourists – doesn't have the same aesthetic appeal of a 737 or Airbus, the passengers were well looked after, in good spirits and grateful for the service their air force had provided. After that final flight from Canberra to Sydney the passengers broke into spontaneous applause, something which the crews reported as being a regular feature of 'Immune'.

The Prime Minister, Mr Bob Hawke, flew to Richmond on the last day of Operation Immune to personally thank the Hercules crews. He said: "On behalf of the people of Australia it is my special pleasure to thank all those pilots, aircrew and support staff who over the past three and a half months have taken part in Operation Immune. I've always known that RAAF flights are synonymous with reliability, good humour and service, so it did not surprise me at all that when the RAAF was exposed to many more Australians the public's response was overwhelmingly positive".

And the public's response was indeed overwhelmingly positive. The RAAF received thousands of letters from grateful passengers. Here are a couple of them.

From Di and Steve Bekker: "My wife and I would like to thank the RAAF's 36 Squadron for flying us from Cairns to Brisbane on Monday, August 28 last. Our trip in the C-130H was a great experience made more so by the professionalism, helpfulness and interest of the crew (particularly the loadmaster), which was very much appreciated by the passengers.

"It restores our faith in the future of this country to be reminded that despite the constant problems and setbacks caused by self-interested pressure groups in our society, there are still organisations and people in the RAAF and elsewhere whose attitude and dedication clearly puts the country and community interests before themselves. Please accept and extend our sincere thanks and appreciation to those responsible".

From Fiona Dockrey of National Information Services: "A word of thanks to the crew and 'flight attendants' of Ansett Flight 170 out of Melbourne, September 11, 1989. I was scheduled for a trip to Adelaide on September 11-16 and there was no way for me to get out of it. With the commercial pilots on strike, I looked like enduring coach, train or self drive travel. Thanks to the RAAF, these options weren't necessary.

"Fortunately you provided a 36 Squadron Hercules to move we mere civilians and items of freight. This experience was thoroughly appreciated not only by myself but also a number of the other passengers with whom I managed a sign language conversation. Again thanks to the RAAF for an experience with which to regale my grandson and in particular for the skill and charm of 'the boys'.

"PS: Remarkable enterprise on the part of the social club of 36 Squadron to raise funds from sale of photos. My Hercules proudly adorns a wall in my home".

37 Squadron even went as far as asking for written comments from their passengers in the form of a kind of visitors' book. Samples include: "Killed 'em again, even got me back home. Good on you RAAF." (Maurie Fields); "I was sick but it was fun"; "I had a choice between Royal Brunei (with gold seat belt buck-



The Hercules substantially increased the RAAF's ability to carry equipment anywhere in the world after it entered service in 1958. Here, a fuel tanker is loaded into C-130A A97-209. (RAAF)



While the Sydney skyline is dominated by the Sydney Opera House in this shot, the sky above it is the domain of 36 Squadron's A97-003, a C-130H Hercules. (RAAF Richmond)

les), Qantas and the RAAF to get me to Brisbane. I chose this for the adventure and will never forget it ... the hosties are much better than Ansett's and I'd love one of those flying suits" (Judy Ruff); "How much for the cute little boys in overalls?"; "Oh well, if we can hear the engines/propellers at least we know they're working"; "So do you land when we reach Brissy, or do we jump?"

And from Townsville's Sandra Jones a bit of poetry:

So here we are
Without a bar
So high in the air,
And I've paid for this fare.
You blokes are great,
And what you've done for the state.
Many thanks to you
And you need a new loo."

Who said Australians were devoid of couth and culture?!

A Spot of Competition

One important part of any training of military personnel is participating in exercises simulating a particular war scenario. Another is competition with similar units of other nations' armed forces, the idea being to sharpen everyone's skills within the framework of a contest, provide a sense of victory for those who win and the incentive to improve for those who don't.

Australia's Hercules had a pretty good year in 1989 in such competition, taking out major trophies at competitions in Australia, the USA and the United Kingdom, all of them around the middle of the year.

First up was the annual 'Bullseye' Tactical Air Transport competition between Hercules of the Australian, New Zealand and Canadian air forces held at Richmond in April. The Bullseye competition began in 1979 and teams compete for the Lockheed Trophy (donated by the manufacturer), an award which carries with it a great deal of prestige. In 1988 the competition was held in Canada and the winner was the RAAF's No 36 Squadron and its C-130Hs.

The Bullseye competition is designed to test aircrew skill levels and Hercules operations generally, including precision airdrops, low level navigational flights and short field landings, each air force presenting two of its best crews to fly exactly the same tasks. The crew with the fewest penalty points against them wins, and in 1989 the defending champions – the RAAF's No 36 Squadron – again came through to win by a comfortable margin (236 penalty points) compared to the Canadians' 411 and the Kiwis' 413 penalty points.

In June, 36 Squadron again demonstrated its prowess after taking out three trophies in what is regarded as the world's toughest tactical air transport competition, Airlift Rodeo at Pope AFB in North Carolina. Described as the 'Americas' Cup' of military aviation, a detachment of 40 personnel from 36 Squadron and 486 Maintenance Squadron (plus a single C-130H) took on 40 teams from around the world and came home with three major trophies including Best C-130 Aircrew, Best Foreign Aircrew and Best Overall. The latter is considered to be the 'world championship' of tactical transport flying in a competition in which the accuracy of air drops of equipment and paratroops, spot landings and low level navigation are measured with stop watch and tape measure.

No 37 Squadron and its C-130Es got into the winning act in July at the International Military Air Tattoo, staged every two years at RAF Fairford, west of



The first and the first! The first RAAF Hercules, C-130A A97-205, in formation with the first of its replacement in 36 Squadron, C-130H A97-001. The shot was taken during a special 'farewell to the C-130A' sortie in late 1978. (RAAF)

London. The public is invited to this competition, and a crowd in the region of 250,000 is normal. Various air and ground competitions are held, the RAAF team (which included personnel from 486 Maintenance Squadron) winning the Overall Ground Competitions, the Spirit of the Meet award, Best Ground Exercise by an Overseas Crew and the big one, the *Concourse D'Elegance* thanks to the efforts of 486's personnel who made the 23 years old Hercules look as if it was straight off the production line.

The Hercules' Future

Of course Australia's Hercules are far from 'straight off the production line', and some decisions – particularly concerning the C-130Es – have to be made soon on the type's future in RAAF service. There is no doubt that the Hercules will remain in the RAAF's inventory for many years yet. In fact it is not beyond the realms of possibility that it may log 50 years service, after all, 1990 is 32 years after the first C-130As were delivered.

But what form the Hercules' 21st century service with the RAAF will take is open to conjecture. Two things must be considered, the first depending on whether or not the RAAF decides to replace its Caribou tactical transports (see the following section of this book) with a more modern type, with more Hercules or with nothing at all and simply allow them to fade out over the next decade.

Secondly, the C-130Es are going to need outer wing replacements to take them to the year 2010. The decision to do this must be made before 1995 (when their currant life expires), by which time they will be 29 years old. If the outer wing replacement work is performed, these Hercules will be 44 years old before they will need retiring and the type as a whole will have been in RAAF service for 52 years! The alternative is to replace the C-130Es with new aircraft.

Another option is to convert the C-130Hs to long fuselage C-130H-30 standard (as the RAF has done with 30 of its fleet) to provide an instant increase in volumetric capacity at minimal cost, or buy new -30s. Obviously, the possibilities are unlimited, but the fitting of new Litton inertial navigation systems to the C-130Es in 1989 indicates the intention is to keep these aircraft for the foreseeable future.

Whatever happens, the Hercules has already enjoyed a distinguished and varied career with the RAAF. What lies ahead will only add to that level of distinction.



A common sight in the last months of 1989, an RAAF C-130H outside a civil airline terminal – Canberra, in this case – during the Australian domestic pilots' dispute. The RAAF stepped in to help out in what they called 'Operation Immune', and between August and December 1989 flew 6,524 hours and carried 172,287 passengers who would normally have flown with the airlines. Both RAAF Hercules squadrons were involved and between them flew the lion's share of the hours and passengers. (DoD)

Sydney Harbour forms a spectacular backdrop for two of 37 Squadron's C-130Es (top), while a close up of A97-177's forward fuselage (bottom) reveals some stencilling detail. Note the United Nations emblem. (RAAF/Eric Allen)







This angle (top) makes the Caribou look about as attractive as it can, although the aircraft is about functionality, not beauty. Viewed from another Caribou, A4-236 (bottom) is seen at low level over the Myall Downs in 1980. (RAAF/Eric Allen)







Caribou A4-228 was only a year old when this shot (top) was taken at Parafield SA in 1966. A decade down the track, A4-225 (bottom) is captured at Williamtown NSW at an airshow. Note the 38 Squadron fin flash. (Eric Allen)



No 35 is the other RAAF Squadron to have operated the Caribou over the years (top), and A4-159 displays the unit's 'wallaby' fin flash. '159' is one of the 12 RAAF Caribou to see active service in Vietnam, as is A4-152 (bottom), seen here in its white United Nations colour scheme but with RAAF roundels instead of the UN markings it wore whilst on duty with the international organisation. (Eric Allen)



A DAY IN THE LIFE OF A HERCULES

While 36 Squadron's C-130Hs are perhaps the most 'visible' of the two RAAF Hercules squadrons due to the more spectacular nature of their usually low level tactical transport duties, the equally important strategic transport role is performed by 37 Squadron's C-130Es which operates numerous scheduled services around Australia, delivering personnel and freight in what is very much an airline operation.

In this chapter, we take a brief look at a typical day's scheduled operation in a 37 Squadron C-130E (A97-167) on what is called the Southern Service. Starting from Richmond, the Hercules flies to Edinburgh, South Australia, via Canberra and Laverton, then reverses the process on the way back to Richmond. It should be noted that this chapter is based on an article prepared for Australian Aviation magazine by Bob Bell in 1986. Bob spent a day with the Hercules and its crew, and his notes form the basis of what follows. The ranks and jobs of the personnel mentioned are as they were in 1986, as are the operating procedures and radio frequencies.

Today, we are flying with Squadron Leader Brian Young, who will captain the aircraft, copilot Flt Lt Simon Henderson, navigator Flg Off Bill Pike (no relation to the founder of Rebel Air), flight engineer



37 Squadron C-130Es A97-180 and 167 over Sydney on the occasion of the squadron's 21st anniversary on the type in August 1987. All 12 of the squadron's C-130Es flew over Sydney on this day. A97-167 is the Hercules 'flown' in this chapter. (RAAF)

Flt Sgt Dick Stone and loadmaster Flt Sgt Greg Bushnell. With 'first doors closed' at 0645hrs, then checklist start at 0700 local, it is expected that our return ETA tonight will be at around 1900hrs, give or take a few minutes. Flight callsign will be 'Trojan 753' with 'Trojan' designating No 37 Squadron and '753' the personal callsign allocated to the captain. The aircraft's serial number plays no part in the callsign process.

From 37 Squadron's HQ we drive the crew van to Base Operations, 1.5 kilometres away at the far end of the base. After Met briefing, it's on to flight planning and the Self Briefing Room, where Bill Pike prepares the flight plan. After that, it's off to the Safety Equipment Section to collect headsets and flying helmets with oxygen masks. Finally, it's back into the van for the trip back to the Air Movements Terminal. Loadmaster Greg Bushnell has already checked the load details of passengers and cargo and is finalising the weight and balance documents. Dick Stone his completed his walk around, so following a check by Brian Young of all maintenance and air movements documents it's time to enter the Hercules' 'office'.

Fuel on board at this stage is 20,000lb (the C-130E can carry up to 64,000lb) and it is planned to take on a further 12,000lb at Laverton later this morning and another 10,000lb at the same place on the return journey.

The loadmaster and flight engineer perform their series of pre start and pre takeoff checks independently of the pilots, simply reporting them completed when asked. The two pilots take care of their own checks, the prestart ones including oxygen – set; nosewheel lock and pitot covers – removed, stowed and checked; radio (UHF or VHF) – on; lights – set; fuel – checked; ramp and door – closed/open (as required), controls neutral (loadmaster); hydraulic panel – set; parking Brake – set, remove chocks; flap lever – set; chocks – removed.

The first leg to Canberra (ASCB) is from Richmond (ASRI) to Katoomba (KAT), Bindook (BIK) and Shelly's (SLS), then it will be on to Laverton (AMLV) via Corryong (CRG), Eildon Weir (ELW) and Plenty. Richmond ATIS is 'Alpha', runway 28, wind calm, QNH 1016, temperature 16, visibility 10 kilometres. The series of pre flight checks then begins and the data card displays an all up weight of 110,000lb, well below the normal maximum takeoff weight of 155,000lb. The engine start sequence in a Hercules is 3-4-2-1, and with that sequence comes further checks – AC generator voltages and frequency, turbine inlet temperatures, oil pressures (gearbox and engine), water pressure, hydraulics and so on.

The before taxi checks consist of crew aboard – doors closed (loadmaster); compass and heading indicators – checked, set, state heading; radios and navigational equipment – set; flaps – up; hydraulic pressures – checked; 15% bypass switch – on; flaps – 50%; altimeters – set, state setting.

"Richmond Ground, Trojan 753 for Canberra, POB (persons on board) 59, received alpha, taxi clearance". During the taxi, further checks take place: brakes, instruments, propeller reversing and feather motors. It's 0712hrs as the Hercules is reversed out from the terminal. There are patches of ground fog. We receive airways clearance on 355.0 as "track Richmond – Katoomba FL140" (14,000 feet). More vital checks before takeoff: trim tabs -set; autopilot – off; 15% bypass switch – on; flaps – 50%; flight controls – checked; hydraulic pres-



Hercules fire and rescue diagram, in this case for a C-130A.

sures – checked; crew briefing – understood, completed; instruments – checked; safety belts, shoulder harnesses – fastened, unlocked.

The Hercules is now cleared to enter the runway and line up. The engines are run up through flight idle and back to ground idle to check propeller revolutions per minute. Trojan 753 is clear for takeoff and rolling at 0719hrs. "Rotate" and when airborne "gear up and landing lights off". The speeds used for this departure are rotation (Vr) 96 knots indicated air speed (KIAS), engine out minimum control speed (Vmca) 95 KIAS, obstacle clearance speed (OCS) 108 KIAS.

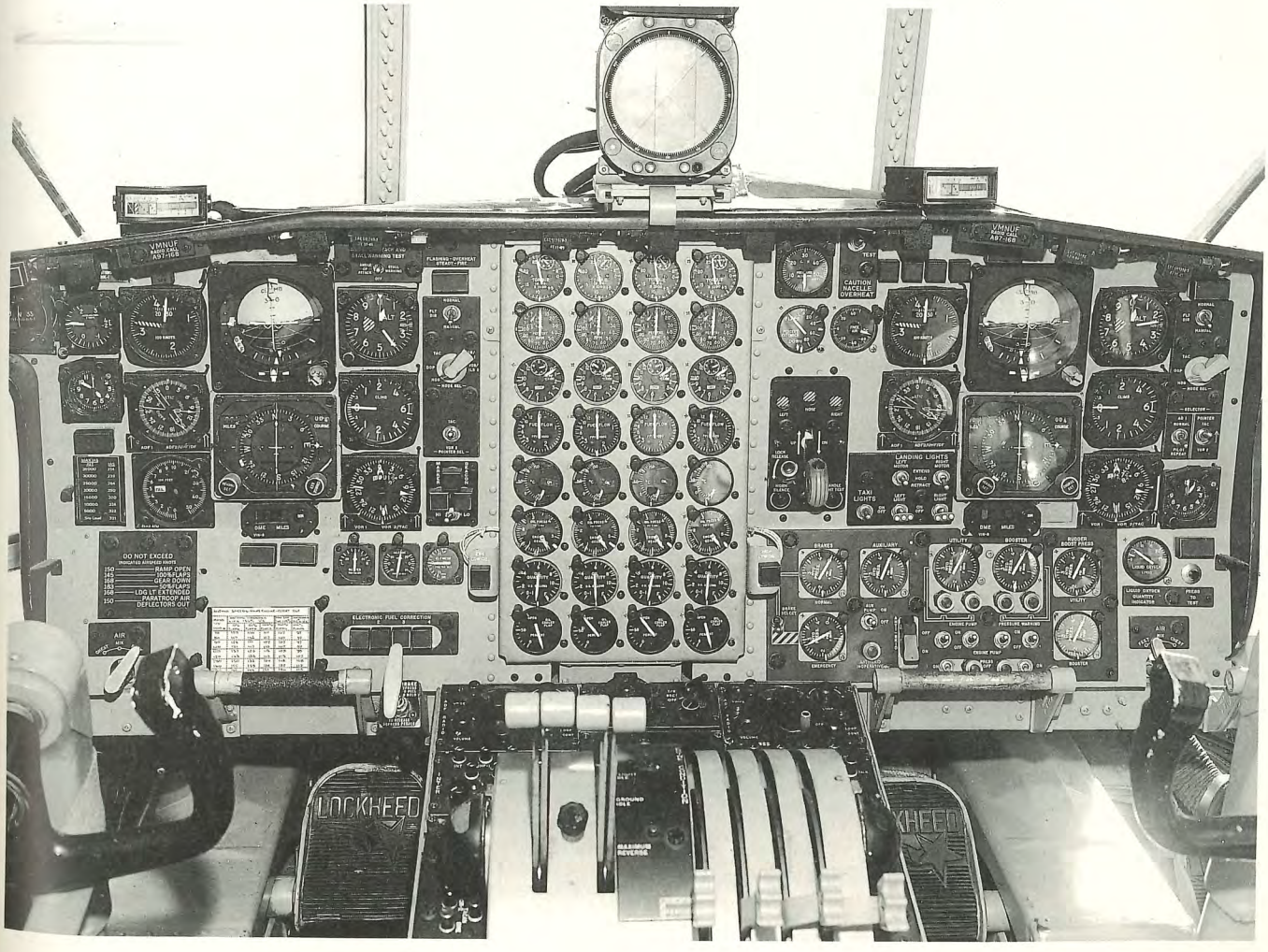
The flaps are now up and Simon is instructed by Brian to call control on 119.7. "Sydney Control, Trojan 753 climbing to FL140". The radar altimeter is turned off and the after takeoff checks begin. Our departure was 2020 hours zulu (2020Z), estimating Canberra at 2053. We report passing through 7,000ft and then call Control on 118.5. Bill Pike's headset, although new, is breaking up, so he replaces it and is soon back on the air. Brian asks Simon to ensure the radio volume 'pots' are in the one o'clock position as the radio is difficult to hear.

Trojan 753 is drifting 3 degrees right of track as it passes the Three Sisters at Katoomba. Sydney Control advises an amended TAF (weather forecast) for Canberra valid 1800 to 0800, wind 340 degrees at 5 knots, visibility in excess of 10 kilometres, cloud 2 OCTAS at 5,000 feet. Control is called on 123.4 and we are told to report level at FL140. At 2030, Simon makes the call and Speedbird Niner (British Airways) can be heard on the frequency. Navigation and after takeoff checks are completed by 2033Z (0733 local) and Shelly's is selected on both ADFs.

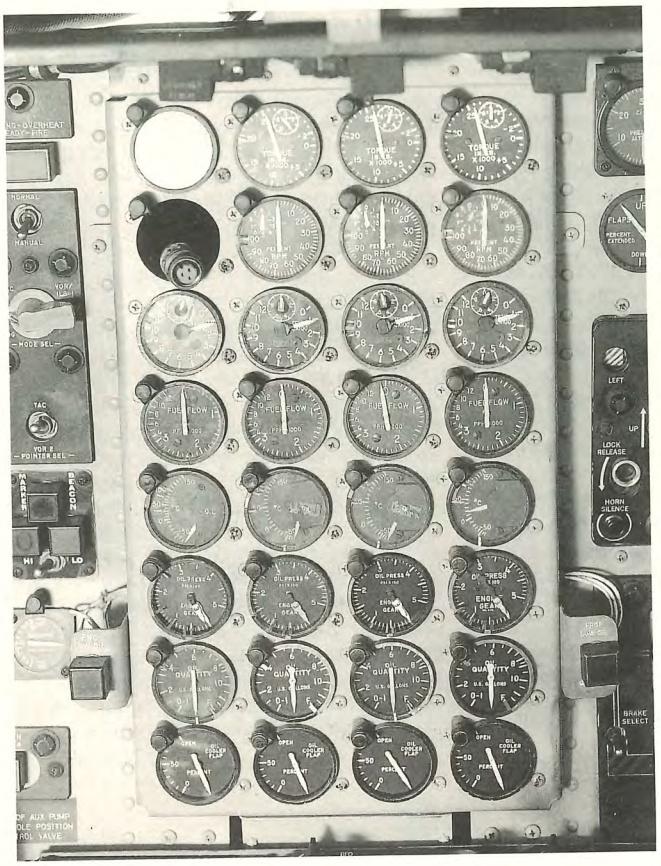
The Hercules is now on 179 degrees and tracking direct Bindook to Shelly's. From Shelly's, it's a direct track to Fairbairn and the Canberra ATIS on 114.5 is selected: "Runway 35, wind calm, QNH 1018, scattered fog patches".

We call control on 125.6 as East West's 'Echo Whisky Bravo' (a Fokker F.28) requests descent into Albury. Simon calls Canberra Approach on 124.5 and we are given a runway 35 LLZ approach as the glidepath on the ILS is unavailable. We get descent in four minutes at 2043 and we have already lost 2,000lb of weight due to fuel burn. 50% flap is selected for approach and the approach plates are out and being studied.

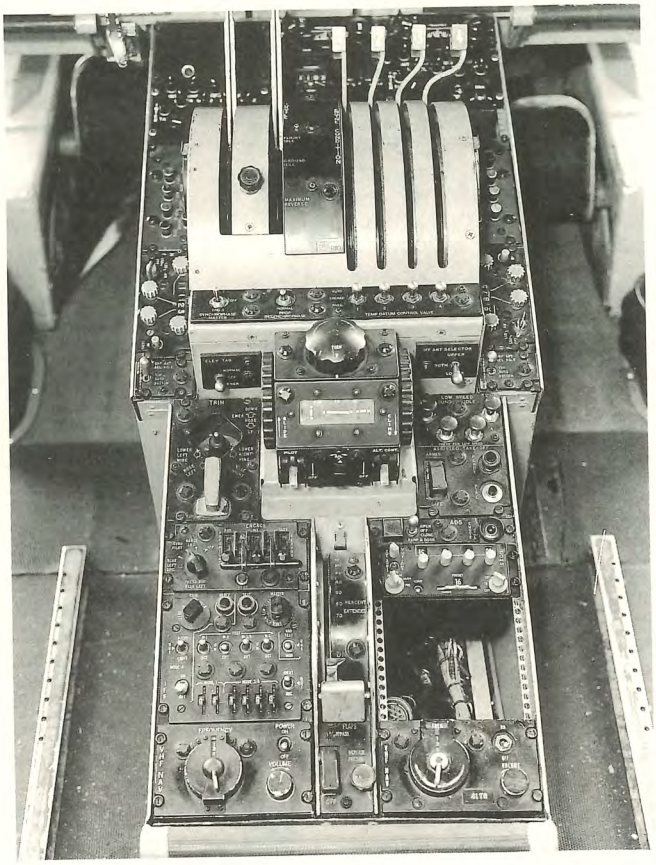
We have traffic at 2 o'clock low as we begin our descent to 8,000 feet and the ATISC changes to 'Echo', with "temperature 16" the only change to 'Delta'. There are 38 miles to run and we are visual above a layer of fog. The radar 'paint' of Lake George shows a surprising amount of detail. We descend to 6,000 feet and are told by Approach to "turn right heading 210 degrees". This will vector the Hercules for a short base leg to the localiser and the before landing checks commence. These include: hot mic – set; radar altimeter – set; altimeters – set, state heading; flaps – as required; landing gear – down – indicators checked; landing light panel – as required; hydraulic panel – set.



General view of a C-130E Hercules' flight deck with pilot's instrument panel on the left, copilot's panel on the right, engine instruments in between and centre console below it. The aircraft is A97-168. (RAAF Richmond)



C-130E centre panel with torque, RPM, temperature, pressure and fuel flow gauges. Note the missing No 1 engine RPM gauge, second row from top. (RAAF Richmond)



C-130E centre console with propeller and condition levers, avionics and trim controls. Note the panel for Rocket Assisted Takeoff (RATO) equipment on the centre right of the console. The hole in the lower right of the panel usually contains UHF radio gear. (RAAF Richmond)

Approach Control further instructs us to "turn right heading 310 for localiser intercept" and it is noticed that we have the LLZ on both pilots' navaids. Approach speed is 131 KIAS and we are getting a four degrees to the right drift. Passing Church Creek locator, the Tower is called on 118.7: "Canberra tower, Trojan 753 on localiser, three wheels". Simon is requested by the tower to advise on the fog and he replies that it appears to be confined to the south of the field, perhaps moving slightly to the east.

At 8 (nautical miles) DME the Hercules is at 3,200 feet and Brian Young now goes visual. Full flap is extended and Brian states he will land short and attempt to turn off the runway at the first taxiway as we are slightly late and this will save some taxying time. Over the keys and flare for a beautifully smooth touchdown in the hands of the captain, a man with 5,500 Hercules hours in his logbook.

"Where the heck are they going to put us?", he asks as we make a right turn onto the Fairbairn apron. There is something of a parking problem this busy Friday morning!

We have changed from the Tower frequency and are now with Ground on 121.7. Hercules aircraft are fitted with both VHF and military UHF. After parking, the engine shut down checks begin – low speed ground idle, parking brake on, flaps up, IFF master switch off, radar altimeter off and so on before the engines are actually shut down. Chocks are positioned, and the ground power unit connected.

Sixty three persons are on board for the trip to Laverton, our endurance is 210 minutes and our all up weight 107,500lb. We get our airways clearance on 121.7 and it's "Runway 17, Kiandra departure, cruise FL200". Trojan 753 intercepts the 219 degree radial and sets course, departing Canberra at 2202Z (0902 local) with ETA Laverton 2303. The Hercules climbs at 209 knots true airspeed (KTAS) and in the cruise settles into 300 KTAS.

In preparation for a left base for runway 05 at Laverton, the Hercules tracks to Eildon Weir and descends to FL130. Out to the left, about five miles ahead and 2,000 feet above, United 815, a Boeing 747SP, gradually starts to pull away from us as it heads for Tullamarine. It's 31 degrees in Melbourne but blowing a gale on finals as we call Laverton Tower on 267.2. The landing here turns out to be a real greaser with an unexpected and very nasty 33 knot crosswind and at a weight of 104,000lb.

We are requested by Laverton to file a flight plan at Edinburgh for the return legs which should be put through Richmond, as Laverton won't have sufficient personnel later in the day to process us if we attempt to flight plan here.

Departure from Laverton to Edinburgh is made at 0024Z (1124 EST) with ETA put at 0157. This time there are 60 POB. The airborne wind is very troublesome at 310 deg/40 knots at FL 135 and we are climbing to FL 250 for the leg into South Australia. Drift is four degrees to the left approaching FL 160 in the climb, heading is 286 degrees, cruise TAS is 295 knots and speed over the ground 260 knots as the Hercules battles the strong headwind component. We pass Netherton exactly on schedule and Brian briefs his crew for a runway 18 arrival at Edinburgh. We will fly a right base and as Brian discusses the approach we soar through





Caribou A4-179 (top) of 38 Squadron is the 'baddie' during this 1981 exercise and has a German cross painted on to identify it as such. A4-299 (bottom) was the last Caribou delivered to the RAAF (in May 1971) and is seen here two years later at Williamtown NSW. (Eric Allen)



Caribou A4-236 (top) and 285 (bottom) on an exercise at Myall Downs in 1980. A properly camouflaged aircraft can be almost impossible to spot from the air. (Eric Allen)

Demonstration of a LAPES (Low Altitude Parachute Extraction System) drop from Caribou A4-285 (top). This aircraft was one of several which were repainted for camouflage trials in the mid 1980s, as was A4-208 (bottom), resplendent in 'Desert Pink'. (RAAF/David Wilson)

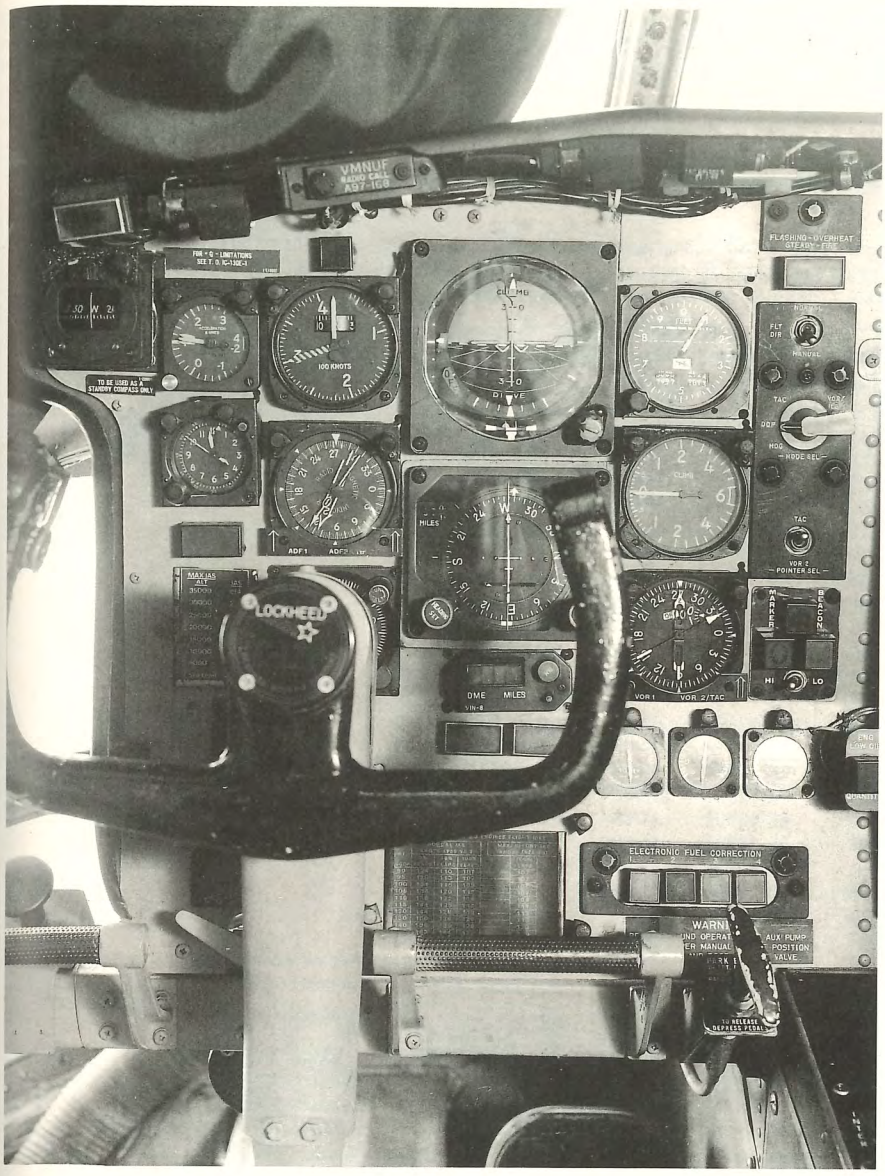








An airshow flypast for A4-204 (top) and a dirt field departure for A4-236. This airstrip is almost luxuriously smooth compared to some the Caribou operates from!



Close up view of the pilot's instrument panel on a C-130E. (RAAF Richmond)

a layer of strato-cumulus, experience bumps ranging from light to heavy. Edinburgh ATIS tells us that QNH is 1019, wind 210 deg/15-20 knots and temperature 21 degrees.

Adelaide Control on 126.8 advises us to call Edinburgh Tower on 118.3. We are soon cleared to land after a change of circuit and left base for runway 18. The 'Dunlops' start to turn at 0201Z, four minutes behind projected ETA. It's been a long flight due to the very heavy headwinds.

The return trip to Richmond reverses the route flown this morning and ends at 0800Z or 1900 hrs local time, arriving exactly at the time estimated before the original departure 12 hours ago. Trojan 753 carried 65 persons between Edinburgh and Laverton, then 75 to Canberra and on the final leg into Richmond the passenger load included three Air Commodores who naturally got a fair share of flight deck time. On the Edinburgh-Laverton leg the strong headwinds of the outbound journey turned into very nice tailwinds, allowing the Hercules to record a ground speed of 394 knots.

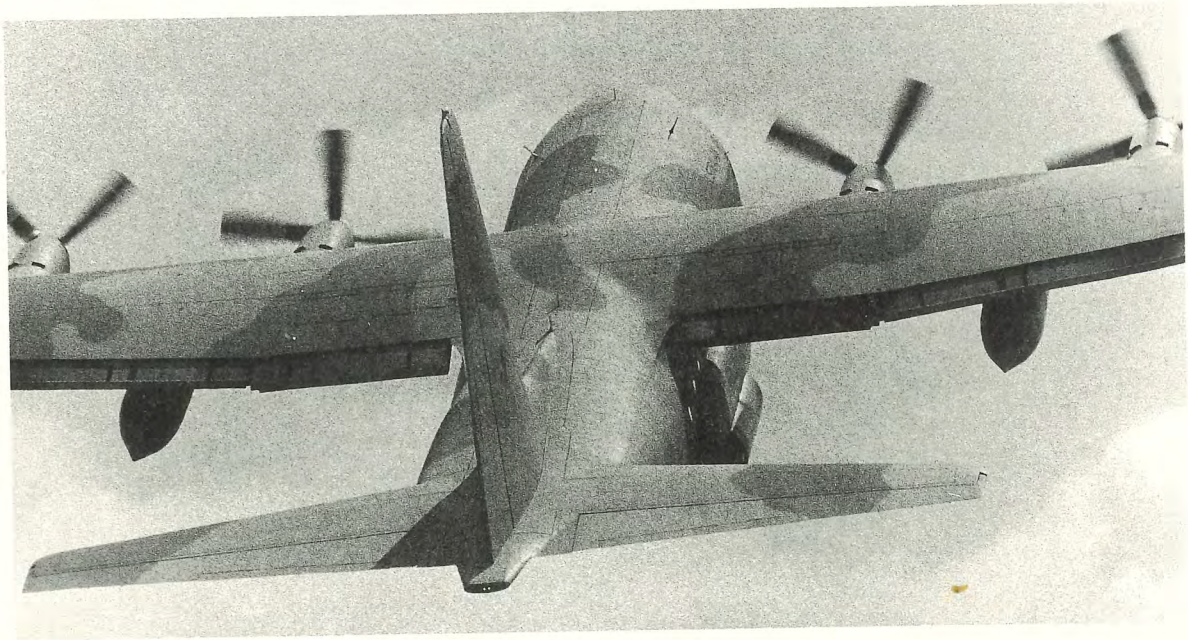
So that's it, a brief look at one 'typical day in the life' of a 37 Squadron C-130E Hercules performing its routine but vitally important job. Routine perhaps, but hum-drum never!

RAAF LOCKHEED HERCULES

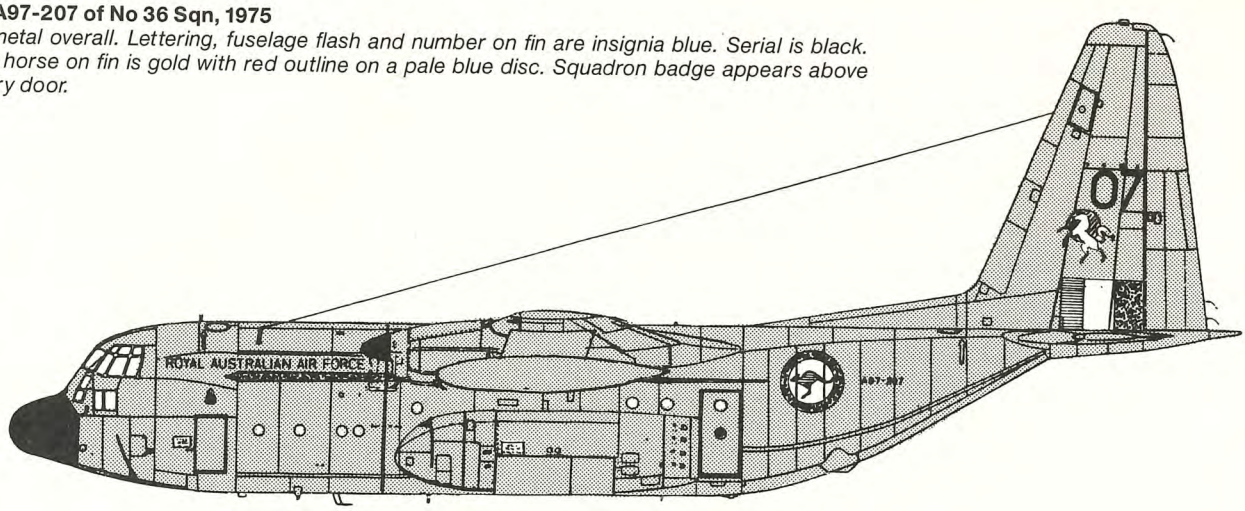
Abbreviations: Deliv – delivery; Const No – constructor's number; n/a – not applicable/available; wfu – withdrawn from use; IRC – International Red Cross.

Notes: The table below lists the aircraft in numerical order of RAAF serial number rather than chronological order. The serial number suffixes reflect the last three digits of Lockheed's constructor's number in the case of the C-130As and C-130Es, while the last three digits of the 'line number' apply to the C-130H serials. These were 7T-0001 to 7T-0012. The USAF serial numbers noted were allocated for administrative purposes and were never worn by the aircraft.

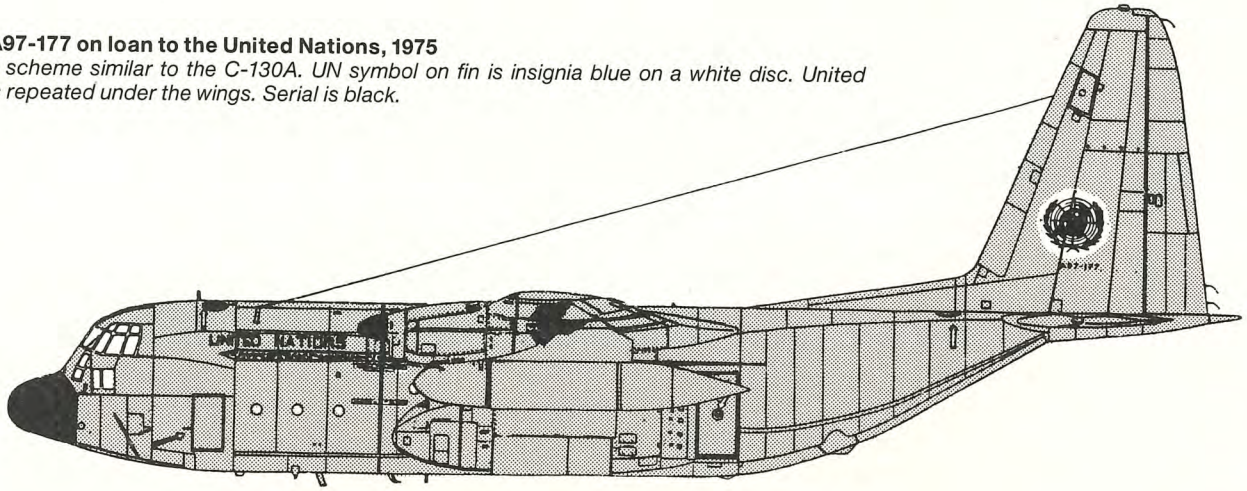
RAAF No	Model	Const No	Callsign	USAF No	Deliv	Disposal/Remarks
A97-001	C-130H	382-4780	VM-JLM	n/a	07/78	current 36 Squadron
A97-002	C-130H	382-4782	VM-JLN	n/a	07/78	current 36 Squadron
A97-003	C-130H	382-4783	VM-JLP	n/a	07/78	current 36 Squadron
A97-004	C-130H	382-4784	VM-JLQ	n/a	08/78	current 36 Squadron
A97-005	C-130H	382-4785	VM-JLS	n/a	08/78	current 36 Squadron
A97-006	C-130H	382-4786	VM-JLT	n/a	08/78	current 36 Squadron
A97-007	C-130H	382-4787	VM-JLU	n/a	08/78	current 36 Squadron
A97-008	C-130H	382-4788	VM-JLV	n/a	09/78	current 36 Squadron
A97-009	C-130H	382-4789	VM-JLW	n/a	09/78	current 36 Squadron
A97-010	C-130H	382-4790	VM-JLX	n/a	09/78	current 36 Squadron
A97-011	C-130H	382-4791	VM-JLY	n/a	10/78	current 36 Squadron
A97-012	C-130H	382-4792	VM-JLZ	n/a	10/78	current 36 Squadron
A97-159	C-130E	382-4159	VM-NUA	65-12896	08/66	current 37 Squadron
A97-160	C-130E	382-4160	VM-NUB	65-12897	08/66	current 37 Squadron
A97-167	C-130E	382-4167	VM-NUD	65-12898	09/66	current 37 Squadron
A97-168	C-130E	382-4168	VM-NUF	65-12899	09/66	current 37 Squadron
A97-171	C-130E	382-4171	VM-NUG	65-12900	10/66	current 37 Squadron
A97-172	C-130E	382-4172	VM-NUH	65-12901	10/66	current 37 Squadron
A97-177	C-130E	382-4177	VM-NUJ	65-12902	11/66	current 37 Squadron
A97-178	C-130E	382-4178	VM-NUK	65-12903	11/66	current 37 Squadron
A97-180	C-130E	382-4180	VM-NUL	65-12904	12/66	current 37 Squadron
A97-181	C-130E	382-4181	VM-NUM	65-12905	12/66	current 37 Squadron
A97-189	C-130E	382-4189	VM-NUN	65-12906	01/67	current 37 Squadron
A97-190	C-130E	382-4190	VM-NUP	65-12907	01/67	current 37 Squadron
A97-205	C-130A	182-3205	VM-JLA	57-0498	12/58	wfu 08/78, derelict at Laverton Vic mid 1990
A97-206	C-130A	182-3206	VM-JLB	57-0499	12/58	wfu 09/78, Aboitiz Air Transport 07/88
A97-207	C-130A	182-3207	VM-JLD	57-0500	12/58	wfu 09/78, IRC 1986, Fowler Aeronautics USA 02/89
A97-208	C-130A	182-3208	VM-JLF	57-0501	12/58	wfu 1978, Chad AF 09/78
A97-209	C-130A	182-3209	VM-JLG	57-0502	12/58	wfu 12/77, instructional airframe RAAF Richmond
A97-210	C-130A	182-3210	VM-JLH	57-0503	01/59	wfu 1978, Aboitiz Air Transport 07/88
A97-211	C-130A	182-3211	VM-JLJ	57-0504	01/59	wfu 1978, Aboitiz Air Transport 07/88
A97-212	C-130A	182-3212	VM-JLK	57-0505	01/59	wfu 09/78, to USA 10/83, Fowler Aeronautics 02/89
A97-213	C-130A	182-3213	VM-JLL	57-0506	01/59	wfu 02/78, Aboitiz Air Transport 07/88
A97-214	C-130A	182-3214	VM-JLM	57-0507	03/59	wfu 1978, at Laverton Vic mid 1990 for RAAF Museum
A97-215	C-130A	182-3215	VM-JLN	57-0508	03/59	wfu 09/78, Fowler Aeronautics USA 02/89
A97-216	C-130A	182-3216	VM-JLP	57-0509	03/59	wfu 1978, to USA 10/83, Fowler Aeronautics 02/89



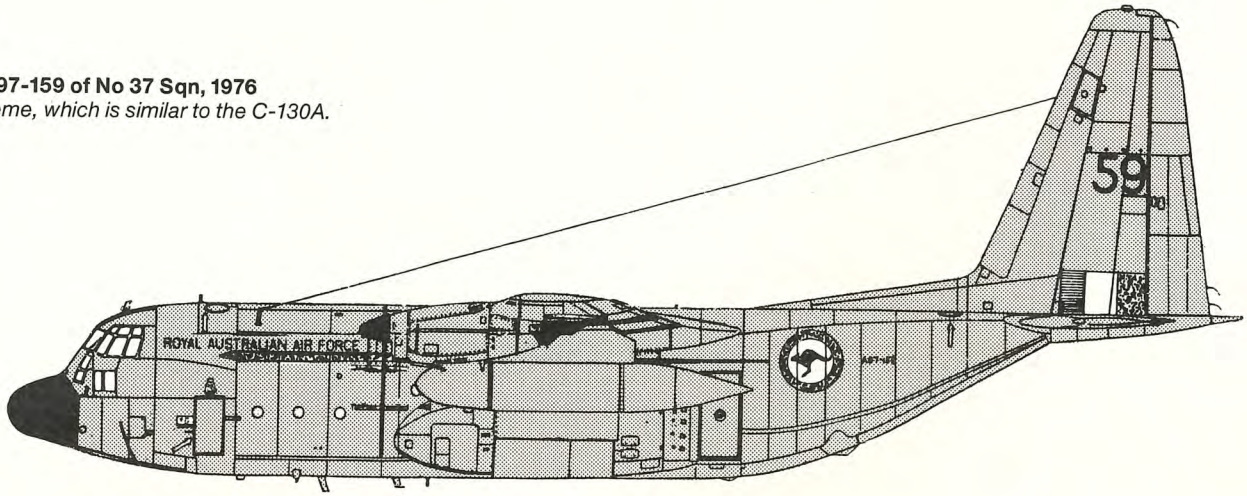
C-130A A97-207 of No 36 Sqn, 1975
Natural metal overall. Lettering, fuselage flash and number on fin are insignia blue. Serial is black. Prancing horse on fin is gold with red outline on a pale blue disc. Squadron badge appears above crew entry door.



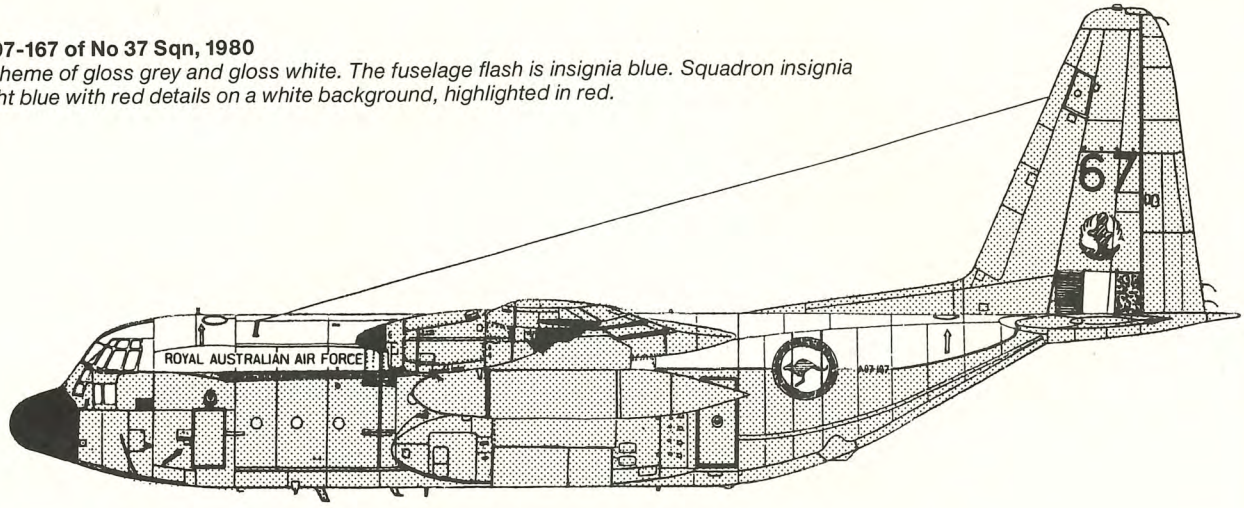
C-130E A97-177 on loan to the United Nations, 1975
Standard scheme similar to the C-130A. UN symbol on fin is insignia blue on a white disc. United Nations is repeated under the wings. Serial is black.



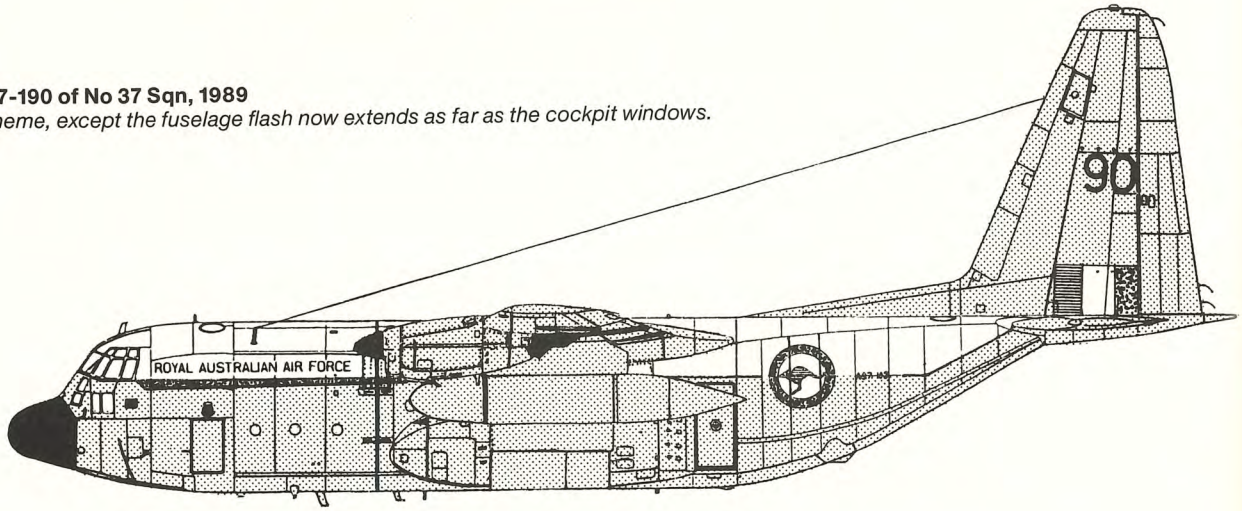
C-130E A97-159 of No 37 Sqn, 1976
Early scheme, which is similar to the C-130A.



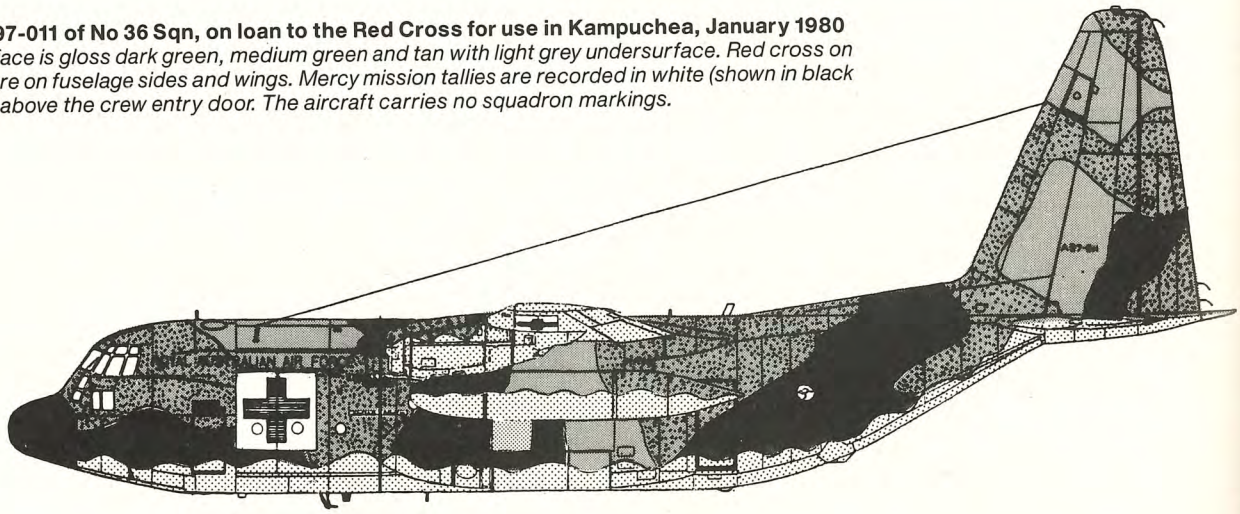
C-130E A97-167 of No 37 Sqn, 1980
Current scheme of gloss grey and gloss white. The fuselage flash is insignia blue. Squadron insignia on fin is light blue with red details on a white background, highlighted in red.

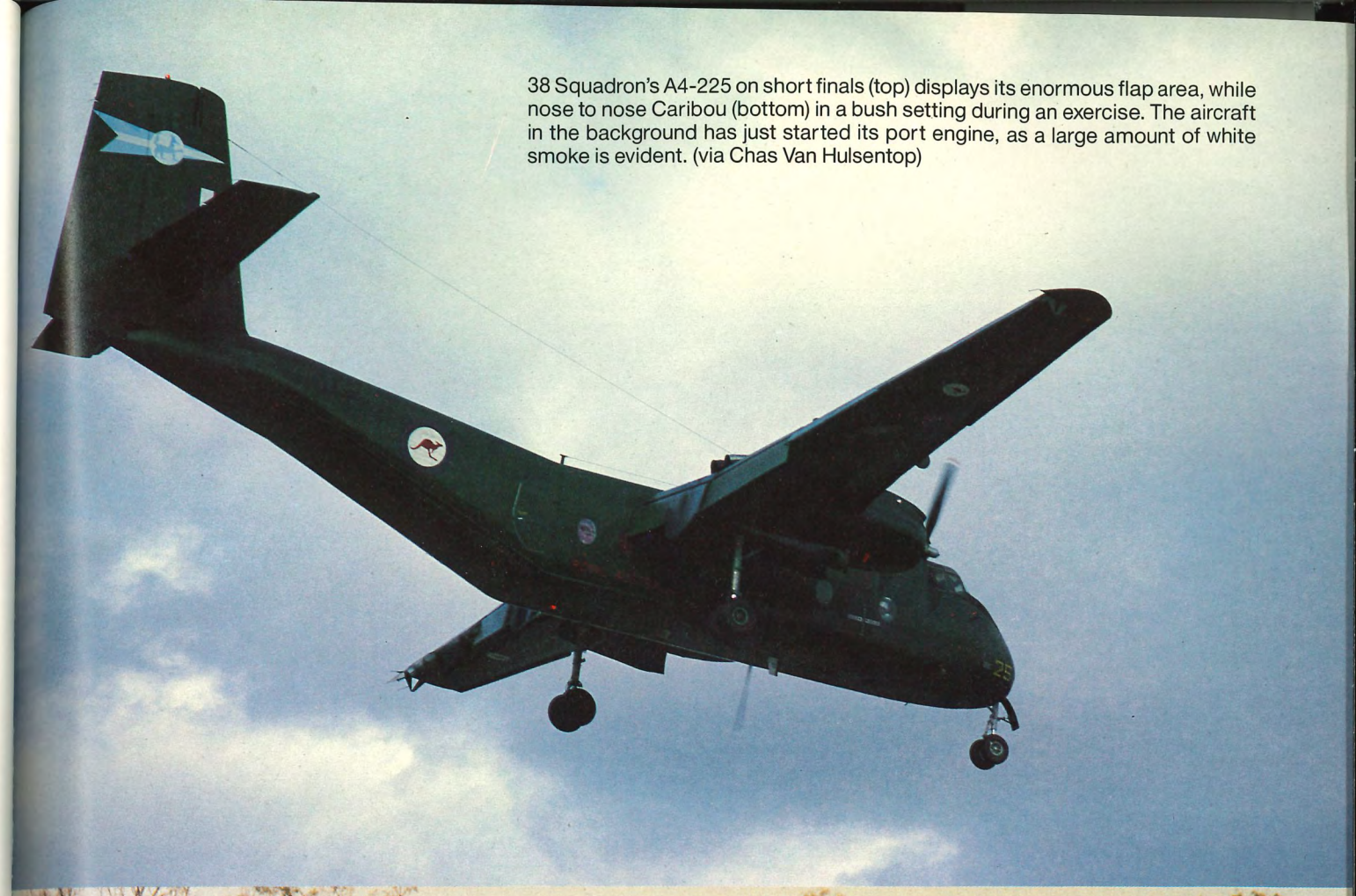


C-130E A97-190 of No 37 Sqn, 1989
Current scheme, except the fuselage flash now extends as far as the cockpit windows.



C-130H A97-011 of No 36 Sqn, on loan to the Red Cross for use in Kampuchea, January 1980
Upper surface is gloss dark green, medium green and tan with light grey undersurface. Red cross on white square on fuselage sides and wings. Mercy mission tallies are recorded in white (shown in black for clarity) above the crew entry door. The aircraft carries no squadron markings.



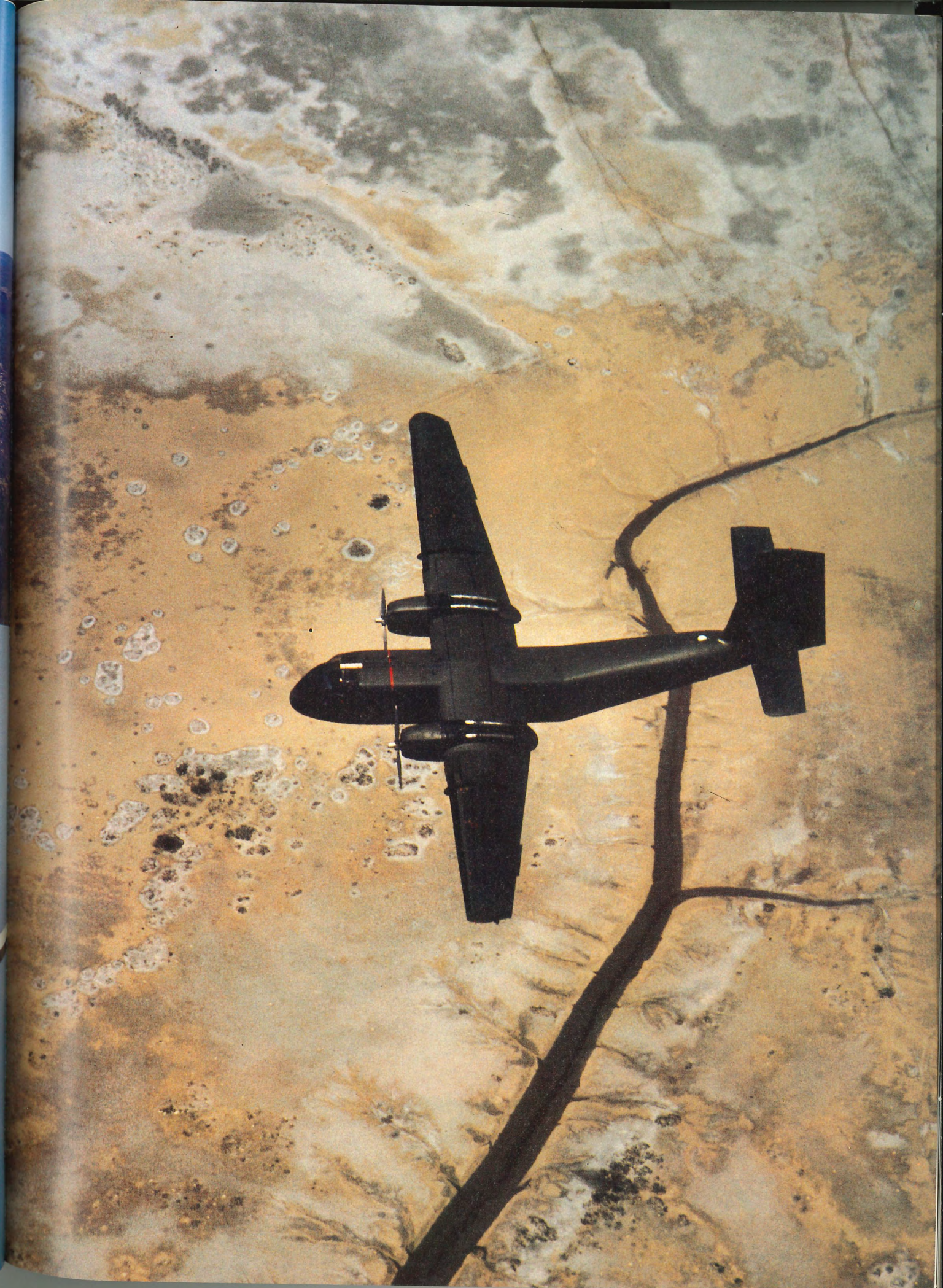


38 Squadron's A4-225 on short finals (top) displays its enormous flap area, while nose to nose Caribou (bottom) in a bush setting during an exercise. The aircraft in the background has just started its port engine, as a large amount of white smoke is evident. (via Chas Van Hulsentop)

Three RAAF Caribou served on rotation on the India/Pakistan border for the United Nations between March 1975 and September 1978. Painted white overall, A4-264 (top) shows the full UN livery and A4-199 (bottom) displays the Red Cross markings it carried in 1975 on relief flights to Portuguese Timor. (RAAF/Chas Van Hulsentop)





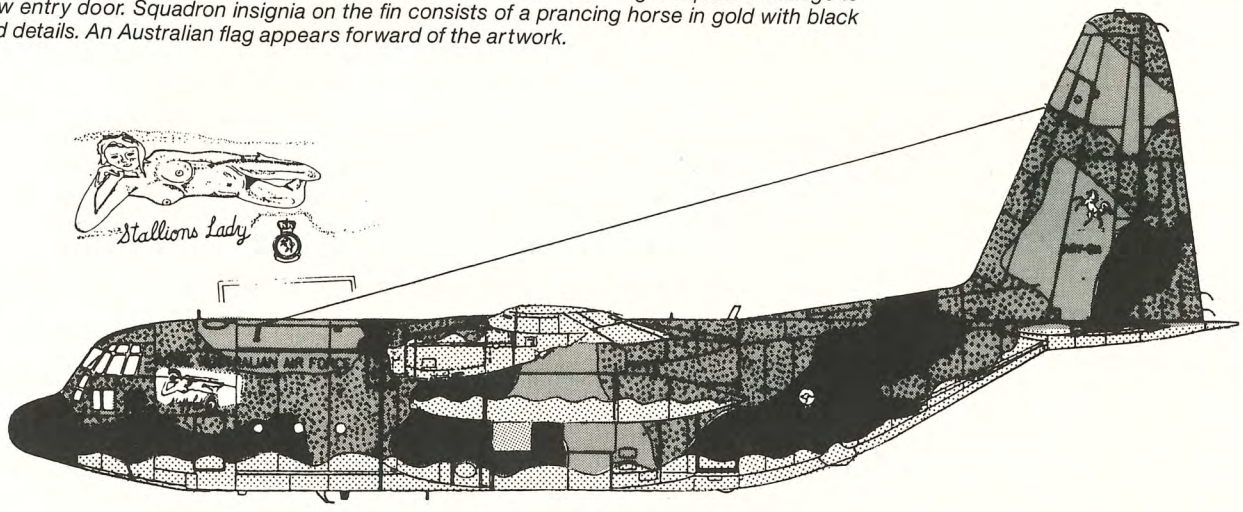




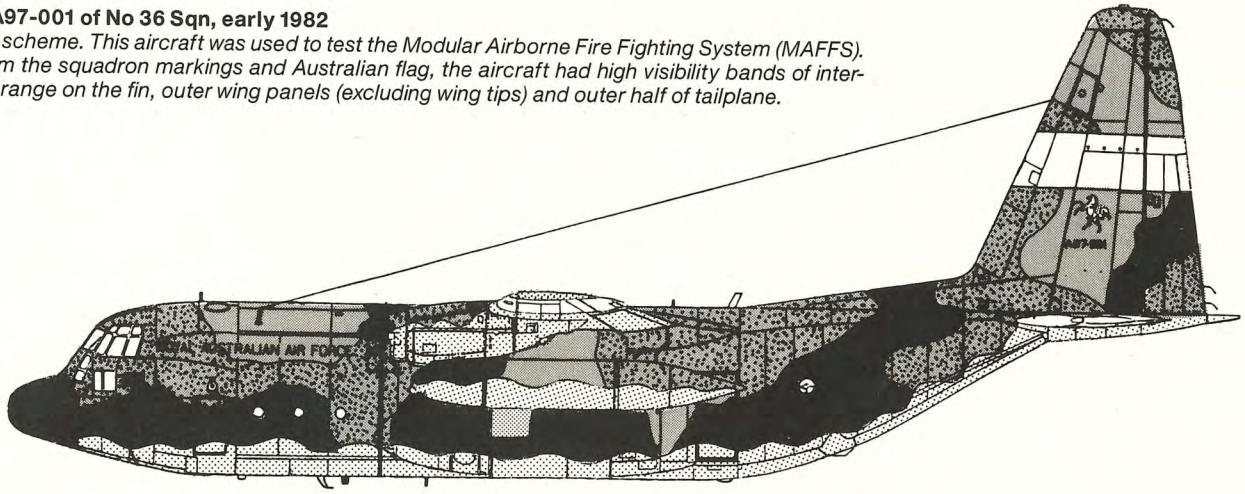
Variations on experimental camouflage schemes applied to some aircraft in the mid 1980s: A4-285 (top) in two tone green and black and A4-208 (bottom) tan, desert orange (or desert pink) and black. (via Chas Van Hulsentop)



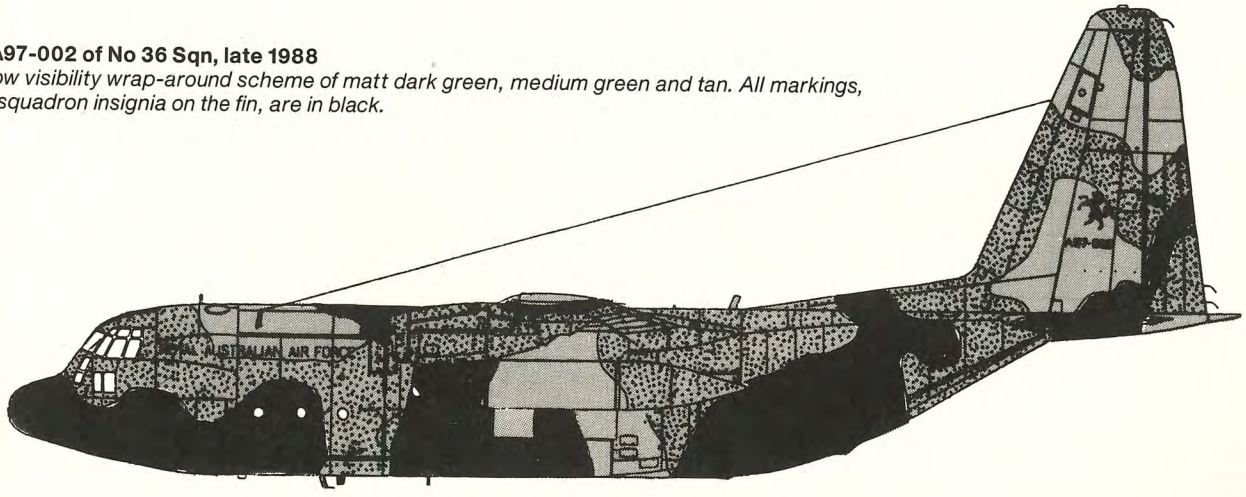
C-130H A97-011 of No 36 Sqn, 1982
Standard scheme. Special artwork, reminiscent of that carried on World War 2 aircraft, was added above the crew entry door during the 40th anniversary of the squadron. The artwork consists of a reclining female nude, flesh coloured with blue eyes and red hair on an azure blue background. 'Stallions Lady' is maroon. This aircraft never actually flew in these markings. Squadron badge is above crew entry door. Squadron insignia on the fin consists of a prancing horse in gold with black outline and details. An Australian flag appears forward of the artwork.



C-130H A97-001 of No 36 Sqn, early 1982
Standard scheme. This aircraft was used to test the Modular Airborne Fire Fighting System (MAFFS). Apart from the squadron markings and Australian flag, the aircraft had high visibility bands of international orange on the fin, outer wing panels (excluding wing tips) and outer half of tailplane.



C-130H A97-002 of No 36 Sqn, late 1988
Current low visibility wrap-around scheme of matt dark green, medium green and tan. All markings, including squadron insignia on the fin, are in black.




A4-233
A4-204
A4-231



The RAAF's oldest surviving Caribou is A4-140 (top), delivered with the first batch in April 1964. It is seen here with Red Cross markings hurriedly applied for relief flights to Timor in 1975. A4-210 (bottom) or 'Juliet Mike Useless' (from its callsign) due to its tendency to not fly straight after an accident in Vietnam (via Chas Van Hulsentop)





Two extremes of RAAF Caribou operations: A4-234 (top) cruising serenely over North Queensland scenic beauty and A4-152 (bottom) blasting out of a rough dirt strip near the front line. (via Chas Van Hulsentop)



DE HAVILLAND CANADA CARIBOU

Try telling the Royal Australian Air Force crews who fly the Caribou it's a museum piece – elderly perhaps, but no museum piece and a unique aircraft which can do things no other transport aircraft can. If the saying that "the only replacement for a DC-3 is another DC-3" is correct, then it must also apply to de Havilland Canada's STOL tactical transport aeroplane, a type which has been serving the RAAF in war and peace for well over a quarter of a century.

"Museum piece" is the description *Newsweek* magazine used when discussing the Caribou's use in US backed covert operations supporting the Nicaraguan Contra rebels during the second half of the 1980s. The fact that the two Caribou, operated by an apparently legitimate charter organisation but on behalf of someone deep in the bowels of the USA's security organisations were able to – in *Newsweek's* words – fly into "dime sized jungle landing strips in any kind of weather" indicates a very useful aircraft and one which isn't quite ready for a museum.

DHC – A Background

The De Havilland Aircraft of Canada company – or Boeing of Canada (de Havilland Division) as it has been known since the American company purchased it from the Canadian government in 1986 – is one of the world's older aircraft manufacturers and one which since the end of World War II has established itself as one of the major forces in the aerospace industry through its series of successful designs.

Better known as simply de Havilland Canada (abbreviated to DHC), the company was established in Ontario in March 1928 as a sales and assembly organisation for the products of its British parent company, who properly recognised Canada as a potentially important market. The basis of the operation was, of course, the hugely successful DH.60 Moth training and touring biplane, an aircraft which was causing something of a revolution in private flying not only in Britain but also in other parts of the world.

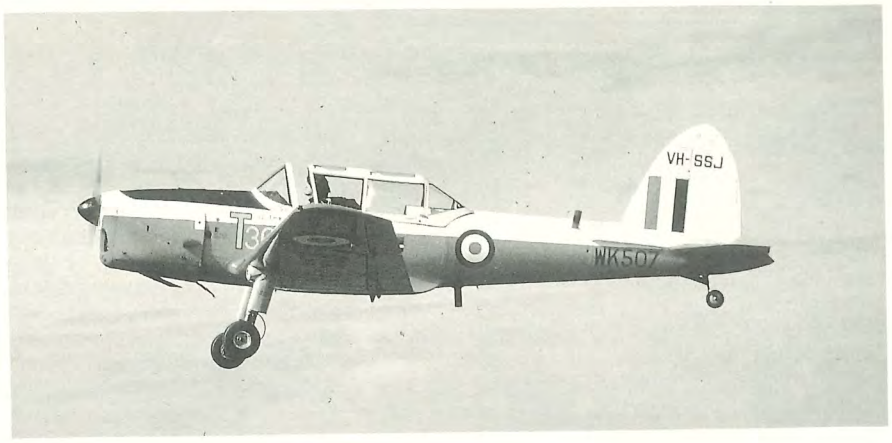
DHC began assembling British built Moths in an old shed in downtown Toronto and in September 1929 opened a new factory at Downsview, Ontario, still the site of the company's main production lines. After more than 60 Moths came local assembly of 25 DH.80 Puss Moth light cabin monoplanes plus sales and support of most of the extensive de Havilland range of aircraft in the 1930s up to and including the twin engined DH.84 Dragon, DH.90 Dragonfly and DH.89 Dragon Rapide types, plus of course the classic DH.82 Tiger Moth.

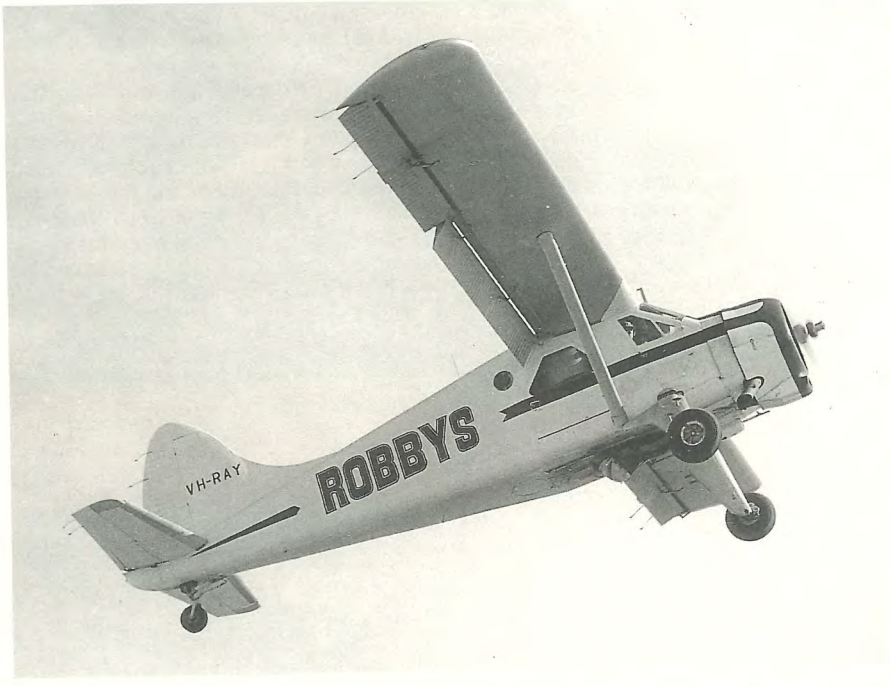
Further, the company developed an expertise in applying modifications to these aircraft to make them more suitable for operations in Canada. These included replacing some wooden components with metal and adapting the aircraft to operate from floats or skis as well as the standard wheeled undercarriages.

It was the Tiger Moth and the demand created by World War II which brought DHC into the business of manufacturing relatively large numbers of aeroplanes. An order for 25 standard DH.82A Tiger



Only its mother would think it beautiful, but from this angle the Caribou has a certain practical elegance to it. This is the RAAF's A4-234 in 35 Squadron markings. (RAAF via Chas Van Hulsentop)







De Havilland Canada's three indigenous designs prior to the Caribou were the DHC-1 Chipmunk (top), DHC-2 Beaver (middle) and DHC-3 Otter (bottom). All were successful aircraft which found a wide market.

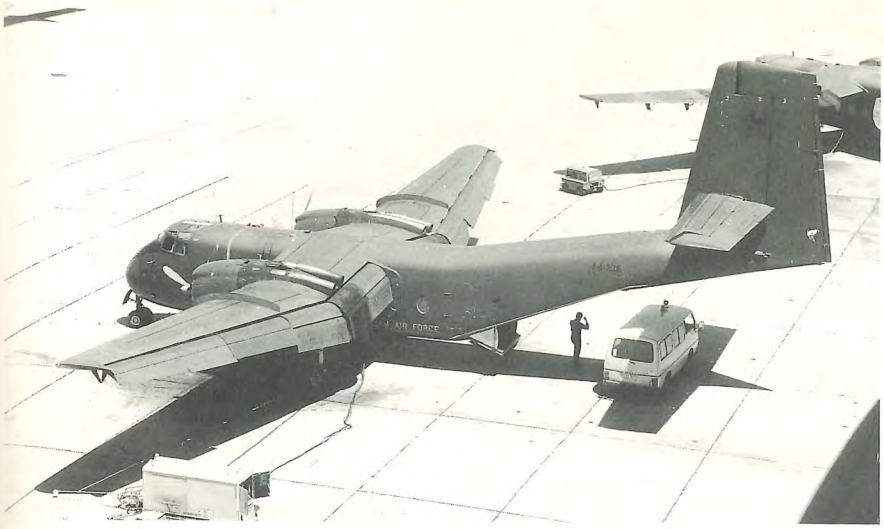
Moths placed by the Royal Canadian Air Force in 1937 began DHC's involvement with the classic trainer. These were followed by 200 Tiger Moth fuselages for Britain and then 205 more DH.82As and 1,520 distinctly Canadian variants dubbed the DH.82C. These differed from the standard aircraft in many ways including the fitting of wheel brakes, a castoring tailwheel in place of the usual skid, elevator trim tabs and in most cases the fitting of a 145hp Gypsy Major 1C engine instead of the standard 130hp Gypsy. Many aircraft were fitted with cockpit canopies while others had 120hp Menasco engines replacing Gypsy Majors during a period of poor supply of the de Havilland powerplant thanks to U-Boat activity in the North Atlantic. DHC delivered its last Tiger Moth in 1942.

The company's wartime activities expanded with the need for more aircraft. It was involved in a consortium of companies which produced 375 Avro Ansons under licence in Canada for twin engined training and from 1942 manufactured a total of 1,133 DH Mosquito fighter-bombers for use not only with the RCAF but also the RAF and USAAF. At its peak, DHC was producing Mosquitos at a rate of 120 per month.

The end of hostilities in 1945 and the wholesale cancellation of military orders which accompanied it left many aircraft manufacturers with excess production capacity and a need to convert to civil projects to keep the factories ticking over. DHC was no exception, and although initial postwar effort revolved around the manufacture of 60 DH.83C Fox Moths – a type first flown in 1933 – work was also progressing on the first of DHC's so far eight indigenous designs to achieve series production.

This was the DHC-1 Chipmunk basic trainer, a replacement for the Tiger Moth and a project 'farmed out' to de Havilland's Canadian subsidiary due to the numerous other projects being undertaken by the parent company in Britain. The first Chipmunk flew in May 1946 and the prototype was followed by 216 production examples from the Canadian production line, 1,014 built by de Havilland in Britain for the Royal Air Force and other customers between 1949 and 1955 and a further 60 manufactured under licence by OGMA in Portugal for that nation's air force.

The success of the Chipmunk was followed by the single engined 6/8 seat DHC-2 Beaver utility 'bush' aircraft (first flight August 1947) of which 1,692 were manufactured over the next 20 years including 974 delivered to the US services. Then came the much larger but still single engined DHC-3 Otter (first flight December 1951) which could carry up to 15 people and reinforced DHC's rapidly growing reputation as a designer and manufacturer of rugged short take-off and landing (STOL) aircraft capable of operating in the harshest environment. Otter production amounted to 466 aircraft.



The secret of the Caribou's exceptional short field performance lies largely in its long span wings and powerful, full span double slotted flaps as displayed here by the RAAF's A4-236 at Richmond NSW.

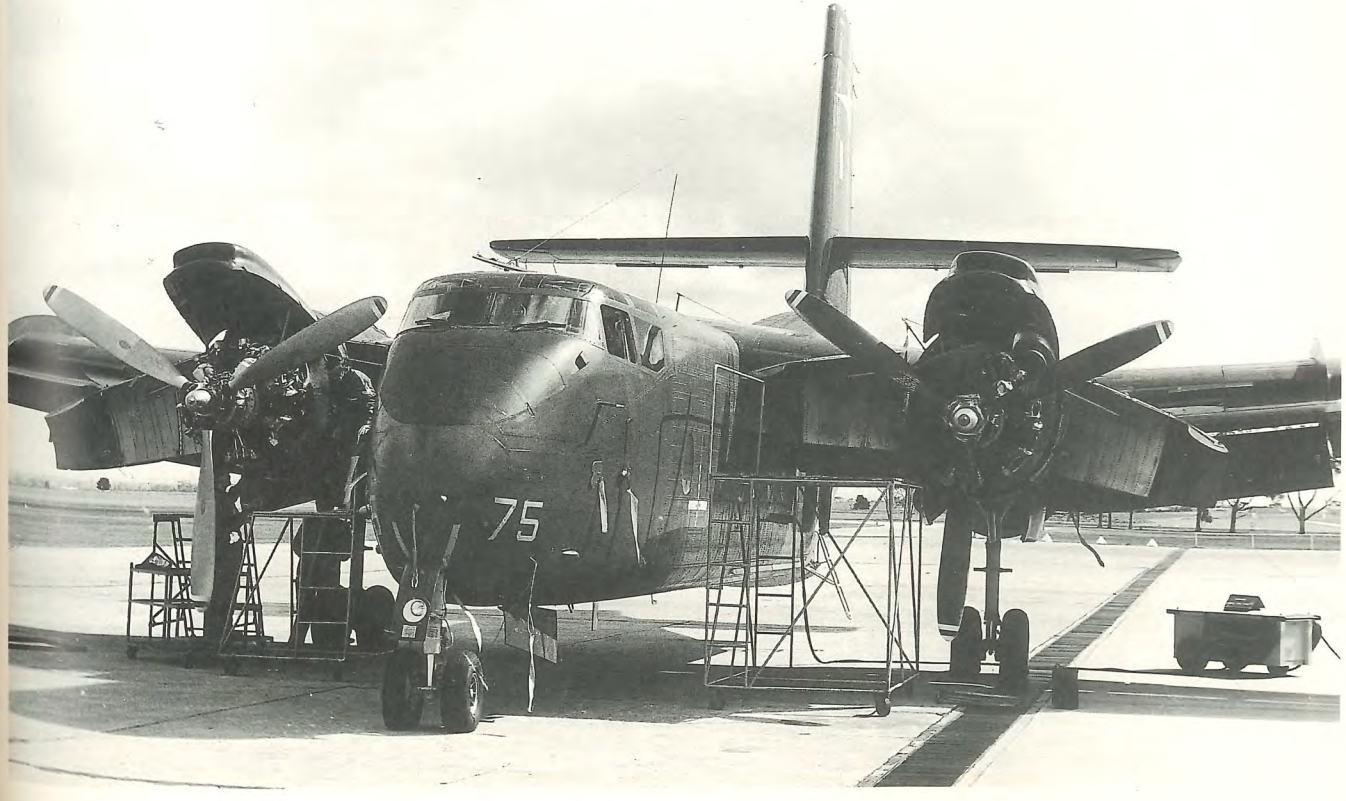
The Otter and Beaver provided the mainstay of DHC's self-designed production during the 1950s, but one other programme on which the company was involved provided a stepping stone to the much larger and more complex DHC-4 Caribou which would follow later in the decade. This was the Grumman Tracker carrier based anti-submarine aircraft, 100 examples of which were manufactured under licence in Canada between 1954 and 1957 for the Royal Canadian Navy. DHC was prime subcontractor responsible for manufacture of the forward fuselage and cockpit and final assembly. The experience gained on the Tracker combined with DHC's extensive expertise in the area of STOL performance placed the company in an ideal position to examine the possibilities offered by the military market for a larger tactical transport aircraft.

A Reindeer That Flies

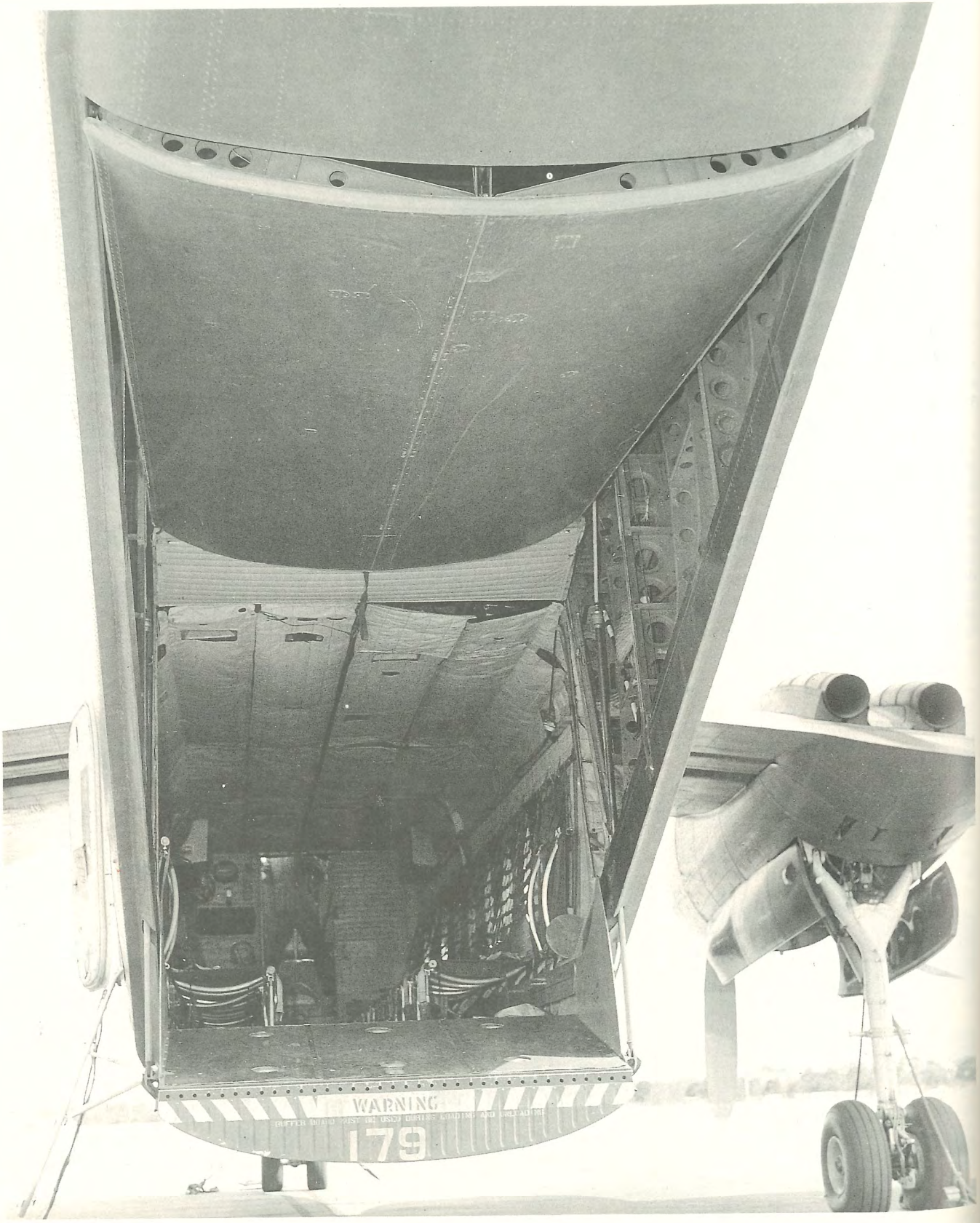
De Havilland Canada began the design and development process which ultimately resulted in the Caribou in late 1954 with a design study resulting from the company's recognition of the need for a twin engined STOL utility aircraft for both civil and military use. What emerged was a kind of 'Twin Otter', an aircraft not to be confused with the hugely successful DHC-6 twin turboprop 19 passenger commuter/utility aircraft of the same name which first flew in 1965 and remained in production for nearly a quarter of a century.

The first 'Twin Otter' emerged as a high wing fixed undercarriage aircraft of around 13,000lb (5,900kg) maximum weight powered by two 600hp Pratt & Whitney R-1340 radial engines, a single example of which was fitted to the DHC-3 Otter. Investigation of the design revealed the aircraft offered no significant payload improvement over the Otter but considerably worse airfield performance and the idea was dropped.

A clean sheet of paper was required and a significant decision taken which would make a large contribution to the final design which would become the Caribou as we now know it. The company recognised that in order to reach a reasonable market, the new aircraft would have to comply with internationally recognised transport category certification standards – CAR 4b as it was then known – which among other



For an aircraft operating near the front line, easy maintenance is a must. The Caribou's Pratt & Whitney engines are readily accessible thanks to its 'petal' cowlings.



A general view of the Caribou's rear loading door and ramp and its interior, capable of carrying up to 32 fully equipped troops and numerous other loads. (RAAF)

things imposed strict engine out performance requirements.

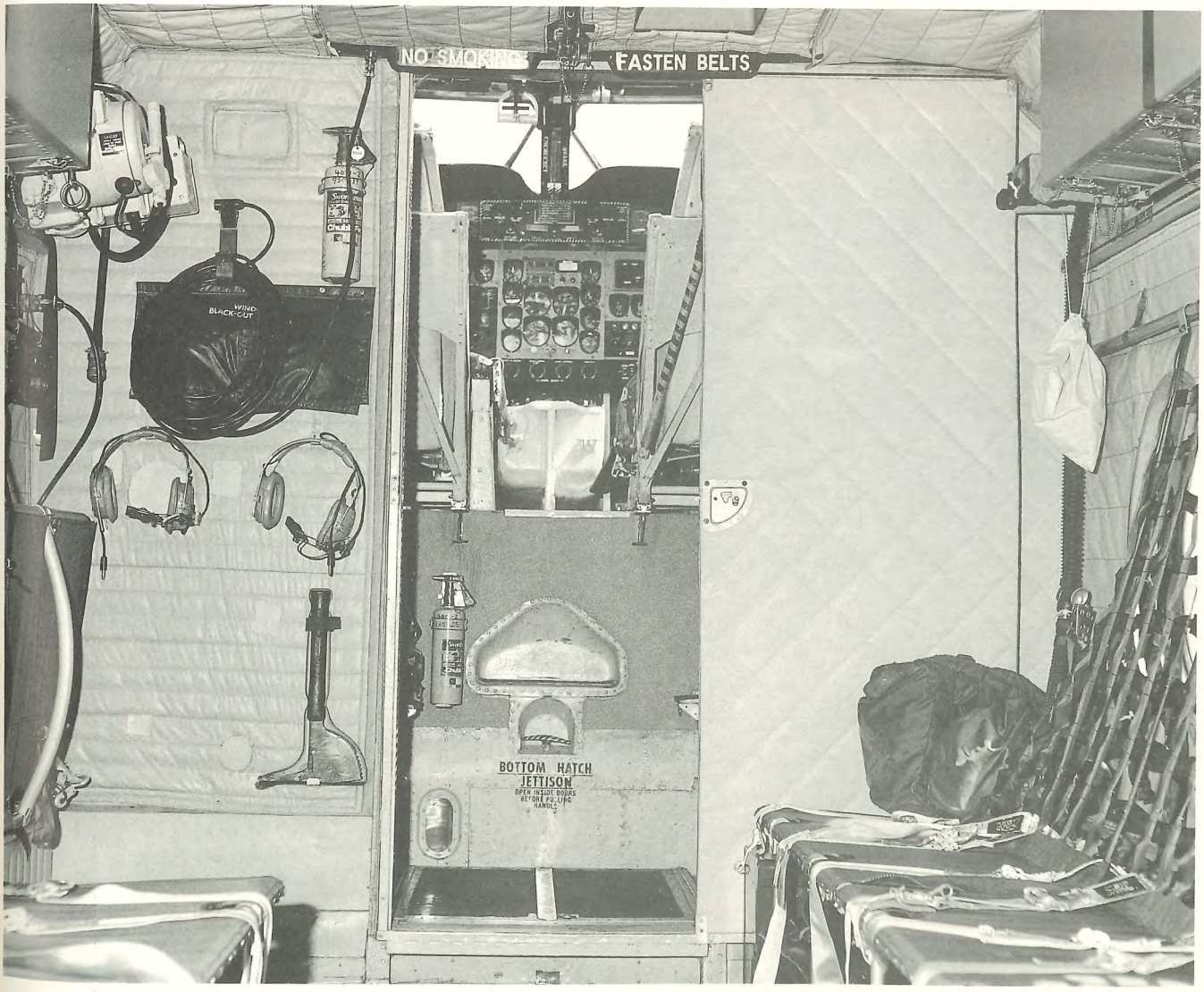
Several design studies were carried out over the next two years, the first for an aircraft with a 22,000lb (9,980kg) maximum takeoff weight powered by two 1,200hp Pratt & Whitney R-1830 Twin Wasps as were fitted to the vast majority of Douglas DC-3/Dakotas. This study was also dropped as it soon became obvious that the payload offered was insufficient and the engine out performance was well below the required minima.

From 1956 DHC looked at various combinations of powerplant, weight and configuration. Maximum takeoff weights of 24,000lb (10,890kg) and 26,000lb (11,800kg) were investigated, as were the possibilities offered by powerplants such as the 1,450hp Pratt & Whitney R-2000 and 1,475 Wright R-1820 radial piston engines plus turboprops in the form of the 1,600shp Rolls-Royce Dart 511 and the at that stage embryonic Lycoming T55.

By late 1956 the general configuration of the new aircraft had been decided with the R-2000 engine/26,000lb gross weight combination providing the best compromise (the turboprop option was not viable due to the very high fuel consumption) in combination with an unpressurised fuselage capable of carrying 28 passengers and incorporating rear loading doors and adjustable ramp, a high wing with relatively large span and high lift devices for exceptional field performance and retractable tricycle undercarriage. As the specification of the aircraft firmed it became apparent that although the original intention of providing a design which would meet the needs of civilian feeder line operators was kept in mind, it also had potential as a tactical transport for the military. It was this factor which was the main influence on deciding to incorporate a rear loading door and ramp.

As 1956 progressed the definitive shape of the Caribou evolved. An early layout had the general fuselage and wing shape including the upswept rear fuselage and 'inverted gullwing' characteristic of the final product but had an empennage design which was substantially different. This consisted of horizontal tail surfaces with marked dihedral and large endplate fins and rudders. Testing revealed some aerodynamic and structural disadvantages, so the definitive very large single fin and rudder (necessary for adequate control at the very low speeds at which the aircraft could fly) and tailplane mounted quite high relative to the fuselage centreline were adopted.

Solving the aerodynamic problems associated with the new design and particularly its all important low speed characteristics was dealt with in a slightly unusual way. Although conventional wind tunnel testing of models was used (particularly in defining the aerofoil shape) DHC used models mounted on first a truck and then an Otter to study flow characteristics. With simple instrumentation attached to the models, this method eliminated many of the normal



Inside the cabin showing the webbed seating standard on RAAF Caribou, the substantial step up to the cockpit and various items of equipment. (RAAF)

wind tunnel tests and provided much valuable data in 'free flight' conditions.

The decision to go ahead with construction of two prototypes of de Havilland Canada's newest design was taken in late 1956 when the Canadian government offered $C2.5m assistance to the company. Although this represented less than one-tenth of the estimated total development cost it was nevertheless an indication of confidence on behalf of the government and was sufficient get the project underway. As it happened, the company was approaching a period of serious financial difficulty brought on by the relatively high development cost of the new aircraft and in mid 1959 would be told by its bankers – the Royal Bank of Canada – that no more money would be forthcoming. The situation was saved by the English bank Barclay's, one of whose directors was Lord Portal, the former Royal Air Force Chief of Air Staff and a man familiar with DHC's operation. De Havilland Canada changed banks!

Following the precedents set by its three earlier designs which were all named after North American animals with a Canadian connection, de Havilland Canada named its new aircraft 'Caribou', a large reindeer. The factory designation was DHC-4, continuing the sequence established by the Chipmunk, Beaver and Otter.

American Interest

A vital element in the Caribou's overall success was the early interest shown in it and subsequent ordering in substantial quantities by the United States Army. Of the 307 Caribou ultimately manufactured, no fewer than 164 were delivered to the US services. The US Army first indicated interest in the Caribou in early 1957 and the service's input influenced many of the aircraft's final characteristics. In the middle of the same year the US Army placed an order for five evaluation Caribou under the designation YAC-1, following previous orders for the Beaver and Otter, both in substantial quantities. Both types had to be given Congressional dispensation from the 'Buy American' Act to be ordered, as did the Caribou.

An even more substantial change to American law had to be implemented before the Caribou could enter US Army service. This was the requirement which limited the US Army to operating aircraft with a basic (ie empty) weight of not more than 5,000lb (2,268kg). The Caribou's basic weight was three and a half times that and a special waiver had to be passed before approval of the purchase could be given.

Caribou Described

The DHC-4 Caribou as it finally emerged from de Havilland Canada's Downsview factory in July 1958 was a practical, utilitarian and functional (if as yet untested) aircraft of certainly distinctive appearance with its bluff nose, large



Good nose detail of the RAAF's A4-231 while based at Darwin. The cartoon is the emblem of Australia's Northern Defence Forces. (RAAF)

upswept rear fuselage and seemingly enormous vertical tail surfaces. The powerplants were a pair of Pratt & Whitney R-2000-7M2 Twin Wasp 14-cylinder two row radials engines each producing 1,450hp for takeoff and driving three bladed Hamilton Standard propellers of 13ft 1in (3.98m) diameter. Early aircraft did not feature reversible propellers, this feature becoming available in 1960. The -7M2 version of the R-2000 engine featured a single speed supercharger; most other versions had two speed blowers.

Fuel tanks containing a total capacity of 690imp gal (3,137 l) were housed within the Caribou's 95ft 7.5in (29.15m) span wing, which featured a 10:1 aspect ratio, a two spar failsafe structure and provided exceptional short field performance due to its size and its full span double slotted flaps of which the outer trailing portions operated independently as ailerons.

The conventional semi-monocoque fuselage gave the first two Caribou an overall length of 69ft 1in (21.05m) but the third and subsequent aircraft featured a forward fuselage extended by 42 inches (1.06m) to improve the centre of gravity range. This was the only modification to the Caribou's dimensions during its production life and apart from helping the centre of gravity situation it also increased the aircraft's carrying capacity from 28 to 32 troops on inwards facing seats. Other military loads included 26 fully equipped paratroopers or up to 22 casualties on stretchers plus four seated patients and four attendants. The proposed civil version could carry 30 passengers plus the regular flight crew of two.

As a freighter and in conjunction with the rear loading doors and ramp the Caribou could carry three tons of cargo or two fully loaded jeeps. The cabin floor was stressed to 200lb/sq in and had tie down fittings on a grid pattern which covered the floor. Some 36 points on the cabin walls could be fitted with tie down rings and of course the fittings necessary for the dropping of men and/or equipment could be installed. The cabin's internal dimensions were: length (in definitive form) 28ft 9in (8.76m), maximum height 6ft 3in (1.90m), width 6ft 1.5in (1.86m) at floor level and 7ft 3in (2.21m) at window level, and volume 1,150cu ft (32.56cu m). The height of the cabin floor was convenient for trucks loading through the electrically operated rear door and ramp at 3ft 9.8in (1.16) while the clear height under the Caribou's tail section was 9ft 6in (2.89m), more than enough for most vehicles to negotiate safely.

For the rugged short field operations which would become the Caribou's operating regime, a very strong undercarriage had to be provided. The result was a retractable tricycle design with



The choice of the 1,450hp Pratt & Whitney 14 cylinder radial engine to power the Caribou was the correct one at a time when turboprops were relatively new and untried in harsh operating conditions. This shot shows good detail of the cowling and Hamilton Standard propeller. (RAAF)

twin wheels on each leg using very low pressure tyres for operating into unprepared fields. A feature of the main undercarriage legs was the use of a two stage shock absorber which had a long stroke to absorb the high landing energy associated with STOL operations and a short stroke to reduce pitching during braking and to ensure a near level floor and constant floor height during loading and unloading.

Undercarriage retraction was via the Caribou's hydraulic system which also operated the nosewheel steering, brakes and flaps. The aircraft's electrical systems looked after everything else as no pneumatic system was fitted.

Only two Caribou variants were manufactured once the fuselage stretch was incorporated from the third aircraft. Designated DHC-4 and DHC-4A, these differed in the maximum takeoff weights permitted, the -4A incorporating structural modifications permitting an increase from the original 26,000lb (11,794kg) to 28,500lb (12,928kg). There has been some disagreement on at which point the -4A replaced the original on the production line, although the Caribou Flight Manual clearly states it as being from aircraft number 23.

As would be expected for an aircraft of this type, the Caribou was not the world's fastest transport. Its normal cruising speed of 150-160 knots (278-296km/h) was similar to the Douglas Dakota, but its short field performance was substantially better. At maximum gross weight in standard conditions and using short field technique, a Caribou needed a takeoff run of only 725 feet (221m) while the Dakota required 1,500 feet (457m) or more than twice as much.

Towards Production

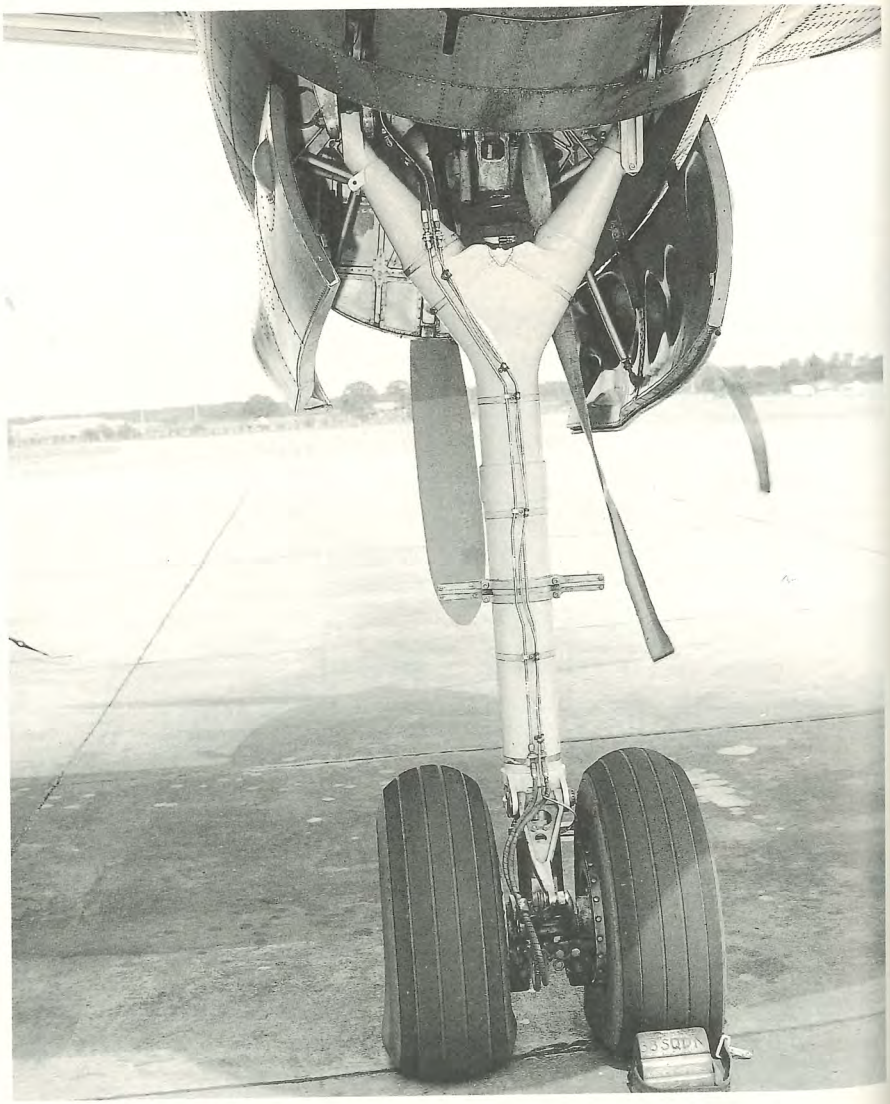
The prototype Caribou (carrying Canadian experimental civil registration CF-KTK-X) took to the air for the first time on 30 July 1958 in the hands of DHC's chief test pilot George Neal and his co-pilot Dave Fairbanks. That successful flight lasted two hours and began with a spectacularly short takeoff run which has been reported – perhaps with some poetic licence – as being a mere 300 feet! A second example was also manufactured in 1958 (CF-LAN) and used as a demonstrator while the third aircraft was the first featuring the lengthened forward fuselage. This aircraft was intended as being the first YAC-1 for the US Army and was allocated the US serial number 57-3079. It first flew with the civil registration CF-LKI-X, but only had a brief life before it was destroyed.

During high speed dive testing in February 1959 as part of the certification programme, George Neal and his Department of Transport co-pilot Walter Gadzos were forced to bail out of the Caribou following flutter in and structural failure of the port elevator. The cause was found to be the longer elevator control cable required by this first 'stretched' Caribou reducing the dampening of the spring tab in the elevator circuit and therefore allowing flutter at a lower speed than expected. The 'fix' was simple.

The strict requirements of CAR 4b certification were being slowly overcome as testing continued through 1959 with the second prototype converted to incorporate the fuselage stretch. Intense activity was shown in the area of stalling, where over 1,000 such manoeuvres in every conceivable configuration were carried out before the authorities were satisfied. Some modifications had to be incorporated before the necessary certification documents were issued and included stick shakers, wing fences, stall bars and drooped wing leading edges.

The crash of the third Caribou delayed the programme slightly but contributed to the financial predicament DHC found itself in as the year progressed. Although the banking problem (as described above) was solved, the situation with the Caribou was that the order book was substantially empty. Of the 20 production aircraft authorised by mid 1959, only the five YAC-1s and four CC-108s for the Royal Canadian Air Force were accounted for. A series of demonstration flights followed in an effort to attract more customers, the US Army – which was supposed to have ordered more aircraft by now – being a prize target.

Additionally, October 1959 saw the beginning of the first of three world demonstration tours conducted by the Caribou, the others being carried out in 1961 and 1964. That first tour (using CF-LVA, the ninth Caribou) started in Toronto and over the next seven months travelled more than 80,000km visiting 40 countries, 154 airports and flying 479 demon-



The Caribou's sturdy and long stroke undercarriage is designed to withstand the sometimes heavy landings associated with STOL operations. Low pressure tyres cope with rough fields. (RAAF)

stration flights. The gruelling tour showed off the Caribou in its proper setting – short strips, heavy loads, performing tasks which hitherto seemed impossible for such a relatively large aircraft. Obviously the potential customers were in the main suitably impressed, for three of the Caribou's subsequent major customers – Australia, India and Malaya – were visited on that first trip.

By the time CF-LVA returned to Canada in May 1960 things were beginning to look up for the Caribou project. The five YAC-1s had been handed over to the US Army in October and December 1959 and the first production order for 50 aircraft just received from the same customer. The US Army would ultimately receive 159 Caribou in several batches in addition to the evaluation quintet; they were delivered between March 1960 and July 1965. Originally designated AC-1, the US Army's Caribou were subsequently redesignated CV-2A and -2B (depending on gross weight) but were transferred to US Air Force control in 1966 where the designation changed yet again, this time to C-7A and B.

Caribou Rampant

With the success of the Caribou assured as a result of the US Army's procurement programme, and despite Canada's surprisingly small acquisition of only nine including the first prototype, exports to other nations contributed to the healthy production run of 307 aircraft spread out over 14 years until the final example was delivered to the Royal Malaysian Air Force in March 1973. The peak years for deliveries were 1963 and 1964 when 64 and 68, respectively, were handed over to customers. Production gradually tapered off after that, declining to nine in 1967, ten in 1968, increasing to 18 in 1969 and averaging five per annum between 1970 and 1973.

Other military customers included Ghana (the first non North American operator), Kuwait, India, Zambia, Uganda, Kenya, Tanzania, Thailand, Abu Dhabi, Spain, Guyana, the Cameroun and of course Australia. Ansett-MAL in Papua New Guinea, AMOCO Ecuador and Air America were among the relatively few civilian operators. The term 'civilian' should be used advisedly in the case of Air America, of course, as this was the 'airline' of the United States' Central Intelligence Agency (CIA) which flew covert and often illegal missions throughout South East Asia during the time of the troubles in Vietnam and neighbouring countries.

Ansett-MAL's experience with the Caribou was restricted to a single aircraft. In May 1965 the airline announced it had ordered a Caribou for general freight work in the then Australian territory of Papua New Guinea, the rugged terrain of the area and its short and difficult air strips apparently tailor made for the aircraft. It was delivered in September 1965 and registered VH-BFC. This was the 23rd Caribou, originally built in 1961 and the first DHC-4A model. It had previously seen service with the Swedish Air Force for evaluation purposes.

A combination of factors conspired to make Ansett-MAL's operation of the Caribou uneconomic and unnecessary, among them the development of upgraded airfields and the establishment of a road between Lae and Goroka. The

DE HAVILLAND CANADA DHC-4A CARIBOU

Powerplants: *Two Pratt & Whitney R-2000-7M2 Twin Wasp 14 cylinder, two row, air cooled radial engines with single speed superchargers and rated at 1,450hp for takeoff. Three blade constant speed, fully feathering and reversible Hamilton Standard propellers of 13ft 1.25in (3.99m) diameter. Fuel capacity 690imp gal (3,137 l) in two wing tanks each consisting of 10 cells.*

Dimensions: *Wing span 95ft 7.5in (29.15m), length 72ft 7in (22.13m), height 31 ft 9in (9.68m), tailplane span 36ft 0in (10.97m), wheelbase 25ft 8in (7.82m), wheel track 23ft 1.5in (7.05m), wing area 912sq ft (84.72m²).*

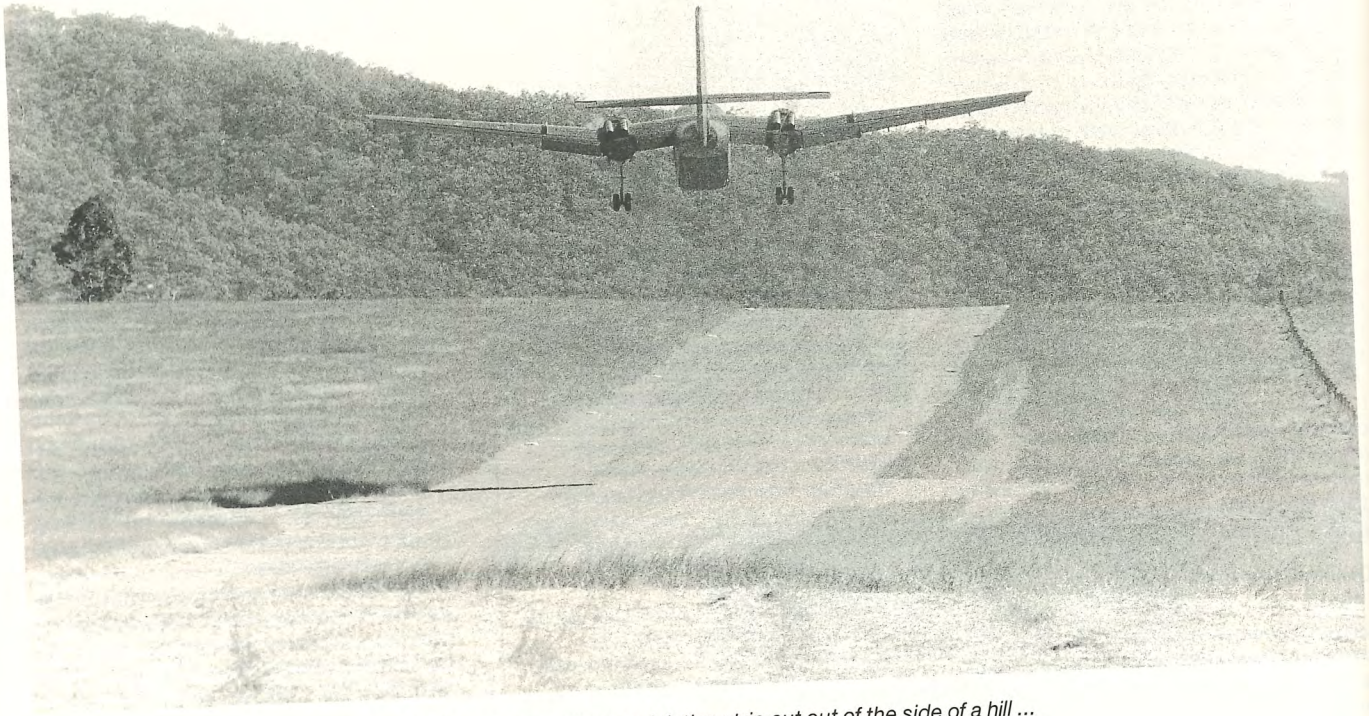
Accommodation: *Flight crew of two plus 32 troops or 26 fully equipped paratroops on inward facing seats or 22 stretcher patients plus eight seated patients or medical attendants.*

Weights: *Max takeoff and landing 28,500lb (12,927kg), operational empty 18,260lb (8,283kg), max zero fuel 27,000lb (12,247kg), max payload 8,740lb (3,965kg).*

Performance: *(at MTOW) Max speed 216mph (348km/h) at 6,500ft; economical cruise 182mph (293km/h) at 7,500ft; takeoff run 725ft (221m), landing roll 670ft (204m); initial climb 1,355ft (413m)/min; service ceiling 24,800ft (7,560m), engine out ceiling 8,800ft (2,682m); range (with 45min reserve at econ cruise) 1,307mls (2,100km) with max fuel, 242mls (389km) with max payload.*



The ninth Caribou during its marathon seven month demonstration tour of 40 countries between October 1959 and May 1960. This 80,000 kilometre journey sowed the seeds for several major orders, including Australia's. (RAAF via Chas Van Hulsentop)



Typical operating environments for the Caribou. From a short undulating strip cut out of the side of a hill ...



... or an even more difficult strip high in Pakistan ...

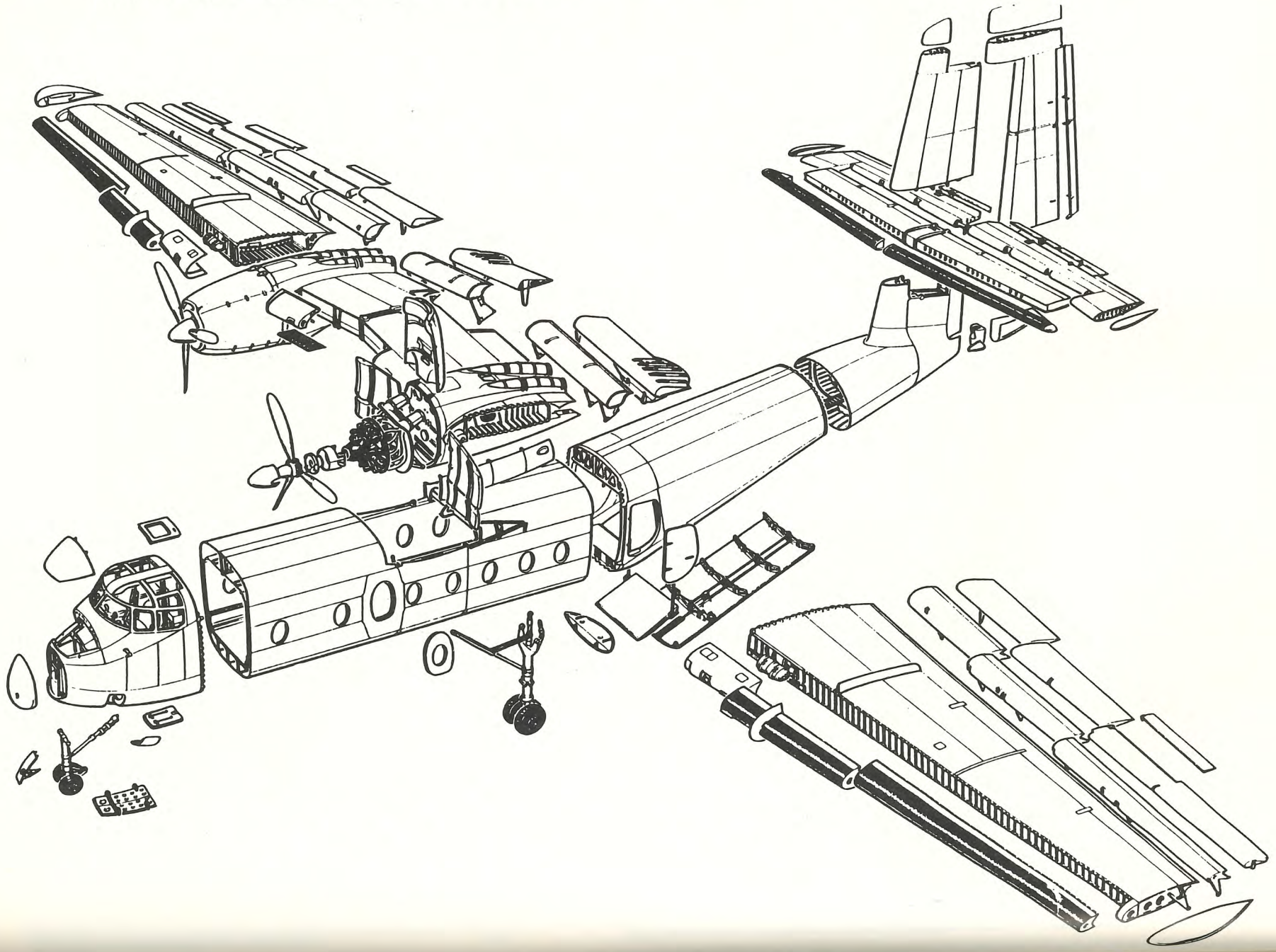


... or from a dustbowl in the Australian outback ...



... or delivering supplies for the troops close to the front line. (RAAF via Chas Van Hulsentop/RAAF Museum)

An exploded view drawing showing the major components of the Caribou. Note the propeller spinners, an item not found on the RAAF's aircraft.



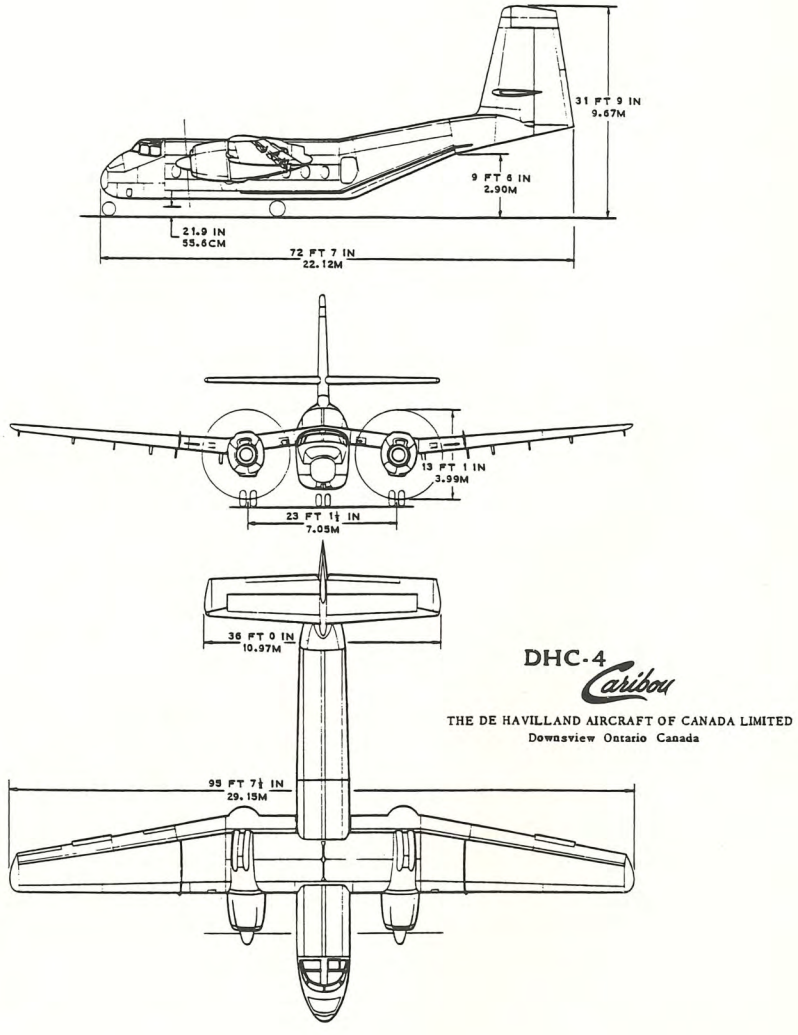


(above) The US Army was the Caribou's major customer, taking 164 of the 307 aircraft built including five evaluation examples. This is a relatively early example, the 41st aircraft off the production line and delivered to the US Army in February 1962. (via Chas Van Hulsentop)

Caribou nevertheless remained with the airline until January 1969 and then sold overseas.

It can be seen that despite DHC's original intention to develop the aircraft for mainly civil roles, the Caribou turned into an almost exclusively military animal. The conflict in which it became most involved was Vietnam, where the US Army (from 1966 the USAF) and the Royal Australian Air Force both found the type extremely useful and well suited to its task. The first US Army aircraft arrived in South Vietnam in 1962 and six squadrons were eventually established there, remaining until the end of the conflict. Twenty US Caribou were lost on operations during the war, while as aircraft from three of the six squadrons were handed over to the South Vietnamese in the war's latter stages, most of these presumably fell into the hands of the North Vietnamese when they took control of the whole country in 1975. The RAAF's Caribou operations in Vietnam will be dealt with in detail in a following chapter.

The Caribou was never developed to any great extent, the only change to the basic specification of production versions being the increase in maximum weight early on. In 1961 de Havilland Canada announced it was embarking on a joint development programme with engine manufacturer General Electric whereby the latter company's new T64 turboprop engine would be installed on the prototype Caribou, by now in the



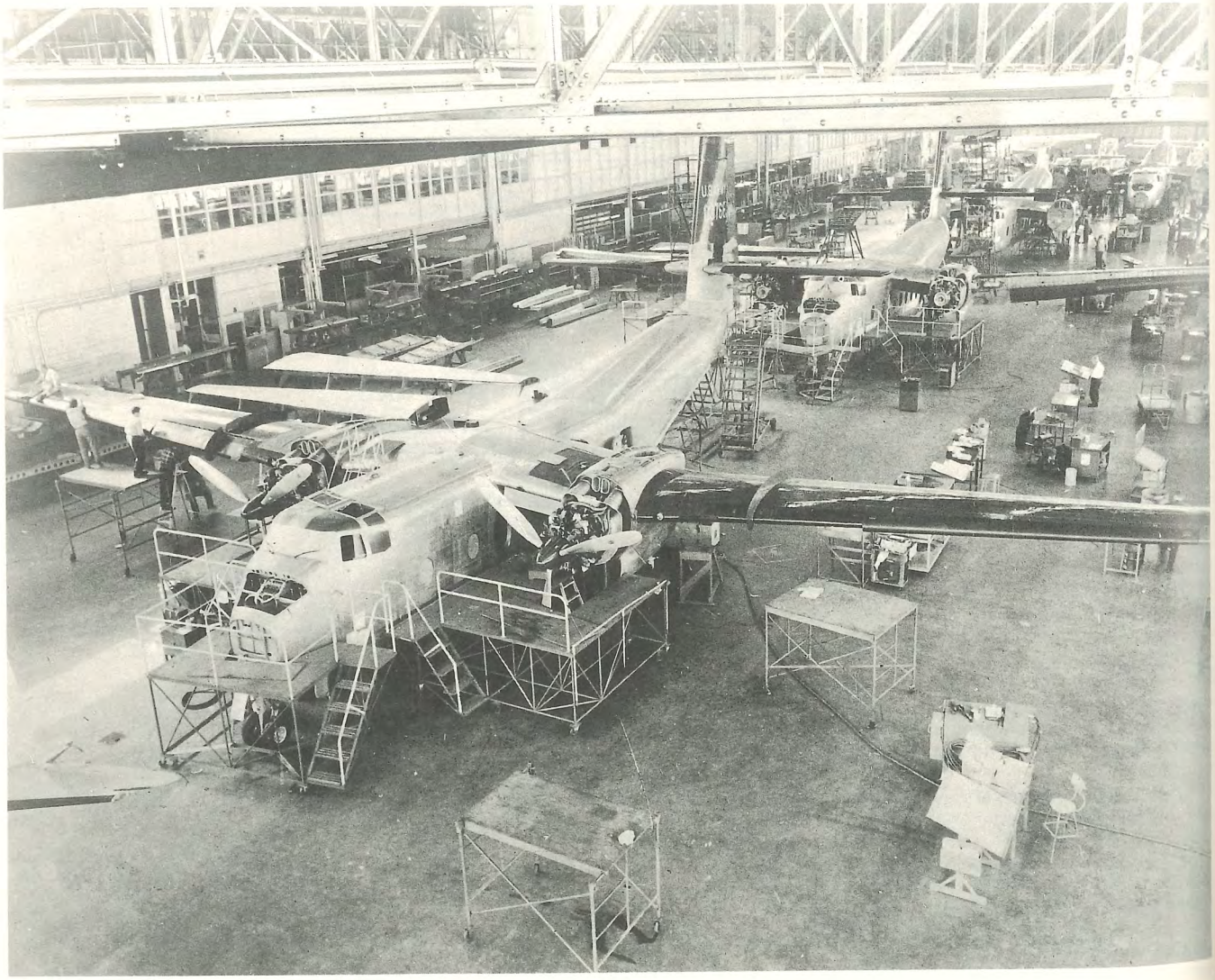
General Arrangement and Dimensions

charge of the RCAF. It was a two way street, General Electric getting a testbed for the development of its new powerplant and DHC getting a potentially enhanced product with great marketing possibilities.

The re-engined Caribou required substantial modification to accept the T64, but this was done quickly and the modified aircraft first flew in its new form in September 1961. With 2,344shp available from this early version of the T64, the Caribou's performance was to say the least, remarkable. In fact great care had to be exercised because it was possible to exceed the airframe's limit speeds on one engine and to reach the design dive speed in level flight. The rate of climb was equally impressive – three minutes to 15,000 feet!

The number one Caribou flew 220 hours with the T64 installed before it was converted back to standard configuration and although a turboprop Caribou was never manufactured, the basic philosophy was carried on to produce the DHC-5 Buffalo. Originally called 'Caribou II', the Buffalo was of similar configuration to its predecessor but slightly longer with a wider cabin capable of carrying up to 44 people and considerably higher maximum operating weights. The first Buffalo flew in April 1964 and 123 examples were sold over the next two decades.

The Caribou is not one of the most glamorous aeroplanes to grace the skies, but its beauty lies in its extraordinary capabilities. Although more modern turboprop designs can offer similar or better carrying capacity, more speed or more range, none can touch the Caribou's field performance or rugged suitability to unfriendly environments. The airframes are tough, a point well illustrated by the fact that the RAAF celebrated 25 years of Caribou service in 1989 and even the earliest examples have plenty of airframe life left in them. The problem is proving to be the old R-2000 piston engines, supplies of critical spares for which are rapidly drying up.



DHC's Downsview factory in early 1961 and the Caribou is in series production. Aircraft numbers 17-20 are evident. (via Chas Van Hulsentop)



Caribou's successor, the similar in basic configuration but much heavier and more powerful turboprop DHC-5 Buffalo. (DHC)

CARIBOU FOR AUSTRALIA

Australia's lengthy association with the Caribou began in February 1960 when the ninth aircraft, CF-LVA, arrived in the area as part of its seven month world demonstration tour which had begun in Toronto the previous October. As was the case with the 39 other countries visited during this epic and successful journey, Australian military personnel and government officials were treated to demonstrations of the Caribou's capabilities and its suitability for the Royal Australian Air Force. It was in effect seen as a replacement for the venerable C-47 Dakota which by 1960 still served the RAAF in some numbers, equipping two transport squadrons and several other smaller units.

By this stage the RAAF had received its first Lockheed C-130 Hercules and needed a modern replacement for the Dakota to complement the much larger Hercules. In the important battlefield support and tactical transport roles the Caribou looked ideal. Certainly the Dakota was showing its age in certain areas, particularly in things like ease of loading and unloading and suitability for air dropping equipment. Also, it lacked genuine short field capability, one of the Caribou's great assets.

The local representative for de Havilland's products (both the British and Canadian firms) was de Havilland Aircraft Pty Ltd at Sydney's Bankstown airport, or de Havilland Australia (DHA) as it was popularly known. Later, the company was retitled Hawker de Havilland Ltd. At the time of the demonstration tour, DHA quoted the price of the Caribou at £257,000 ($514,000) each; in January 1961 a detailed pricing document was prepared with quotes for the purchase of seven, 13 and 18 aircraft equipped to RAAF requirements and including the cost of spares and other necessary equipment.

A unit price of £285,000 ($570,000) was quoted including cabin heating, airframe and propeller de-icing, provision for the installation of 12 stretchers, ferry tank installation and the required radio equipment comprising UHF, VHF, Radio Compass, HF, IFF, VOR, Glideslope Receiver, Intercom and UHF Homer. On the basis of an order for 18 aircraft, this meant the cost of the aircraft only would be £5.137m ($10.274m) in total, necessary extras bringing the programme cost to £6.534m ($13.068m) for 18 aircraft. Those extras included spare engines and propellers, ground handling equipment, overhaul and maintenance spares, crew training, packing, land and sea freight, marine insurance for spares and a ten per cent contingency on spares.

Caribou Ordered

In October 1962 the Australian government announced it would be purchasing 12 fixed wing STOL transport aircraft in the near future, and although the type was not immediately revealed, it was apparent the Caribou was the aircraft in question. Finally, on 22 May 1963 the Prime Minister, Sir Robert Menzies, announced an order for 18 Caribou as part of a general re-equipment of the RAAF. First deliveries were scheduled to take place "before mid 1964". The first squadron to receive the Caribou would be No 38, then equipped with Dakotas and based at Richmond, New South Wales.

At the same time orders for a further 40 Mirage III fighters (bringing the total to 100) and eight more Bell Iroquois helicopters were announced. Later in the same year the General Dynamics F-111 was ordered to replace the Canberra bomber while the extensive re-equipment of the RAAF continued into 1964 when C-130E Hercules, P-3 Orions, two



The RAAF's first Caribou, A4-134. This aircraft had a short life, arriving at Richmond NSW on 22 April 1964 and then being damaged beyond repair in a landing accident at Nowra NSW just ten weeks later. The fuselage now resides in the Army Transportation Museum. (CPE)



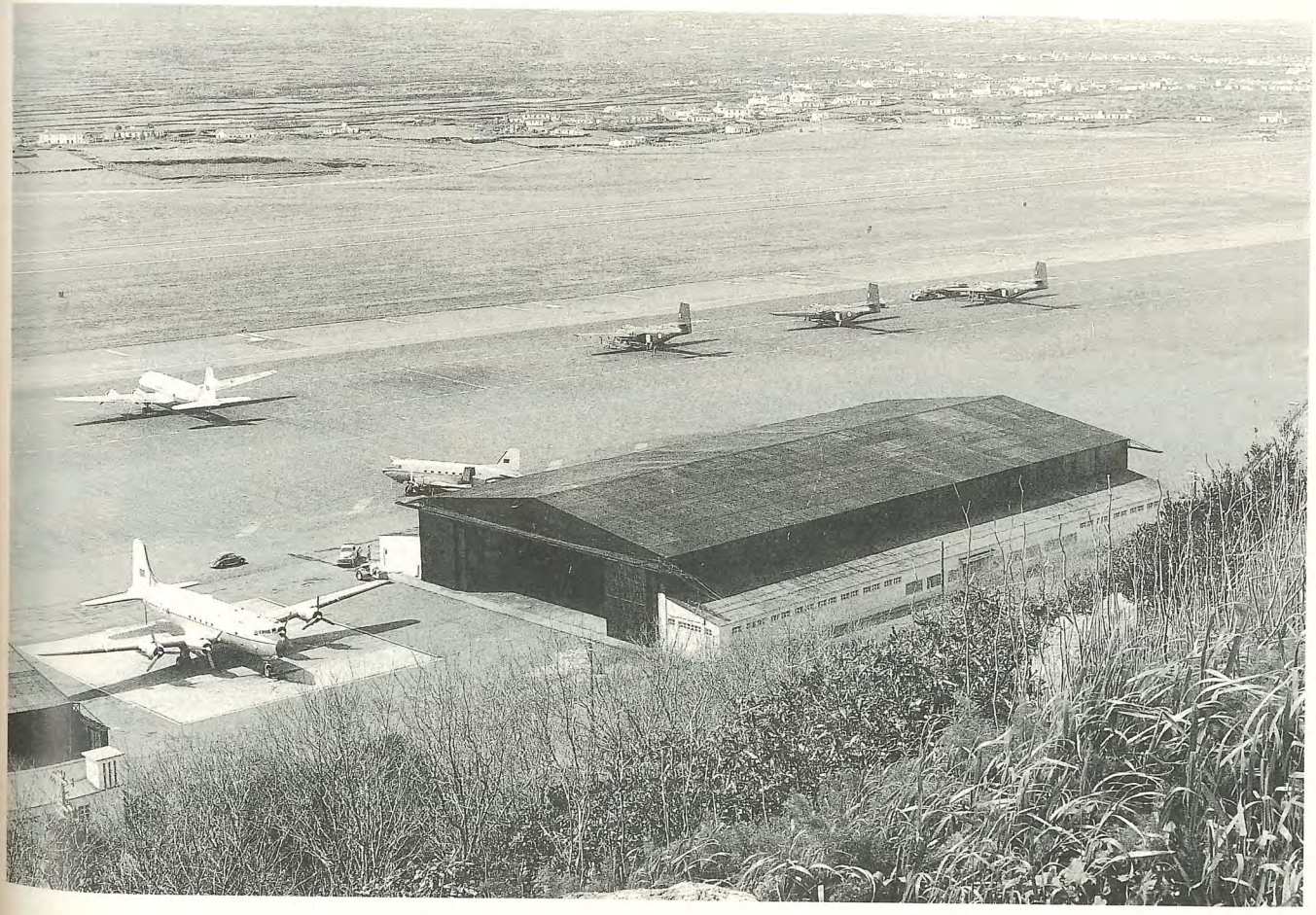
Members of the RAAF Caribou familiarisation course in Canada in January and February 1964 with engineless A4-164 forming the background. Members of the crew of the first ferry flight of three aircraft to Australia include Flt T Gilroy (middle row far left), Plt Off W Hall (middle row far right) and (front row, left to right) Cpl K Smith, Cpl J Ryle, Plt Off J Lidner, Flt Lt J Bellamy, Wng Cdr T Fairbairn, Flt Lt J Bevan, Plt Off M Bertram, LAC K Pratt and Flg Off J McQueen. (via Chas Van Hulsentop)

seat Mirages IIIDs, Vickers Viscounts, Bell 47G helicopters (for the Army) and Grumman Trackers (Navy) were ordered, plus commitments made for the purchase of 75 jet trainers (the Macchi MB.326) and eight navigation trainers (HS.748).

It was a period of great activity in the RAAF, with new aircraft entering service on a regular basis. September 1964 also witnessed the placing of an order for seven more Caribou, bringing the total thus far to 25.

For RAAF service the Caribou was allocated serial numbers in the A4 range, the suffix then applied indicating the aircraft's construction number. Australia's first Caribou was the 134th example to come off the production line, therefore it was allocated the serial number A4-134.

Preparations for the Caribou's entry into RAAF service began immediately, the tasks including putting 38 Squadron's air and ground crews through appropriate familiarisation courses, the sending of an RAAF spares assessing team to Canada and the USA and a maintenance team to DHC's training school to learn about the aircraft which would soon be in their charge.



The three Caribou of the first ferry at Lajes in Portugal en route to Australia and in the company of Portuguese Air Force Douglas C-47s and C-54s. (via Chas Van Hulsentop)

38 Squadron's commanding officer, Wng Cdr T S Fairbairn, made several overseas trips during 1963, including a period during which he was attached to the Air Attache Washington. In January 1964 he and the five other pilots and three navigators from 38 Squadron who would perform the delivery flight of the first three Caribou from Toronto to Australia were attached to RAAF Washington. The pilots were Flt Lts J N Bellamy and J Bevan, Flg Off J McQueen and Plt Offs J E Lidner and G A Martin; navigators were Flt Lt T M Gilroy and Plt Offs R M Bertram and W Hall. Three Caribou would be ferried initially, each with two pilots and a navigator on board plus a loadmaster.

Wng Cdr Fairbairn and Flg Off McQueen performed their first two hour familiarisation flight in an Australian Caribou on 18 February 1964. The aircraft was A4-134 and the pilot in command was DHC's chief test pilot George Neal, the man who had flown the prototype Caribou on its maiden flight and had survived bailing out of the third aircraft during testing. Flt Lt Bevan and Flg Off Linder also flew A4-134 later in the same day, and by the end of the month the other two aircraft involved in the first delivery flight (A4-140 and 147) had also been flown by the Australian crews. Training flights continued into March in preparation for the long flight to Australia.

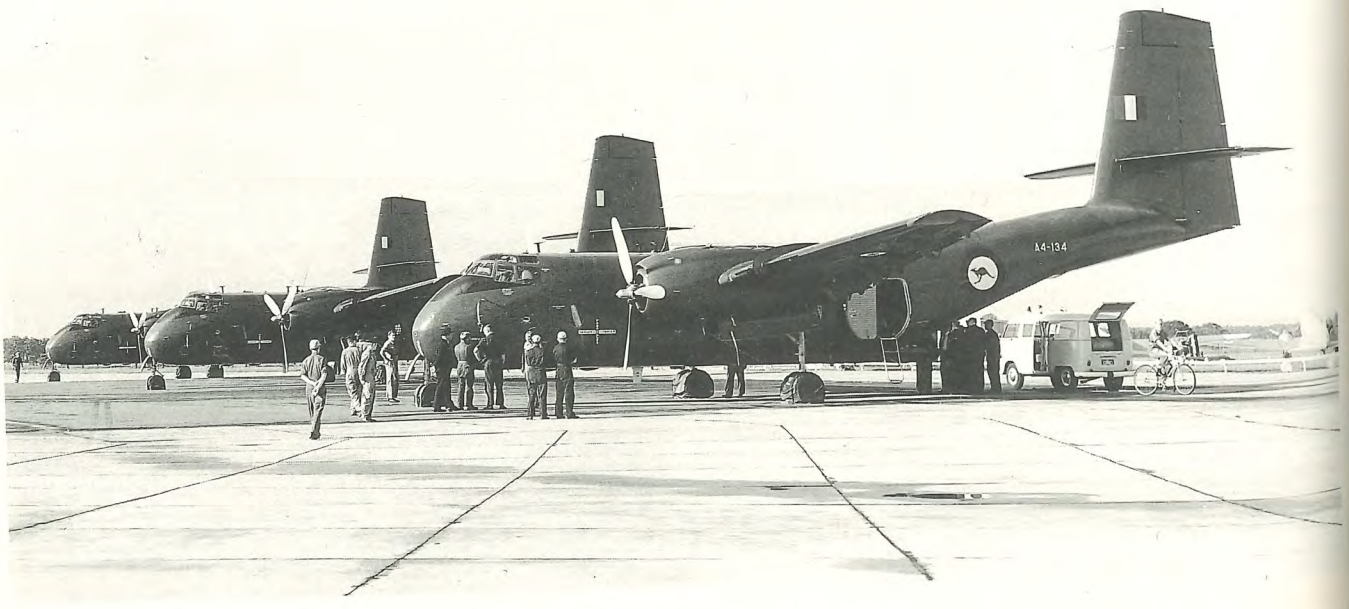
The first Caribou had meanwhile been formally handed over to the RAAF on 25 February. In a ceremony at DHC's Downsview plant in front of 600 industry, military and government people, DHC's chairman and managing director, Mr P C Garrett, presented A4-134's log book to the RAAF's Group Captain J F Lush, the Washington Air Attache. Other speakers at the ceremony included the Australian High Commissioner to Canada, Mr D O Hay.



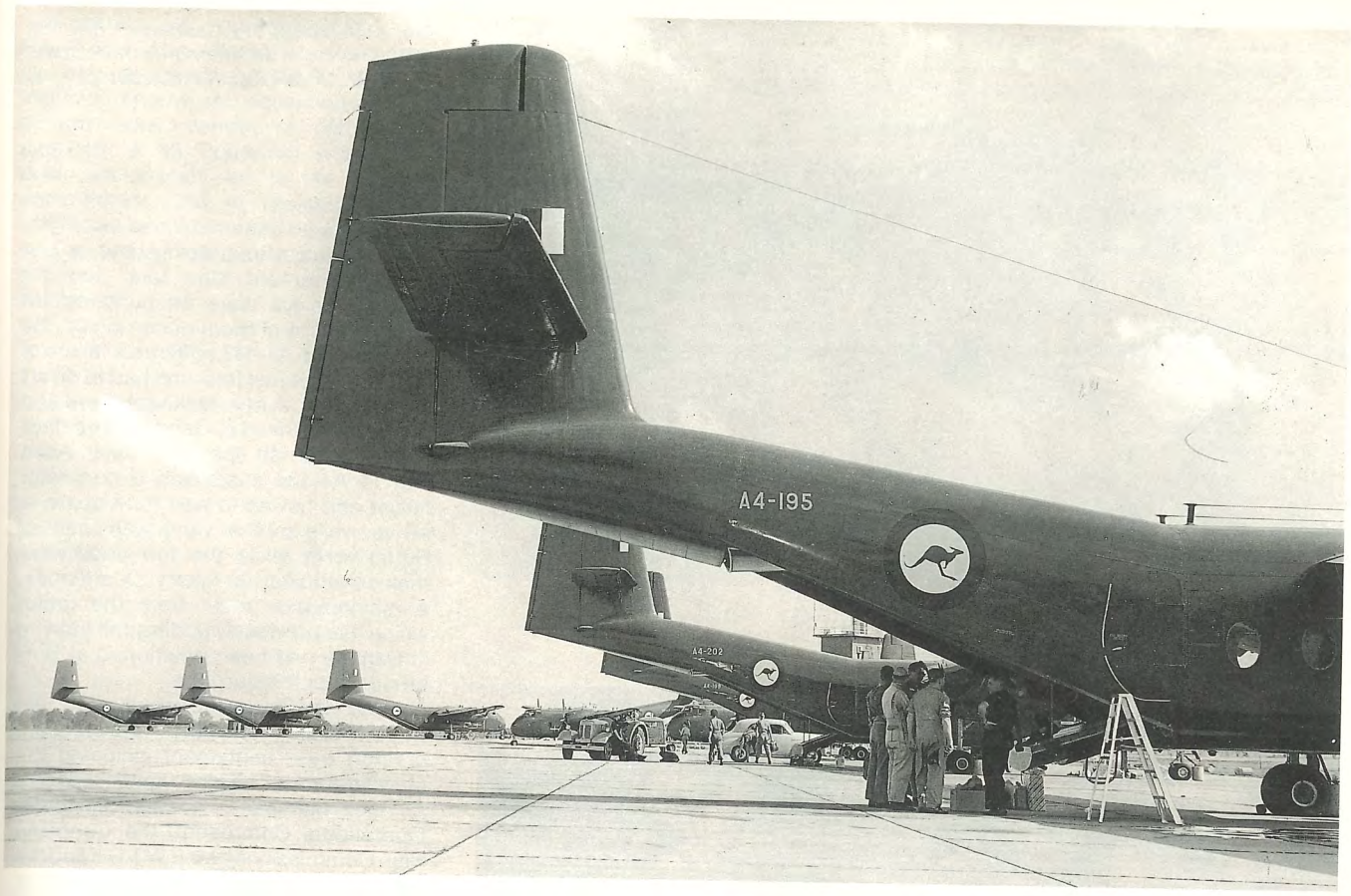
The ceremony marking the handover of the RAAF's first Caribou on 25 February 1964 in front of 600 industry, military and government guests.

Ferry Flights

Suitably equipped with long-range auxiliary fuel tanks, the first three Caribou (A4-134, 140 and 147) departed Toronto on 17 March 1964 on the 25,000 kilometre journey which would see them arriving at 38 Squadron's base at Richmond on 22 April. The journey was made in easy stages, the aircraft stopping for one or two days at some centres. The route was Toronto/Gander/Lajes (Portugal)/Gibraltar/Luqa/El Adem (Libya)/Khartoum/Aden/El Masirah (Oman)/Karachi/Calcutta/Butterworth (Malaysia)/Djakarta/Darwin/Alice Springs/Richmond



Their 25,000 kilometre journey from Canada over, RAAF Caribou A4-134, 140 and 147 arrived at their base at RAAF Richmond on 22 April 1964. (CPE)



By late October 1964 the RAAF had 15 of its original order for 18 Caribou in service with the remainder due to be delivered the following month. Of these, six had been diverted from their delivery flights direct to Vietnam for active service and one had been written off. This shot taken at Richmond on 19 October 1964 shows the newly arrived A4-195, 202 and 199 in company with the five survivors of the first six aircraft delivered earlier in the year - in other words, 38 Squadron's full Caribou strength at the time. (RAAF via Chas Van Hulsentop)



Caribou A4-225, 228 and 231 were the first to be ferried via the Pacific route, arriving at Richmond on 26 June 1965. They are pictured here after arriving and are in company with 38 Squadron's other aircraft. These Caribou were the 19th, 20th and 21st delivered to the RAAF and the first three of the follow up order for seven aircraft. (RAAF via Chas Van Hulsentop)



(left) Marshalling the Caribou of the fifth ferry, arriving at Richmond on 19 October 1964. (RAAF via Chas Van Hulsentop)

and involved a total flying time of just under 97 hours.

Some delays were encountered en route, the first of them occurring on the first leg when A4-147 suffered a failure of its long-range fuel tank and had to divert to Fredricton. A new tank was fitted and the aircraft arrived in Gander three days later. The aircraft spent a week in Aden due to A4-134 sustaining a generator failure and having to wait for a spare to arrive, while another week was spent at Butterworth while the trio underwent their scheduled 100 hourly 'D' services. A maintenance team from the group which had previously undergone training in Canada had been positioned at Butterworth for this purpose.

Arriving at Richmond in heavy rain, the three Caribou and their crews were greeted by a contingent including the Minister for Air, The Hon David Fairbairn, Air Vice Marshall A M Murdoch (AOC Operational Command), the Canadian High Commissioner, Mr E W T Gill and the CO of RAAF Richmond, Air Commodore C W Pearce. Australia's era of the Caribou was underway.



A gift from the Royal Canadian Air Force to 38 Squadron RAAF ... a Caribou's head, displayed by Wng Cdr Fairbairn (centre) with Flt Lts Raymond (left) and Bellamy. (via Chas Van Hulsentop)

More Deliveries and Orders

The remaining 15 Caribou from the original order were delivered in groups of three over the following seven months. The second ferry comprising A4-152, 159 and 164 departed Toronto on 8 May and arrived at Richmond on 13 June; the third ferry (A4-171, 179 and 185) left Canada on 1 July, took a different route (incorporating Greenland, Iceland, Northern Ireland and Monaco in its earlier stages) and was abruptly halted at Butterworth. The reason for this was Australia's involvement in the Vietnam war. Three weeks earlier it had been announced that six RAAF Caribou would be sent to Vietnam and these three aircraft were immediately diverted to that country. A similar fate was in store for the three aircraft of the fourth ferry (A4-173, 191 and 193), these Caribou being delivered directly to Vietnam from the factory in August where they formed the six strong RAAF Transport Flight Vietnam at Vung Tau under the command of Sqdn Ldr Chris Sugden. The role of the RAAF's Caribou in Vietnam will be dealt with later.

The fifth and six ferry flights were to Richmond, these being completed in October and December 1964, respectively, and comprising A4-195, 199 and 202 plus A4-204, 208 and 210.

Meanwhile, in September 1964, the RAAF placed an order for a further seven Caribou at a cost of £2.9m ($5.8m) including spares and equipment. These aircraft were intended to restore the strength of 38 Squadron which was down six aircraft due to the Vietnam commitment and to replace A4-134 which had been damaged beyond repair in a landing accident at Nowra NSW the previous July only ten weeks after delivery.

These seven aircraft were delivered in two groups. The first three (A4-225, 228 and 231) left Canada on 11 June 1965 and travelled to Australia via a new Pacific route which took them to San Francisco, Honolulu, Canton Island, Fiji and Norfolk Island. They arrived at Richmond two weeks later. The second group of four aircraft (A4-233, 234, 235 and 236) left Toronto on 6 August 1965 and again travelled via the Pacific route, arriving at Richmond 15 days later.

Four more Caribou were subsequently ordered by the RAAF as attrition replacements, bring the total procurement to 29 aircraft. A4-264 arrived in June 1968, A4-275 in August 1969, A4-285 on Christmas Day 1969 and A4-299 in June 1971.



With the arrival of the first three RAAF Caribou (A4-134, 140 and 147) at Richmond on 22 April 1964 and the next trio (A4-152, 159 and 164) two months later, 38 Squadron was able to get operations on the new type underway. Of course the squadron's strength and planning suffered a little in the middle of the year when the next six aircraft were diverted direct to Vietnam, but training was able to immediately get underway along with a variety of operational flying which set the scene for RAAF Caribou operations over more than a quarter of a century.

The first three months saw the completion of the first two Caribou Conversion Courses, the use of the aircraft for civil aid duties, an airstrip survey in Papua New Guinea and support of the Army's activities (the aircraft's primary role then and now) by way of delivery of troops and equipment either by parachute or by ground delivery at rough airstrips close to the action.

The nature of the Caribou's operations – low and slow out of short, rough strips – means it is more susceptible to accidents than most other types serving with the RAAF, and over the years seven aircraft have been lost in flying accidents and one directly due to enemy action. Of the remaining 21 RAAF Caribou, most have at some stage suffered damage of one kind or another (whether by misadventure or enemy action) but have been repaired and returned to service.

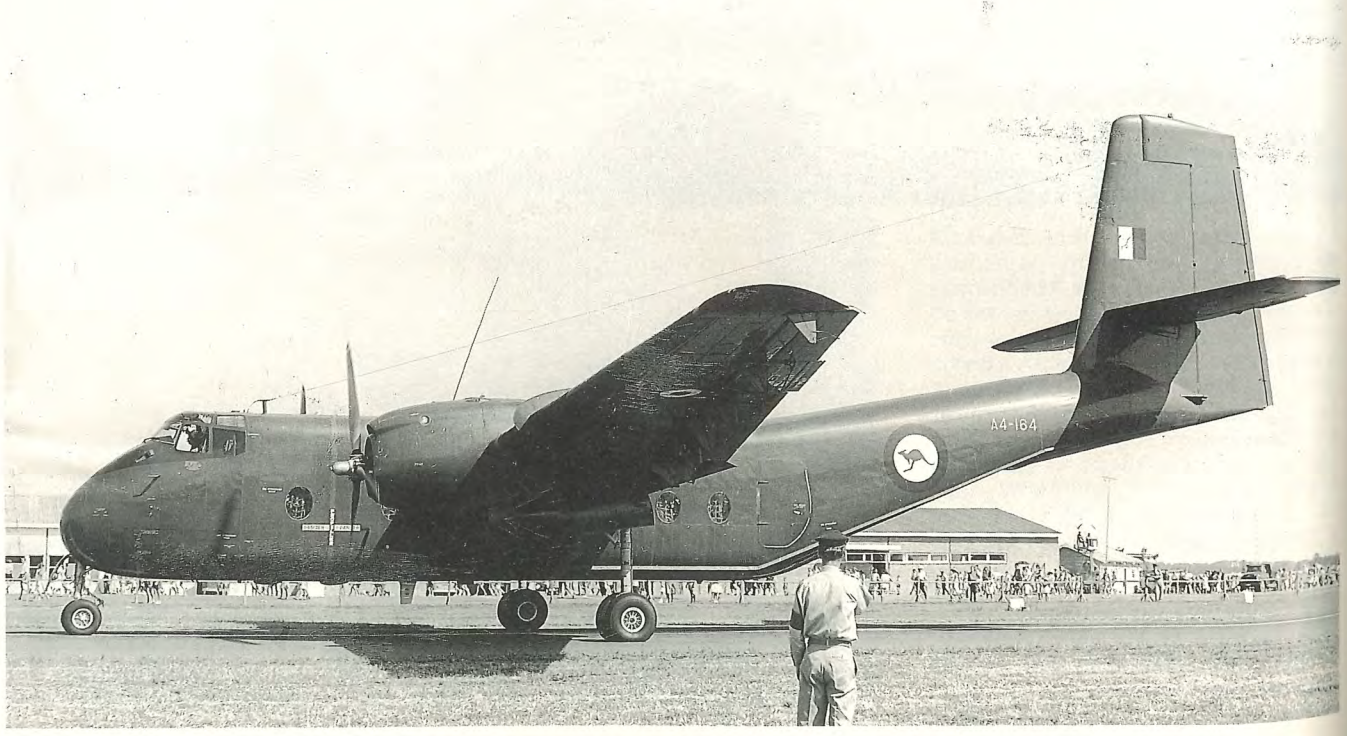
Unfortunately for 38 Squadron, one of its aircraft was lost very early in its RAAF career. On 1 July 1964, A4-134 was attempting a short landing at Naval Air Station Nowra, NSW, during a demonstration flight. On board were the crew of three plus six passengers comprising two Wing Commanders (including the author's father in law!), a Squadron Leader, a Flight Lieutenant and two Army Lieutenant-Colonels. On short finals, the aircraft appeared to stall, hitting the lip of the runway (well short of the threshold) and scraping to a halt a short distance further on with its undercarriage collapsed, both wings drooping (with tips on the ground), the port engine almost detached, the rear fuselage broken and the cabin area badly buckled. One passenger received minor back injuries in the crash.

Needless to say, the Caribou was a write off, the accident investigation blaming a downdraught and inexperience on type. A4-134 had flown only 40 hours since arriving in Australia. That was not the end of its usefulness, however. The fuselage was taken to No 1 Commando Unit's Mosman, NSW, headquarters for paratroop training. A large door was cut into its side so it could simulate dropping from a C-130 Hercules as well as a Caribou. In 1986 the fuselage was moved to Richmond for refurbishment and in the following year it went to Albury NSW for display in the Army Transport Museum where it represents the interior of a Vietnam Caribou.

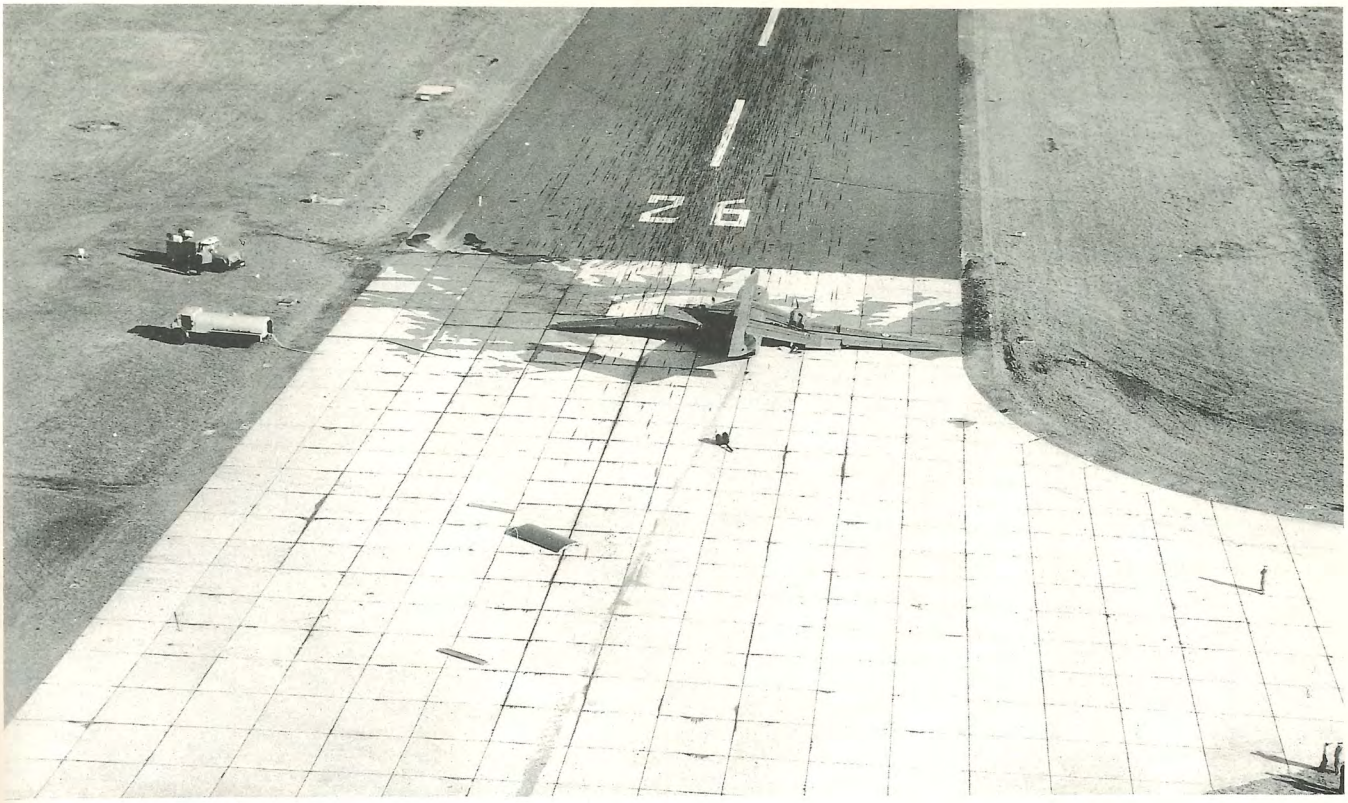
Transport Flight Vietnam

Australia's involvement in the lengthy, costly and ultimately lost Vietnam war began in 1962 with the sending of 30 Army advisors to the country. From there, Australia's involvement escalated with ultimately all three Services seeing action until South Vietnam's capitulation to the communists in 1975.

The establishment of the RAAF Transport Flight Vietnam (RTFV) equipped with Caribou tactical transport aircraft in 1964 marked the beginning of Australia's and the RAAF's 'formal' participation in the war, a participation which lasted until



A4-164 arrived at Richmond from Canada in June 1964 as part of the second Caribou ferry flight. It is photographed here during a 1964 public display. (Stewart Wilson)



Ten weeks after its arrival in Australia, A4-134 was permanently out of service due to this accident at Nowra NSW on 1 July 1964. As can be seen, the Caribou landed heavily and well short of Nowra's Runway 26 and suffered severe damage. The fuselage is now part of the Army Transportation Museum at Albury, NSW. (RAAF/Chas Van Hulsentop)



Australian partners in Vietnam, a 35 Squadron Caribou (complete with 'wallaby' insignia on tail) and a Bell Iroquois from No 9 Squadron.

February 1972 when the Caribou returned to Australia. In the interim, RAAF Canberras and Iroquois helicopters also served in Vietnam, but it was the Caribou which were – as an unofficial motto said – "first in and last out".

On 8 June 1964, Australian Minister for Defence, Senator Shane Paltridge, announced increased military aid to South Vietnam including the deployment of six of the brand new Caribou aircraft along with the appropriate air and ground crews. On that same day, the seventh and eighth RAAF Caribou (A4-171 and 179) were handed over to the RAAF at de Havilland Canada's factory in Toronto, while A4-185 was taken onto RAAF charge three days later.

As related in the previous chapter, these three aircraft formed the fourth Caribou ferry flight to Australia, departing Toronto on 1 July, coincidentally the date of the crash of A4-134 at Nowra. Of course these Caribou never reached Australia, getting as far as Butterworth in Malaysia before being diverted to Vietnam to form the basis of the newly established RTFV. The aircraft arrived at their base at Vung Tau in Phuoc Tuy Province (80 kilometres south-east of Saigon) on 8 August after servicing and preparation had been undertaken at Butterworth. In less troubled days, during the era of French influence in what was called French Indo-China, Vung Tau had been a fashionable seaside holiday resort called *Cap St Jacques* by the French.

The first three Caribou were joined on the 29th of the same month by the three aircraft of the fourth delivery flight (A4-173, 191 and 193) which flew directly from Canada to Vung Tau. The RAAF Caribou thus became the first aircraft deployed to South Vietnam from a country other than the United States.

Preparations for the establishment of the RTFV were necessarily hurried. They began with the departure from Sydney on 19 July 1964 of the first personnel to go to Vietnam. The senior officers were Sqdn Ldr Donald McCord of 86 Transport Wing and Flt Lt N R ('Chummy') Wade (38 Squadron's Engineering Officer), their task being to conduct a detailed survey of operations and requirements. Vung Tau was selected as the base for RAAF Caribou operations as the US Army already operated the type from there and facilities were established as a result. Among the recommendations resulting from the survey was the fitting of armour for the protection of the crew and fuel systems against the expected heavy incidence of small arms ground fire against the Caribou from the ground.

Sqdn Ldr McCord's report included advice that "the job involves airlifting personnel and equipment to some 115 airfields of varying surfaces and dimensions in support of Vietnam operations against the Viet Cong ... it is of interest to note that not only troop movements will be involved but on odd occasions that of civilian families plus their cows, pigs, goats and fowls ..." The latter comment proved to be entirely accurate, and it has since been noted that an extensive knowledge of the veterinary sciences would have been useful!

McCord went on to advise that the RAAF would be expected to perform transport, supply dropping, trooping, paradropping, communications and medical evacuation tasks, as well as warning against the high probability of attracting small arms fire "... not only at outlying airfields but also in the circuit area and on approach to Tan Son Nhut airport, Saigon. The general technique is to operate always above 3,500ft (above ground level) and to make the steepest possible climb out and approach to any airfield".

This technique was subsequently adopted by the Caribou pilots, who flew

a very tight pattern as they descended to land. As a result, RAAF Caribou suffered relatively few hits from ground fire, at least when compared to the US Army aircraft which were 'dragged in' on long approaches and suffered accordingly from their increased vulnerability.

The RAAF Transport Flight Vietnam was formally established at Butterworth on 20 July 1964 under the command of Sqdn Ldr Chris Sugden DFC, a former World War II Boston pilot and a Meteor pilot with 77 Squadron in Korea. This was to be his third war. Sugden was transferred from 38 Squadron to take up his post with the RTFV. He had commanded the second Caribou ferry flight from Canada to Australia, arriving at Richmond just five weeks earlier.

The Flight was ready for the move to Vung Tau from Butterworth in early August, flying there on the 8th of the month in a three aircraft formation led by Sqdn Ldr Sugden. The total compliment moved that day comprised the Caribou, nine officers and 20 airmen plus the Officer Commanding RAAF Butterworth, Air Commodore N Ford. Upon arrival at Vung Tau the aircraft were met by the Commander of the US Army Aviation Support Battalion at Vung Tau, Lt Col Robert Dillard.

Two days later the 'official' welcome took place at Tan Son Nhut, Saigon, complete with South Vietnamese government and US military officials, floral garlands, pretty girls and signs saying things like "Vietnamese People Warmly Welcome the Australian Air Detachment".

Down to Business

From its base at Vung Tau, the RTFV operated as part of the US Air Force's 2nd Air Division, 315th Air Commando Wing (later Tactical Airlift Wing), and operations quickly began following the Flight's establishment. The first mission was flown on 14 August, two aircraft (commanded by Sqdn Ldr Sugden and Flt Lt D J Lancaster) departing Vung Tau and flying freight to Tan Son Nhut and Pleiku in the north central region of the country. With the arrival of the second batch of three aircraft in late August, the Flight began a heavy schedule to all corners of South Vietnam, from the 17th Parallel in the north (the border with North Vietnam) to the Mekong Delta region in the south and everywhere in between.

It wasn't long before 'Wallaby Airlines' (as the Flight became known due to its callsign) was a familiar sight all over the country. The Americans – who wouldn't have known a wallaby if they tripped over one – thought the logo painted on the tail of the aircraft was a funny looking rat!

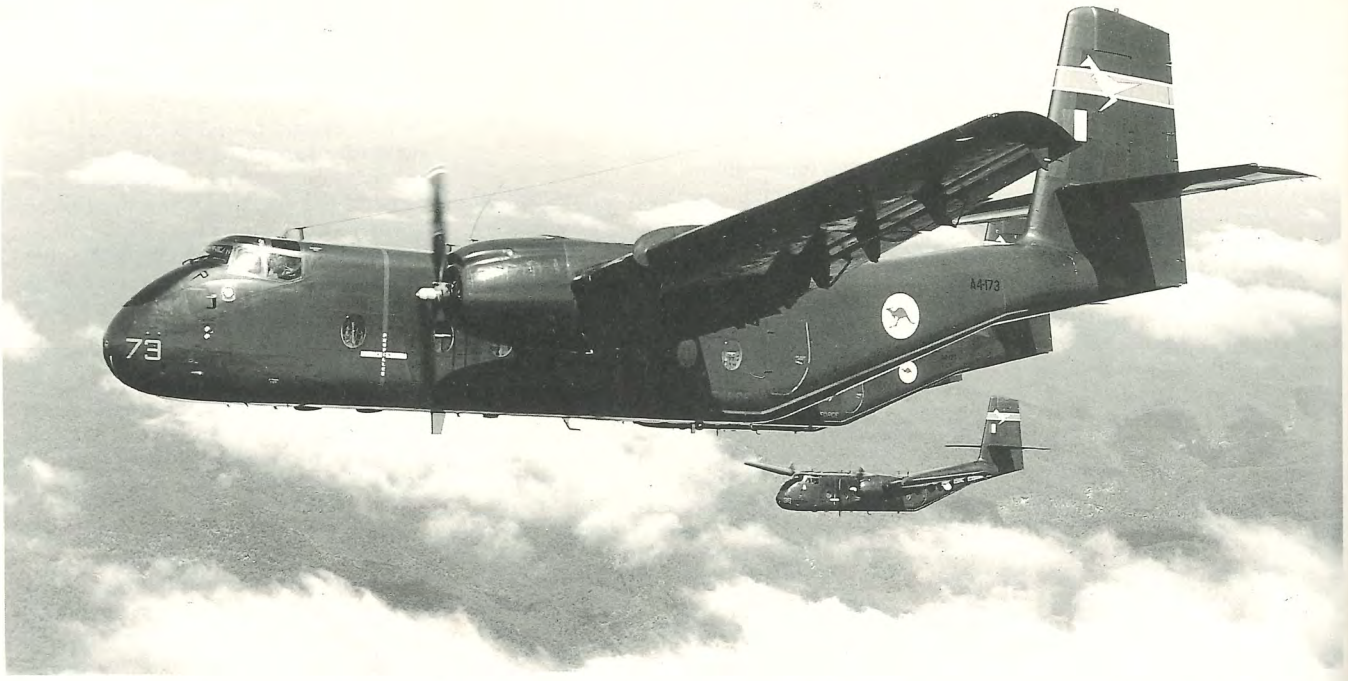
In August 1964 (a 'short' month with only three aircraft available) the Flight flew 220 sorties; in October the figure had increased to 765 and in June 1965 (when the general situation was at its most critical, with the enemy controlling most of the countryside) a total of 865 sorties were carried out. The effort put in by the crews was considerable, some of them flying up to ten sorties per day (often under fire at some stage of the trip) and logging between 80 and 90 hours flying time per month. As an illustration of the Australian Caribous' utilisation, it was revealed that although the RAAF aircraft flew only 1.4 per cent of the total transport missions in Vietnam, they were carrying between seven and eight per cent of the freight.

In March 1965, for example, the RAAF's Six Caribou carried 1,010 tons, while the US Army's 42 similar aircraft lifted 5,095 tons. Using these figures as a basis, the Transport Flight Vietnam was operating nearly 40 per cent more efficiently than its American counterparts.

The Americans even sent in efficiency experts to examine the Australians'



A4-159 was one of 12 RAAF Caribou which served in Vietnam. Here it takes on a load of Ghurkas while another Caribou taxies over. (DoD)



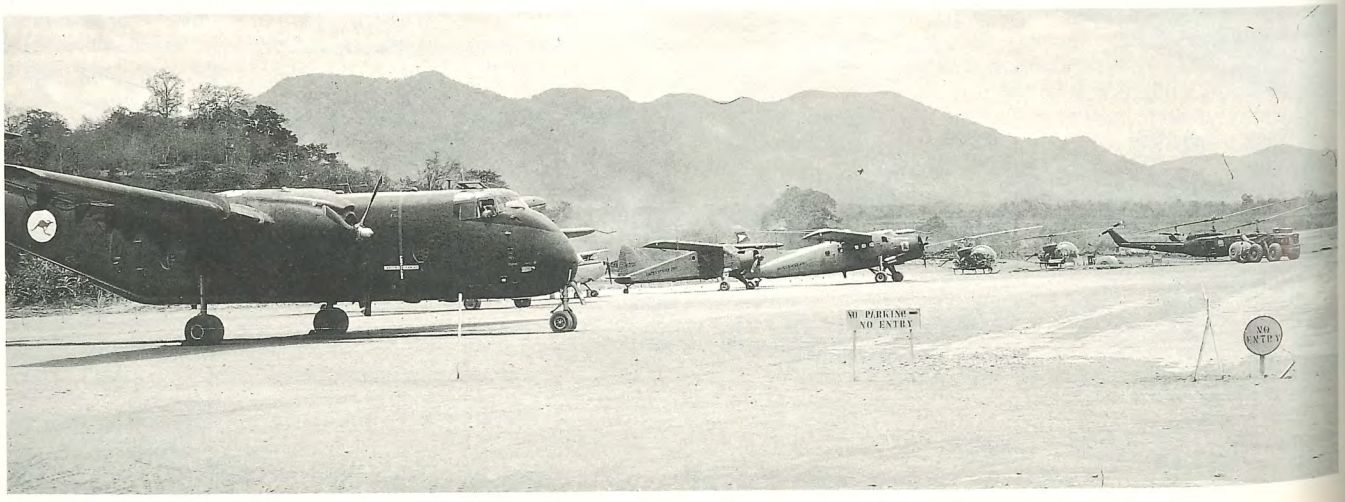
'Wallaby Airlines' with Vietnam veterans A4-173 and A4-179 nearest the camera. Both these aircraft were the first into Vietnam (in August 1964) and the last out in February 1972. (via Chas Van Hulsentop)

maintenance and operating procedures. Naturally, it all came back to the dedication of the ground crews and their willingness to work very long hours if necessary, plus the reluctance of the air crews to waste a sortie by flying without a useful load on board.

This efficiency prompted the US Military Assistance Command chief, General Westmoreland, to request a further 12 RAAF Caribou in May 1966. The request was denied, mainly because there were insufficient aircraft to commit more to Vietnam and to meet requirements at home. By that time the RAAF had received 25 Caribou (the first and second orders) of which six were in Vietnam, three had been written off and the remaining 16 were in service with No 38 Squadron back at Richmond. Of those 16, two were on semi-permanent detachment in Papua New Guinea. Westmoreland's request would have left just four aircraft for training and operational requirements at home and to allow for maintenance.

The RTFV's achievements were also recognised at home. In November 1967, it (as 35 Squadron by now) was awarded the coveted Gloucester Cup for being the most proficient RAAF Squadron of the year. The citation accompanying the presentation of the Cup stated: "The success of operations in the area (Vietnam) was greatly enhanced by the outstanding efficiency of transport support given by No 35 Squadron. This efficiency is attributed directly to the unstinted efforts of all members of the Squadron".

It should be noted that the RAAF's other Caribou squadron, No 38, has also been awarded the Gloucester Cup on



Caribou A4-193 shares a dusty Vietnamese ramp with various US Army aircraft including a Beaver, an Otter, a pair of Bell 47s and two Iroquois. '193' was destroyed by enemy mortar fire at That Son in March 1970.

several occasions over the years, the most recent and fourth time in 1988.

As 1965 progressed the Transport Flight Vietnam's operations settled into a reasonably predictable (if not routine) pattern, flying activities centring around a daily schedule involving four aircraft on six days of the week and one of those on seven days.

Typically, the first aircraft would fly a scheduled route from Vung Tau, alternating daily between a route to the east (to Nha Trang) and the west (to Hai Yen) with a number of stops in between. On an 'easterly' day, the Caribou would depart Vung Tau at 0630hrs for Saigon's Tan Son Nhut airport, take on passengers and freight there and depart at 0740 for Ham Tan, Phu Thiet, Tusong Mao, Phan Rang and Nha Trang. Stage lengths averaged just over 20 minutes on this run, and turnaround time was typically just five minutes with engines running. The aircraft would be refuelled at Nha Trang and at about 1300hrs depart for Dalat, then Bao Loc and return to Tan Son Nhut where the last passengers and cargo would be unloaded before the aircraft returned empty to its base at Vung Tau at around 1800hrs.

A second Caribou would operate from Vung Tau and be given daily tasks by USAF Transport Movement Centre (TMC) at Saigon, operating mainly within the Mekong Delta area or within a close radius of Saigon. Caribou number three flew from and operated around Nha Trang – again given its tasks by a local TMC – while the fourth aircraft operated from Da Nang, flying to strips near the North Vietnamese border, about 160km away.

Sqdn Ldr Sugden ended his tour of duty in April 1965, his place as Commanding Officer of the Flight being taken by Sqdn Ldr Douglas Harvey DFC, AFC until November 1965 when Sqdn Ldr Victor Guthrie AFC assumed command. All three earned Distinguished Flying Crosses in Vietnam, Bars to existing decorations in the case of Sugden and Harvey.

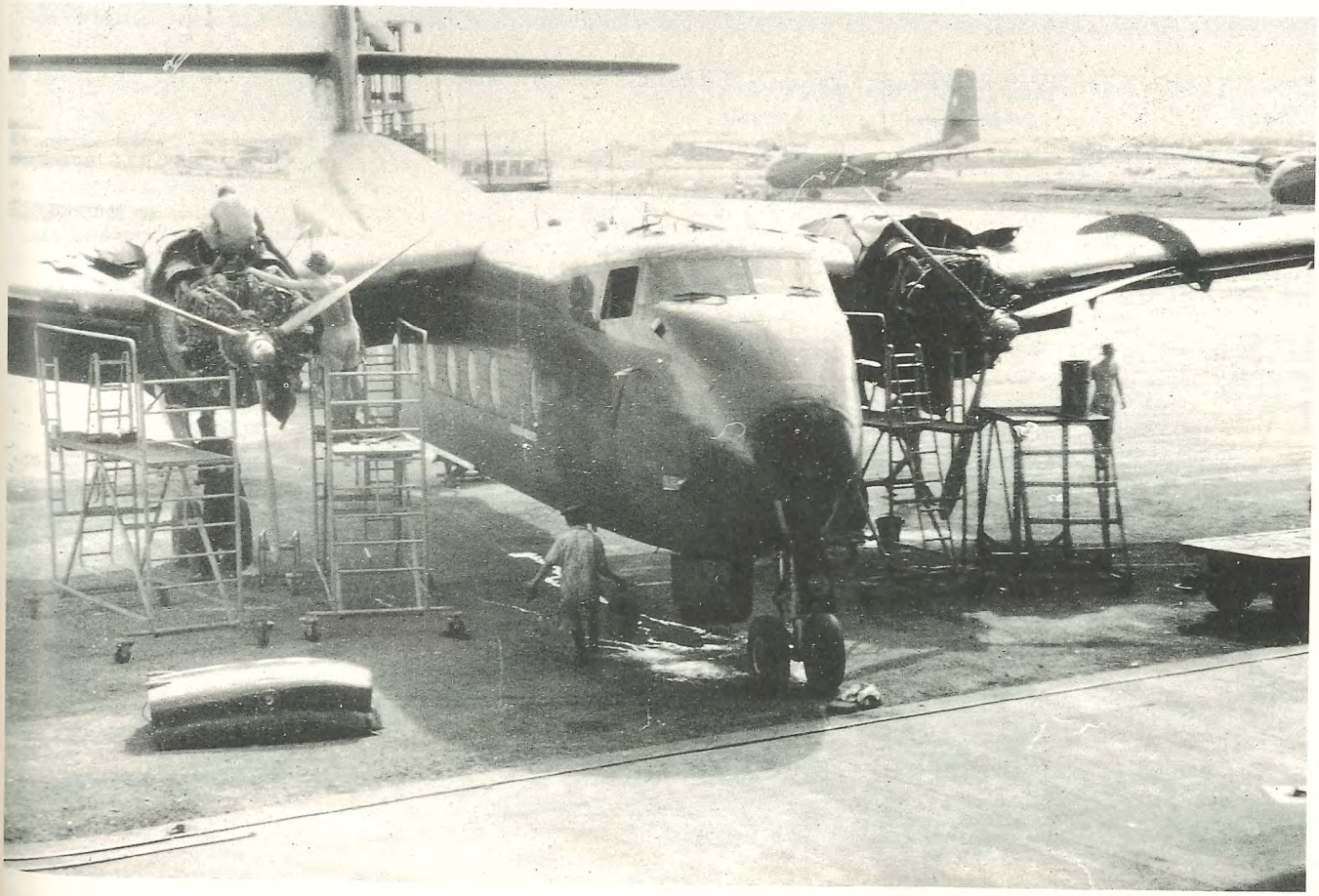
Sugden's award was for "distinguished service ... although the Caribou transport aircraft under his command were subjected to increasingly accurate ground fire, he constantly improved the effectiveness of the unit and this was due to a large extent to his personal example ... demonstrated the highest degree of courage and ability ..."

Harvey's Bar to his DFC was for "outstanding courage, skill and devotion ... on two occasions he personally flew crippled aircraft out of unimproved forward airfields to locations where repairs could be effected ..."

Guthrie's citation mentioned one incident of particular note: "On February 28, 1966, Wing Commander (as he was at the time of the award) Guthrie flew a dangerous mission to air drop ammunition in Vietnam to an Army unit which was low on ammunition and hard pressed by the Viet Cong. He carried out the mission under adverse monsoonal weather conditions and difficult terrain while on detachment to Nha Trang. In an effort to obtain pinpoint accuracy, it was necessary to fly the Caribou at a dangerously low altitude and this brought the aircraft into the range of enemy small arms fire. In spite of immediate dangers of low cloud, heavy rain, rugged mountain terrain and repeated small arms fire, the mission was a complete success".

35 Squadron RAAF

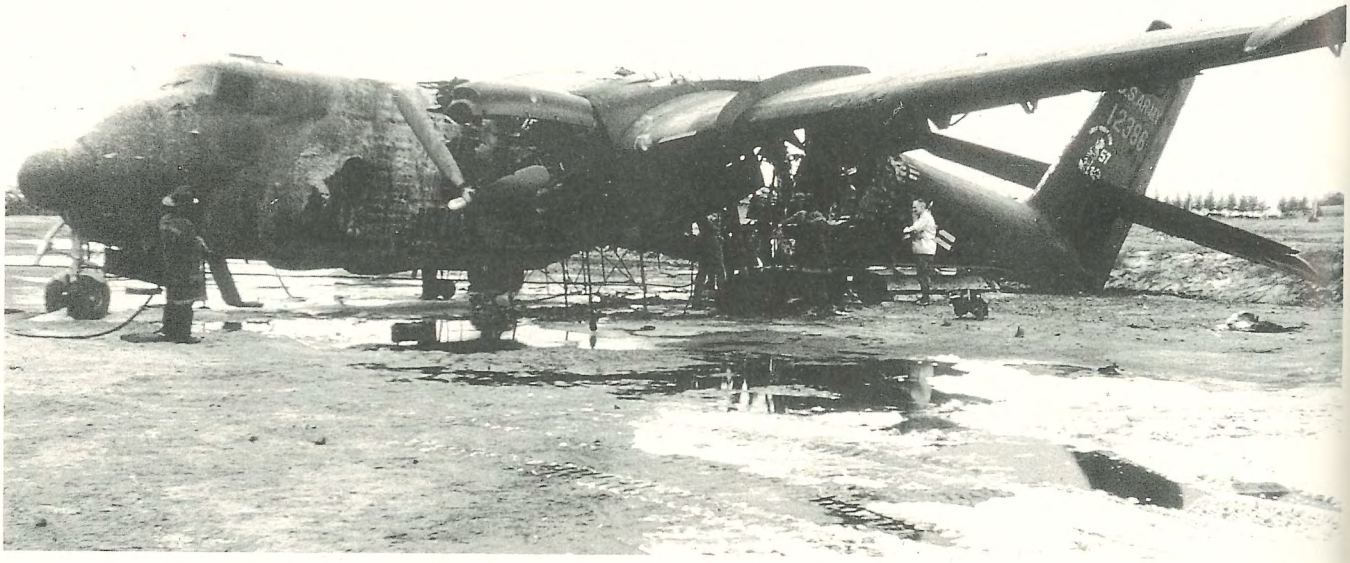
Some organisational changes came into effect from 1 June 1966 when the RAAF Transport Flight Vietnam ceased to exist as such and was renamed No 35 Squadron RAAF. At the same time the squadron began to operate with the USAF's 834th Air Division of the 7th Air



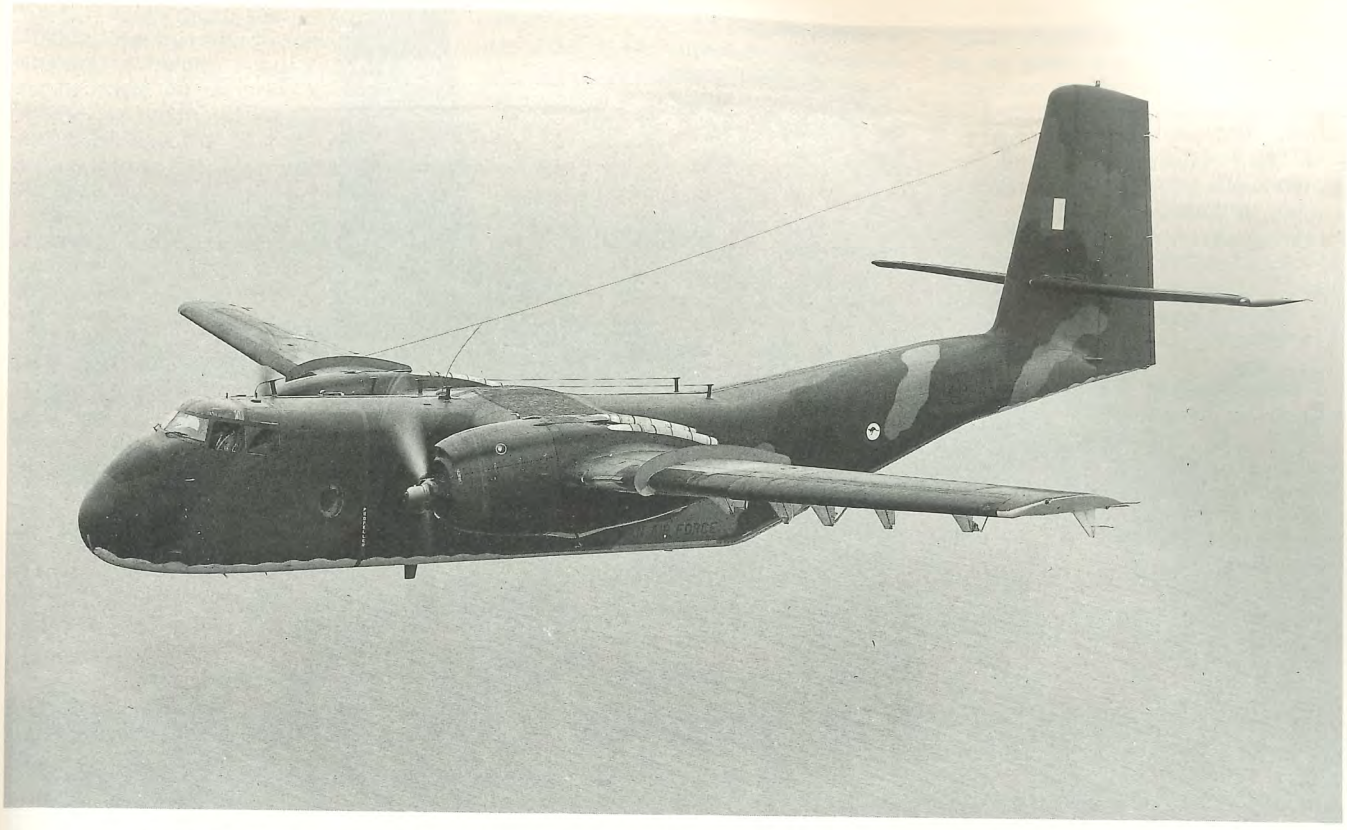
RAAF Caribou servicing at Vung Tau in 1967. Vung Tau remained 35 Squadron's main base during its stay in Vietnam. (via Chas Van Hulsentop)



Caribou A4-234 served in Vietnam for 21 months from May 1970. It was sent there as a replacement for the destroyed A4-193. (via Chas Van Hulsentop)



Aircraft and mortar shells do not mix, as this US Army Caribou in Vietnam discovered. The aircraft (BuAer No 61-2386) was the 41st Caribou built and the 29th of 164 delivered to the United States Army. Note the radar nose. (RAAF Richmond)



A4-191 displays the American South-East Asia camouflage applied to most RAAF Caribou in Vietnam following major servicing in either Thailand or the Philippines. (via Chas Van Hulsentop)

Force, and a new commanding officer, Wing Commander C J Melchert, was appointed. The record the Transport Flight had left behind it was an impressive one: 17,702 sorties flown, 11,396 hours flown, 30 million pounds (13.6 million kilograms) of cargo and 297,733lb (13,505kg) of mail carried and 82,696 passengers uplifted.

35 Squadron had originally been formed at Pearce, WA in March 1942 and operated in Western Australia and Queensland before disbanding at Townsville in June 1946. In its early days it flew a mixed bag of mainly impressed transport and training aircraft including the de Havilland Fox Moth, Dragon Rapide, Tiger Moth, DH.86 and Moth Minor plus the Fairey Battle, Avro Anson and Northrop Delta. Later, it standardised on the Douglas Dakota. Twenty years after disbanding, the squadron was reformed on the Caribou, and a quarter of a century after that it still operates the type.

The reorganisation had little effect on RAAF Caribou activities. Scheduled and short notice 'priority' sorties in support of mainly US forces but also – increasingly as time went on – of members of the Australian Task Force in Vietnam, were the squadron's staple activities, carrying the usual mixture of loads ranging from people (both military and civilian) to general cargo, mail, animals, fuel drums and casualties. In August 1966 the squadron began a scheduled twice daily courier service between Vung Tau, Saigon and Bien Hoa. In its first full month of operation (September 1966), the courier carried 2,527 passengers and 150,000lb (68,000kg) of freight. Nui Dat was added to the route later in the year.

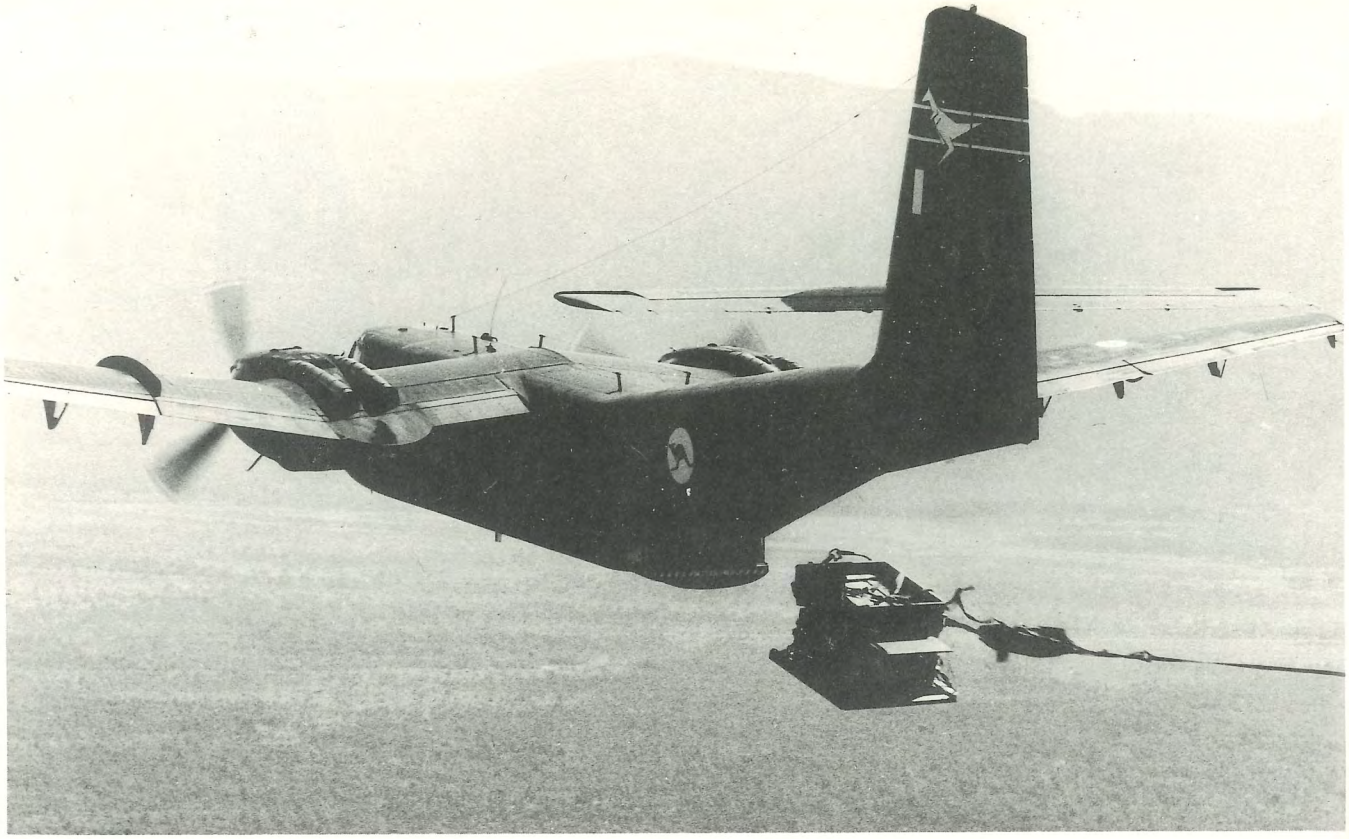
Special activities might include dropping flares for night combat operations, dropping paratroops or even parachuting cows into villages! As had been the case before, operations were conducted into difficult airstrips and often under fire.

On one occasion a Caribou was even used as a kind of 'bomber'. In March 1967 a single Caribou flown by 35 Squadron's commanding officer, Sqdn Ldr Tony Fookes, combined with a pair of 9 Squadron Iroquois to set a suspected Viet Cong supply point ablaze in what was the first Australian air strike of the war. Over three passes, the Caribou dropped several hundred gallons of highly volatile fuel onto the heavily wooded area in Phuoc Tuy province and the Iroquois crews set it ablaze with tracer ammunition from their door mounted M60 machine guns. The idea was to deny the Viet Cong the cover provided by the scrub and forest and therefore flush them out into the open.

Utilisation of the aircraft continued to be high, as did the standard of efficiency achieved. With the standard strength of the squadron now at seven Caribou, a

RTFV/35 SQUADRON VIETNAM
Commanding Officers 1964-72

Sqdn Ldr C Sugden DFC and Bar	July 1964 – April 1965
Sqdn Ldr D Harvey DFC and Bar, AFC	April 1965 – November 1965
Sqdn Ldr V Guthrie DFC, AFC	November 1965 – June 1966
Wng Cdr C Melchert DFC	June 1966 – March 1967
Sqdn Ldr A Fookes MVO, DFC	March 1967 – February 1968
Wng Cdr J Espie DFC	February 1968 – December 1968
Sqdn Ldr B Seedsman DFC	December 1968 – November 1969
Sqdn Ldr S C K Mitchell DFC	November 1969 – November 1970
Sqdn Ldr S Clark DFC	November 1970 – November 1971
Sqdn Ldr C D F Smithies	November 1970 – February 1972



Another load goes out the back of a 35 Squadron Caribou. The aircraft's versatility and ability to operate almost anywhere made it perfect for its tasks in Vietnam. (via Chas Van Hulsentop)



Caribou A4-173 was another to be based in Vietnam from beginning to end of the RTFV/35 Squadron's time there. In May 1965 an accident left it rather less pristine than this. (via Chas Van Hulsentop)

typical month might see it carry up to 10,000 passengers and a commensurate amount of freight. Around 320 flying hours would be recorded in a typical month, of which just under one-third would be devoted to supporting Australian troops and the remainder to the Americans.

One extraordinary example of daily utilisation was recorded by Flg Off Joe Wilson when his Caribou flew 28 sorties and moved 152 drums of fuel (202 tons worth!) between Vung Tau, Cao Lanh and Binh Tuy. Each leg was only 30-35 kilometres in length and the engines ran continuously except for when refuelling was required. Wilson and his crew worked non stop for nearly 12 hours on that particular day.

The Cost of Commitment

A total of 12 of the RAAF's fleet of Caribou saw active service in Vietnam. Of these, three were written off – one by enemy action, two in flying accidents – and most of the others suffered some kind of damage during their period of active service, in some cases on more than one occasion and in others serious damage requiring major repair was recorded.

The first RTFV Caribou to be written off was A4-185, on 18 November 1964. That month had already proven to be an exciting one for the aircraft. Six days before its final flight, A4-185 had been afforded the dubious honour of being the first RAAF Caribou to suffer battle damage when it received six rounds in the rear fuselage.

On the day it was written off, the Caribou had been tasked to perform a supply drop which failed due to a parachute extraction malfunction. As the supplies were needed urgently by US ground forces, the pilot elected to put the Caribou down at the drop zone (DZ), at A Ro. The unprepared strip was 1,800 feet (550m) long by just 60 feet (18m) wide, reducing to a mere 40 feet (12m) wide at its mid point. Sustained reverse thrust was used during the landing roll which threw mud onto the windscreen, obscuring vision. The Caribou drifted to the right, the starboard main wheels sinking into soft mud and tearing the undercarriage leg off. That and other damage resulting from the accident caused the aircraft to be written off. Even so, the aircraft was dismantled on site and moved out, the nose and forward fuselage section seeing further service as part of an observation post!

The dismantling of the Caribou was hazardous in itself, with the recovery crew working under the constant threat of mortar and small arms fire. In addition, monsoonal weather made the task doubly difficult, and engine fitter Cpl Robert Wark was later mentioned in despatches for his efforts.

The next Vietnam Caribou write off occurred nearly three years later, on 30 August 1967. Under the command of 35



A4-185 was the first RAAF Caribou written off in Vietnam, on 18 November 1964. The aircraft attempted to land on this very narrow strip at A Ro but ran off, causing extensive damage. This photograph well shows the rugged conditions at what was a drop zone. When his load got 'hung up', the Caribou's pilot attempted to land in order to deliver the badly needed supplies. (via Chas Van Hulsentop)







Three more views of A4-185's predicament at A Ro in November 1964. The aircraft was dismantled on site under the constant threat of enemy fire, the nose section ending up as part of an observation post. The 'Hammond House' sign refers to the Caribou's captain at the time of the accident. (via Chas Van Hulsentop)

Squadron's CO, Sqdn Ldr Tony Fookes, Caribou A4-171 was conducting a flight across the South China Sea to An Thoi on the Island of Qua Phoc, home of a fleet of US Navy river gunboats. Low cloud, rain squalls and poor visibility hampered the flight, necessitating a low altitude transit across the water. Approaching An Thoi, a large rain squall was seen, so a modified approach to the airfield was made at 300 feet so as to remain visual. Turning onto finals, the copilot (Plt Off Aiken, who was flying the aircraft) called for 30 degrees of flap. The captain looked inside to set the flaps and check the undercarriage indication while at the same time the copilot made a quick scan of his instruments.

That was enough to cause problems, and when the pilots' eyes were outside the cockpit again it was discovered the aircraft was only about 50 feet above the water and nose low. The Caribou hit the water about 300 metres short of the runway, the fuselage resting on the bottom of the shallows and allowing relatively easy egress for the 16 people on board, some of whom were non swimming Vietnamese. A US Navy gunboat picked them all up and only one person (Cpl Allen Hudson, the loadmaster) was injured.

The Caribou remained where it crashed and some suggest it is still there today with its fin sticking out of the water at low tide. That wasn't the end of the adventure for A4-171's crew, however. On the following day they were picked up by another 35 Squadron Caribou and taken back to Vung Tau. En route, and while descending to land at Ca Mau, the aircraft was fired upon and a tracer round passed up through the floor narrowly missing the rescued men.

The third RAAF Caribou written off in Vietnam was the only one lost as a result of enemy action. On 29 March 1970, A4-193 was delivering drums of aviation fuel to the South Vietnamese training base at That Son in the Mekong Delta. After taxying in and before unloading of the volatile cargo had begun, the Caribou came under intense and accurate mortar attack. The second round was a direct hit on the starboard wing, causing a fire which rapidly spread to the rest of the aircraft. Not surprisingly, the crew (Plt Off B Milne, Plt Off M Calvert, Cpl N Church and LAC R Laing) abandoned the Caribou and headed for the nearest bunker about 30 metres away while mortar rounds continued to fall around and onto the aircraft. The captain, Plt Off Milne, had his helmet blown off when the aircraft was first hit.

A4-193 burnt 'to the Plimsoll line', but amazingly the fuel drums on board did not explode. That Son suffered considerable damage in this attack, which had been going on for some hours before the RAAF Caribou arrived and carried on for a time afterwards. The base's fuel dump was destroyed.

Damage and Heroism

Mortar attack caused damage to other RAAF Caribou in Vietnam and inspired some substantial acts of bravery. On 19 January 1969, Flt Lt Tommy Thomson and the crew of A4-208 were taxying after landing at Katum special forces camp near the Cambodian border when a mortar attack began. The shells landed very close to the aircraft, the first one just in front of the port wing, peppering the aircraft shrapnel and shattering the windscreen. Thomson received shrapnel wounds in his right leg while his copilot, Flg Off Rod McGregor, received cuts to the face from flying glass. The barrage also knocked out the Caribou's hydraulic system and punctured both port mainwheel tyres.

Realising that remaining at Katum would almost certainly mean the end of his Caribou, Thomson made the decision to takeoff despite the damage (the full extent of which was of course unknown) and – to use a popular expression – get the hell out of there. The loadmasters – Cpls Barry Gracie and Bill Barnes – more than earned their keep by very quickly pushing the cargo out of the aircraft and onto the runway as Thomson prepared for takeoff.

Takeoff was successfully achieved and the Caribou flown back to Bien Hoa. With the hydraulics out the undercarriage had to be pumped up manually and the emergency system was used to lower it before landing. For their actions, Flt Lt Thomson and Cpl Gracie were both decorated, Thomson receiving a DFC and Gracie a DFM.

Caribou A4-173 was an aircraft which had one or two incidents enliven its long stay in Vietnam. On 17 May 1965 the aircraft ran off the runway whilst landing at Ha Tien and into soft ground which damaged the undercarriage. Ground crew were brought in to repair the aircraft, a job which turned into a mammoth exercise in field improvisation after a supply drop damaged the aircraft further. An ammunition box hit the Caribou's starboard wing, badly damaging it and

RAAF CARIBOU IN VIETNAM

Serial	Date of Service
A4-140	11/68-06/71
A4-152	10/67-09/68
A4-159	07/68-06/71
A4-171	08/64-08/67
A4-173	08/64-02/72
A4-179	08/64-02/72
A4-185	08/64-11/64
A4-191	08/46-06/71
A4-193	08/64-03/70
A4-208	06/65-02/72
A4-210	06/65-07/68
A4-234	05/70-02/72

Note: A4-171, 185 and 193 were written off in Vietnam; A4-152 and 210 were withdrawn to Australia for major repairs.



The remains of Caribou A4-193 after suffering a mortar attack at That Son in March 1970. Note the bloated but unexploded fuel drums inside what's left of the fuselage. (via Chas Van Hulsentop)

necessitating a change of wing if the aircraft was to be recovered.

Four days later, the Australian and American crews completed their job, fitting a wing from a US Army Caribou to A4-173 under difficult conditions. The crew could work only in daylight due to nearby Viet Cong forces and in addition to the wing, the undercarriage, propeller and other components had to be changed before the aircraft could be flown out. A quarter of a century later, A4-173 still flies on that American wing, identifiable by the lack of three blue formation lights on its upper surface.

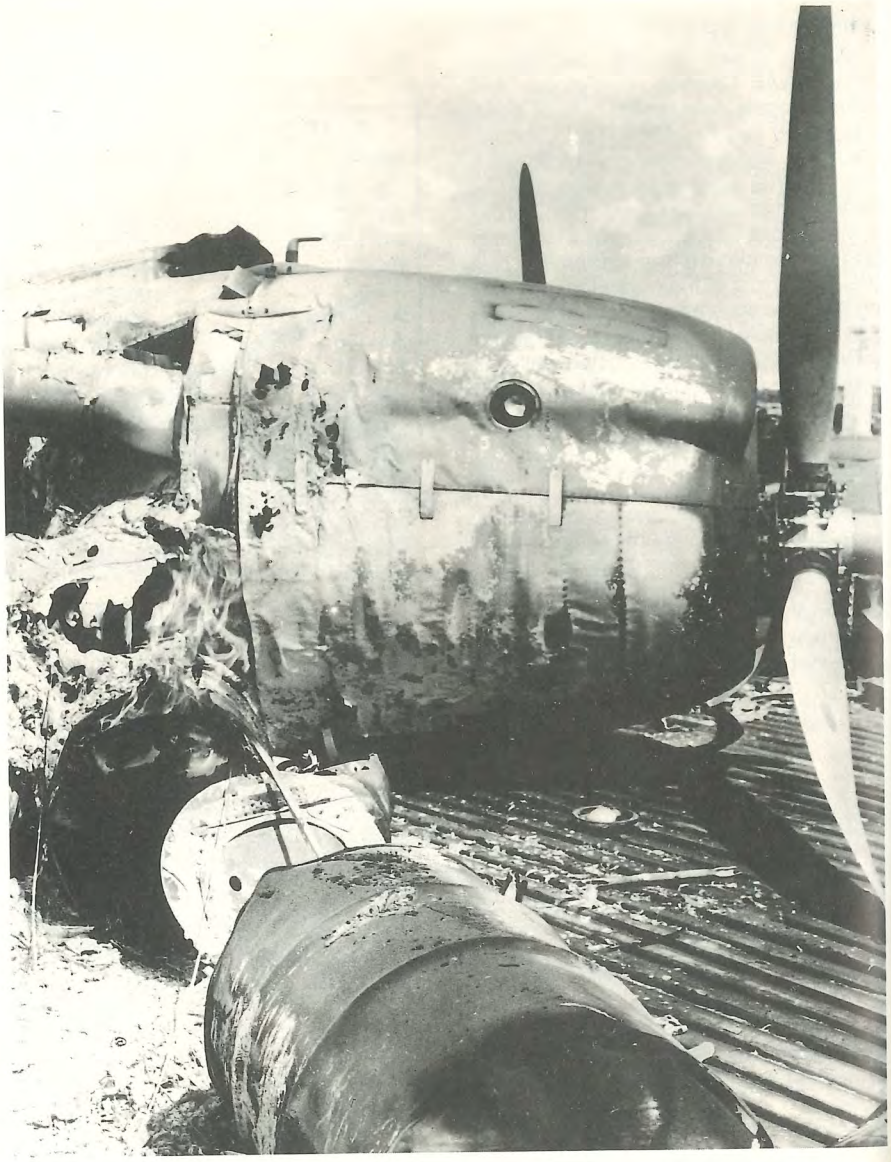
One more adventure awaited A4-173 in Vietnam. On 16 August 1966 it landed short and hit the runway lip at Ba To Special Forces Camp whilst delivering building materials. Ten days later the Caribou was able to be flown back to Vung Tau following temporary repairs which included chaining the undercarriage into position. A4-173 survived all this and served 35 Squadron until the unit returned to Australia in February 1972. Years later, in 1979, it flew HRH The Prince of Wales to Lizard Island in north Queensland and then to Townsville, the Prince flying the aircraft for parts of the flights.

Caribou A4-152 had a relatively brief stay in Vietnam (from October 1967) before it suffered major damage and had to be shipped back to Australia for repairs. In September 1968 the nosewheel steering was inadvertantly left off on landing and the aircraft ran off the strip, severely damaging the undercarriage and wing centre section. The Caribou was dismantled and shipped to Australia where Hawker de Havilland at Sydney's Bankstown Airport carried out repairs. The aircraft arrived at Hawker's in early December 1968 and was flying again late in the following February.

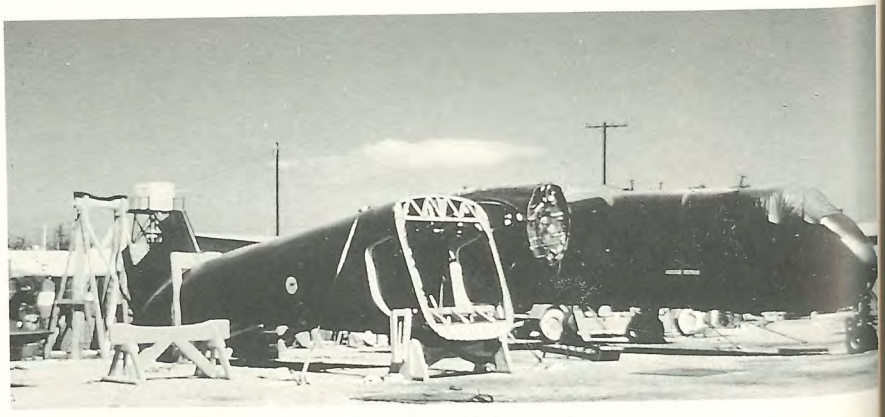
Caribou A4-210 was sent to Vietnam in June 1965 as an attrition replacement for A4-185 which had crashed the previous November. In early July 1967 '210' was severely damaged at Dalat whilst taxying when the edge of a ditch collapsed under the aircraft's weight. The drop and sudden stop twisted the wing centre section and bent one of the main undercarriage legs back some 15 degrees.

Although US contractors repaired the Caribou in Vietnam, the centre section remained twisted and as a result the aircraft could not be rigged to fly properly. 35 Squadron's crews struggled on with '210' for another year before it was decided to send the aircraft back to Australia so Hawker de Havilland could correct the twist. This was done, but even now some fiddling of the rigging tolerances is required to make this particular Caribou fly straight. Perhaps that's why A4-210's callsign VM-JMU is often repeated as 'Juliet Mike Useless'!

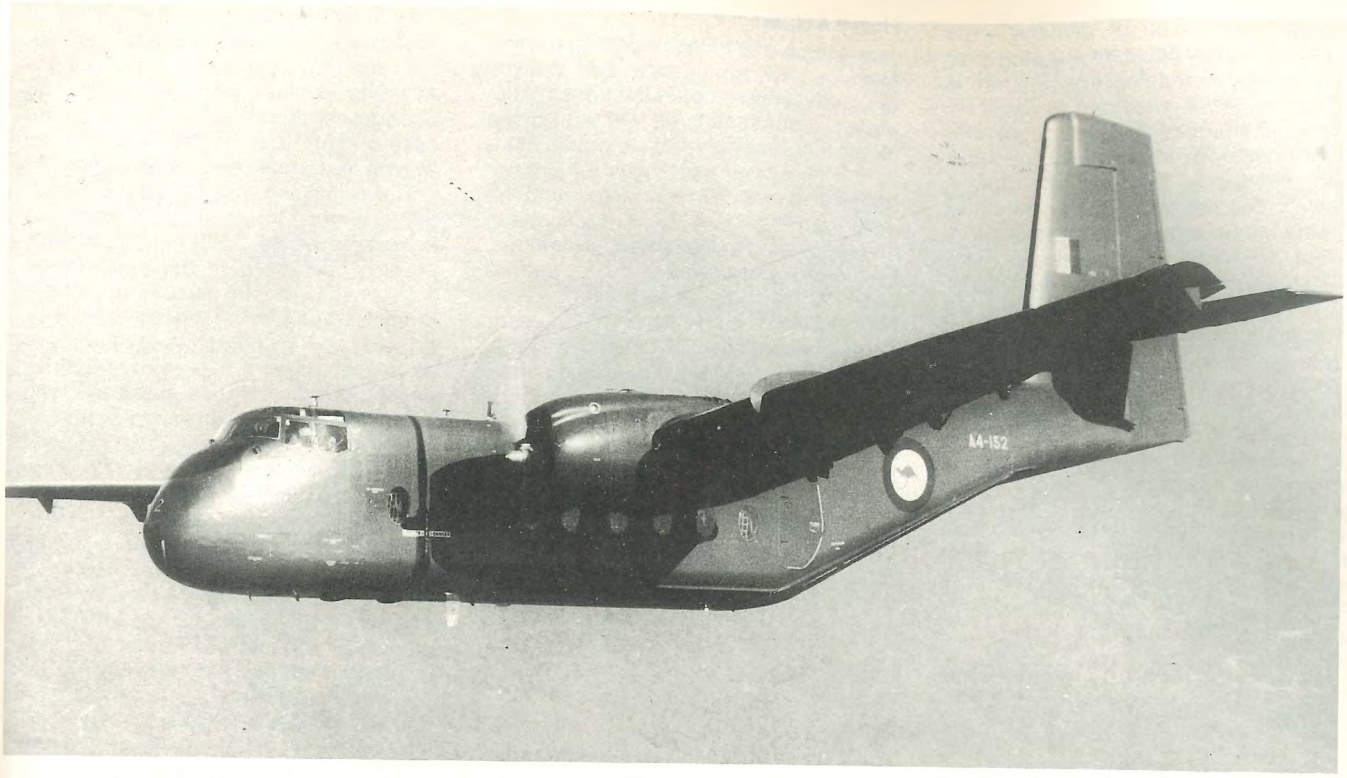
These incidents illustrate the difficulties facing RAAF Caribou crews in Vietnam and the dangers encountered. This list is by no means complete, as most of the aircraft serving in the conflict



A close look at A4-193's starboard engine cowling after the mortar attack reveals the aircraft was still burning when this shot was taken. Flames can just be seen immediately aft of cowling. (via Chas Van Hulsentop)



One of the two RAAF Caribou shipped from Vietnam to Australia so that Hawker de Havilland could carry out major repairs. A4-152 is shown dismantled and ready for shipping in September 1968 after suffering damage on landing. (via Chas Van Hulsentop)



Portrait of Vietnam Caribou A4-152 before it went to the war zone in October 1967. It was there for just under a year before being shipped home for major repairs. (via Chas Van Hulsentop)



A4-173 had two serious accidents in Vietnam. The first – in May 1965 – was when the aircraft ran off the runway at Ha Tien and had its damaged starboard wing replaced in the field with a wing from an American Caribou. The second (pictured here) was at Ba To in August 1966 when the Caribou landed short and hit the lip of the runway, damaging its port wing and undercarriage. Again, repairs were carried out in situ, the undercarriage being chained into position and the flaps locked down before the aircraft was flown out for permanent repairs. (via Chas Van Hulsentop)

suffered some kind of damage – by enemy action or accident – during their time of active service and numerous personnel were wounded or injured. Damaged aircraft were flown out of difficult strips on several occasions, usually with the enemy in close attendance. Happily, the list of Australian fatalities among those involved with the Caribou in Vietnam contains no names.

Attacks on the aircraft weren't necessarily confined to when they were flying on operations, either. In March 1966 their base at Vung Tau suffered a mortar attack, some 60 rounds landing on the airfield area causing no casualties among the Australians but damaging two aircraft, one of them holed in 18 places and the other in three. RAAF groundcrews worked around the clock to have the aircraft serviceable again within 48 hours, and despite the fact the incident grounded two-sevenths of the RTFV's fleet for that period, full services were able to be maintained.

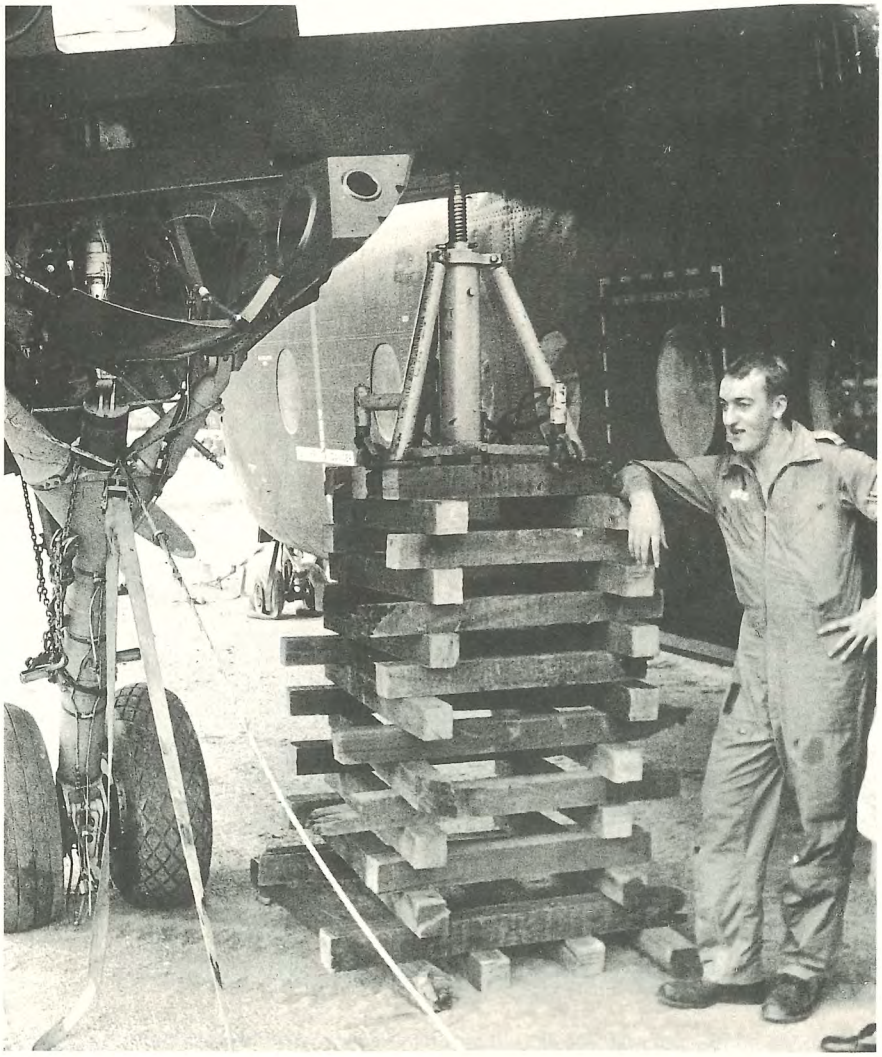
Home At Last

In March 1971, the Australian Prime Minister, William (later Sir William) McMahon announced reductions in Australia's commitment to Vietnam in the face of increasingly hostile public opinion. The same thing was of course happening in the United States, and the American President (Richard Nixon) was also beginning to implement reductions. Five short years earlier it had been a case of "all the way with LBJ" (Prime Minister Holt's public comment to President Johnson) at which time the majority of the public supported continued operations in Vietnam. By 1971 the majority – from all walks of life – did not, perhaps sensing that here was a war which could not be 'won' in the traditional sense.

McMahon's decision resulted in the withdrawal of No 2 Squadron's Canberras in June 1971 and of No 9 Squadron's Iroquois the following December. 35 Squadron would remain there for the moment but in reduced strength and level of activity. On 1 June 1971, three of 35 Squadron's seven Caribou (A4-140, 159 and 191) departed Vung Tau for Australia, whereupon they joined 38 Squadron's aircraft at Richmond. In the case of '191', this was the first time the aircraft had landed on Australian soil.

The remaining four Caribou (A4-173, 179, 208 and 234) stayed in Vietnam until February 1972. No 35 Squadron formally ceased operations in the area on the 13th of that month and six days later departed Vung Tau for the last time. They arrived at Richmond on 26 February after performing a flypast over Sydney and a 'beat up' of their new base. The formation was led by the squadron's CO, Sqdn Ldr C D Smithies. Of that group of four Caribou, two (173 and 179) were landing in Australia for the first time.

In seven and a half years active service in Vietnam, aircraft of RTFV/35 Squadron created another chapter of superb RAAF service in war which was the envy of those they served with. Their efficiency has been mentioned elsewhere and the final statistics tell part of the story. Between August 1964 and February 1972 the RAAF's Vietnam Caribou carried 700,000 passengers and 91 million pounds (41.3 million kg) of freight and mail and flew 79,739 sorties totalling 47,000 hours. For once, it appears Australia went into a war with exactly the right aircraft for the task.



A4-173's bent and chained into place port undercarriage leg before it was flown out of Ba To in August 1966. (via Chas Van Hulsentop)



38 Squadron Caribou in echelon, the nearest aircraft wearing the squadron's standard 1972-82 tail insignia of Enfield in blue and white arrowhead. (via Chas Van Hulsentop)

CARIBOU SERVING AUSTRALIA

In 1990 the Royal Australian Air Force still operated the same two Caribou squadrons – 35 and 38 – with 21 aircraft on strength: 13 with 38 Squadron at Richmond, five with 35 Squadron at Townsville (Qld), one each at Darwin (NT) and Pearce (WA) for search and rescue and liaison duties, and one with Hawker de Havilland in Sydney.

Until 1989, 35 Squadron's flight line was shared with Bell Iroquois helicopters, the two types flying in support of the Army's Operational Deployment force based there. Now, the Army has taken over the responsibility for the operation of tactical helicopters and the Iroquois have been replaced by Sikorsky Blackhawks.

The basic role of the aircraft is supporting the Army, delivering men and equipment to often remote and rough airstrips close to the area of operation. The method of delivery can be by conventional landing and offloading, paradropping or LAPES – Low Altitude Parachute Extraction System – techniques. The Caribou is also used for general transport and specialist training work (for example, training paratroops) when required and for community aid duties in times of civil emergency.

As is the case with the Hercules, the Caribou has helped in numerous such situations over the years, including the April/May 1990 floods in western New South Wales and southern Queensland. The workload under such circumstances is usually high. No 38 Squadron had aircraft based at Narromine, Dubbo and Walgett (all in NSW) during those floods, dropping supplies to isolated properties in the area. Getting hay to stranded stock was a priority, the Caribou carrying 60 to 100 bales per sortie and dropping them from a height of 150 feet above ground level at a speed of 95-100 knots.

These activities required a great deal of skill as the 'drop zones' were usually tiny and poorly marked. Nine times out of ten the stores dropped 'right on the money', although a couple of ungrateful farmers actually complained publicly if a drop was slightly inaccurate or not performed at the time specified by the farmer! Not surprisingly, this attitude annoyed the aircrews, who worked long and hard to help. One Caribou engineer (as loadmasters are now called) flew 62 sorties in 16 days and logged 105 hours of overtime during the same period, a workload common to most of those involved.

Happily, the vast majority of people helped showed the appropriate attitude to the RAAF crews and were genuinely grateful.

So were the people of south-eastern Queensland in April of the previous year when more flooding isolated several towns and cut off thousands of sheep and cattle from the feeding areas. Over a two week period, two 35 Squadron Caribou and a Chinook helicopter operating under the control of the State Emergency Service flew 101 sorties and dropped 11,000 bales of hay to livestock.

But it is military tactical flying for which the Caribou was purchased by Australia, and that flying is difficult and demanding. While training for a wartime situation, a typical day's work might be to deliver troops and freight to the front line from a usually reasonably close 'bridgehead', take out wounded, return to bridgehead, fly more personnel and materials to the front line and so on until the job is done. This 'shuttle' flying is usually performed at very low level (around 150ft AGL) with the pilot using surrounding terrain for shielding. In this kind of operation the Caribou is without peer, and no other aircraft available today can completely replace it and its ability to operate out of



Pleasing head on view of A4-235. Since being delivered in August 1965, this Caribou has served with 38 Squadron at Richmond, 35 Squadron at Townsville and in the search and rescue/liaison roles with No 2 Flying Training School (Pearce WA) and 79 Squadron, Malaysia. (via Chas Van Hulsentop)



The much maligned A4-210 in 38 Squadron colours. An accident in Vietnam twisted its centre section, making it impossible to fly straight. Even after two rebuilds it still requires some fiddling of the rigging tolerances to achieve approximately straight flight. (Stewart Wilson)

just about any patch of ground with a mind to call itself an airstrip.

Caribou crew conversions are performed by 38 Squadron at Richmond, which also has a full maintenance and support infrastructure in place. Tyro Caribou pilots emerge from their conversion courses as copilots permitted to perform basically 'straight and level' general transport flying. Tactical flying requires more instruction and experience, and after this has been achieved the young officer will be qualified for air drops, STOL operations and low level flying by both day and night. At this stage he will still be a copilot, but a year or so later he will be able to earn an upgrade to captain status if everything has gone well.

Night tactical flying is by far the most difficult task, the crews developing an uncanny knack to know where they are and what the winds are doing despite the lack of visual clues *en route* and at a drop zone, where a fluorescent light stick might be the only indication of where to drop the load. At only 150 feet above the ground, even daylight navigation in a tactical situation has its problems, and although the Caribou have had GNS500 navigation systems installed since the mid 1980s, it's usually the skill and instincts of the crew which ultimately makes the difference.

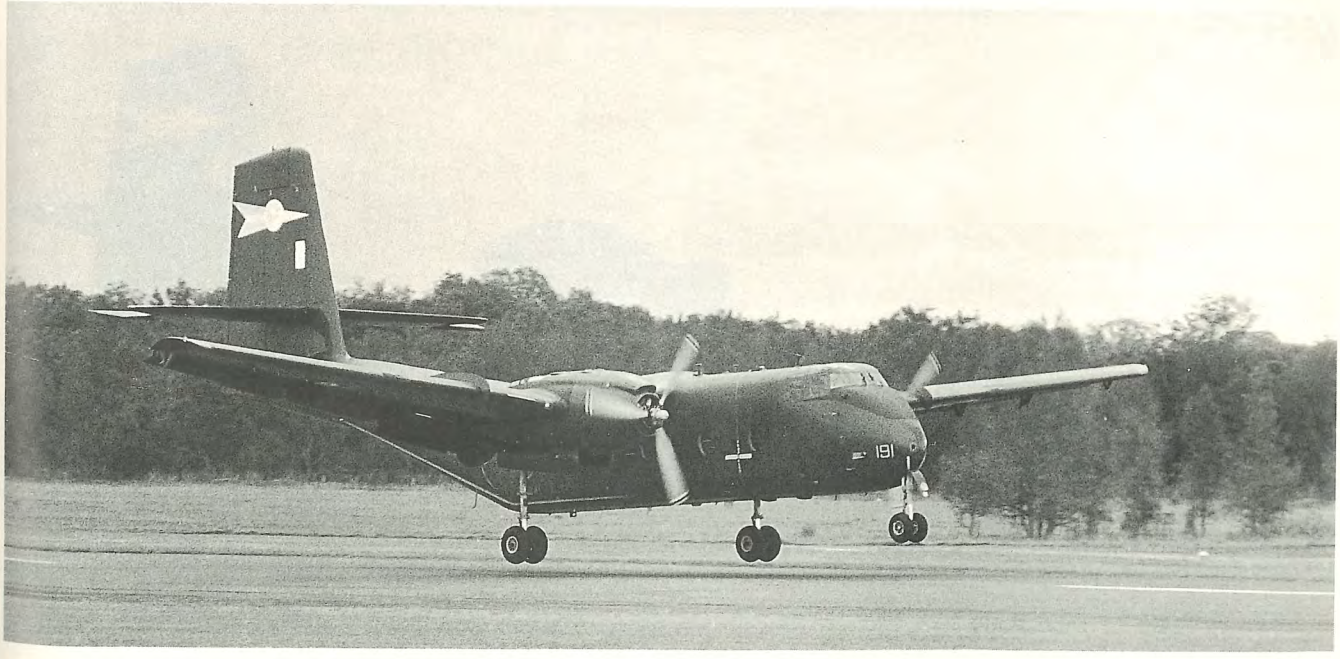
Caribou After Vietnam

When 35 Squadron returned from Vietnam in February 1972, all the RAAF's Caribou were based at Richmond except for a 38 Squadron detachment in Papua New Guinea, as described below. Both squadrons operated all over Australia in support of the Army, while some aircraft flew in Indonesia carrying Australian and Indonesian Army survey teams as they made a mapping survey of Sumatra, the Celebes and West Irian. No 35 Squadron moved to Townsville in 1976 to support what was then the Army's No 6 Brigade.

In preparation for the phasing out of RAAF service of the Douglas Dakota, Caribou were moved to some RAAF bases to take over the search and rescue role previously performed by the Dakotas. In May 1980, two Caribou joined the Transport Support Flight at Butterworth, while one was sent to Darwin and another joined No 2 Flying Training School at Pearce, WA. In each case the Caribou replaced Dakotas in search and rescue duties. The Butterworth aircraft returned to Australia in May 1988 following the handing over of the base to Malaysia.

PNG Detachment

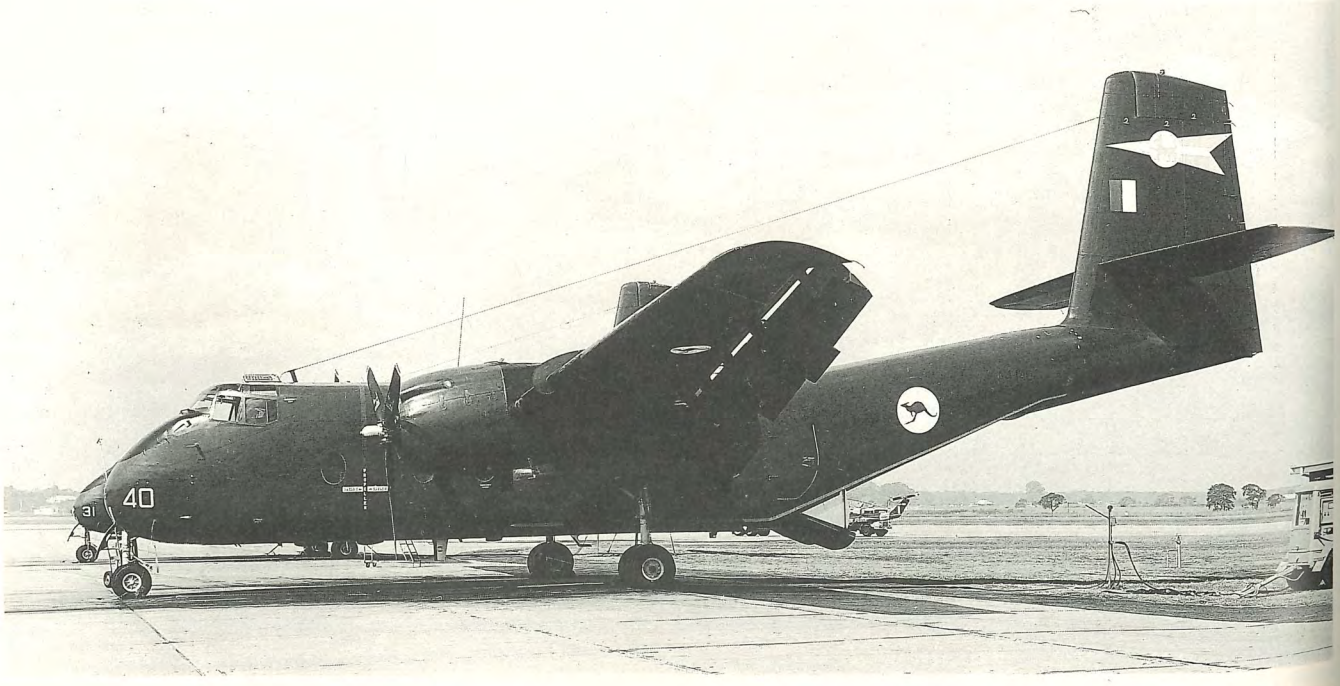
During 1965, Caribou from 38 Squadron were regularly, if temporarily, based in Papua New Guinea (PNG – then an Australian territory) for general flying duties and exercises with the Army. Later in the year it was decided to establish a semi-permanent detachment of two air-



A4-191 on the point of touchdown at Schofields NSW during a 1977 airshow. It was serving with 38 Squadron at the time. (Stewart Wilson)



"Geronimo"! A spot of freefalling from a Caribou's rear door. (RAAF Museum)



The RAAF's oldest surviving Caribou, A4-140, served in Vietnam between November 1968 and June 1971. It still operates in the standard overall dark green colour scheme. (via Chas Van Hulsentop)



A4-264 approaches the drop zone during a LAPES exercise with 7 degrees of flap set and about 95 knots on the clock. (via Chas Van Hulsentop)

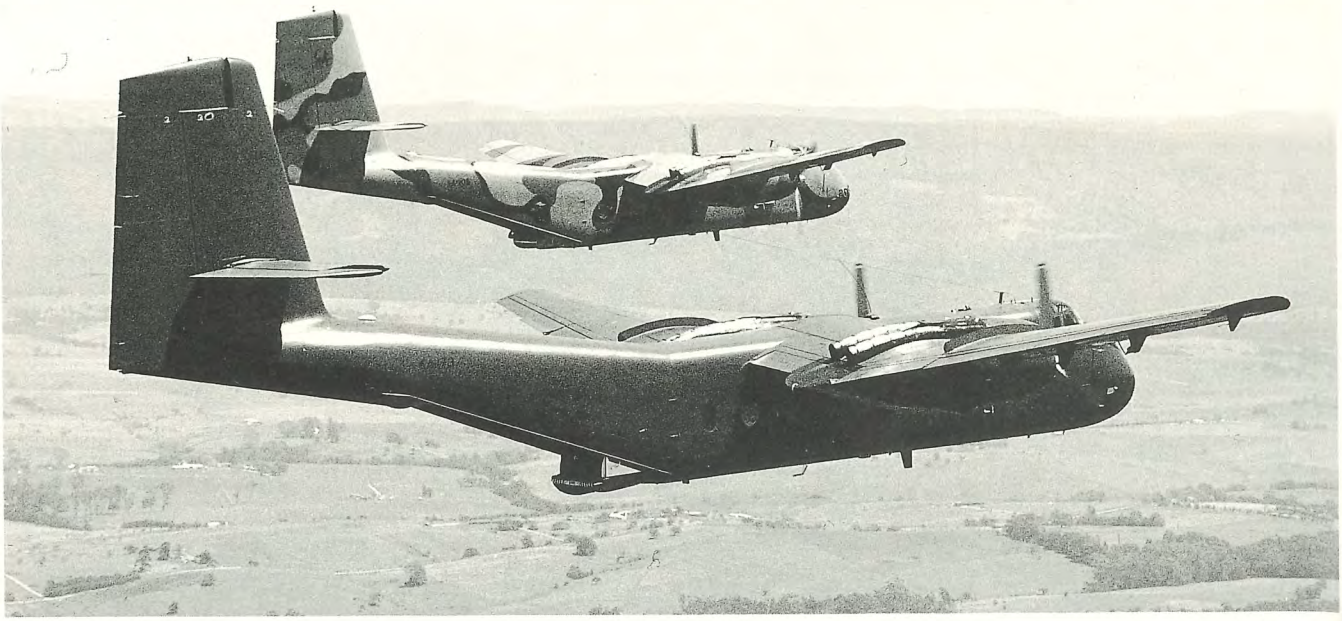
craft in the area for the support of Army units, general tactical transport and flying and to assist local authorities with air transport. As a result, 38 Squadron's Detachment 'A' was established at Port Moresby on 18 October.

The aircraft operated all over the Territory and its islands and a large proportion of its activities were for the purpose of civil assistance, flying prefabricated structures such as bridges, schools and hospitals to isolated areas and performing a multitude of other tasks.

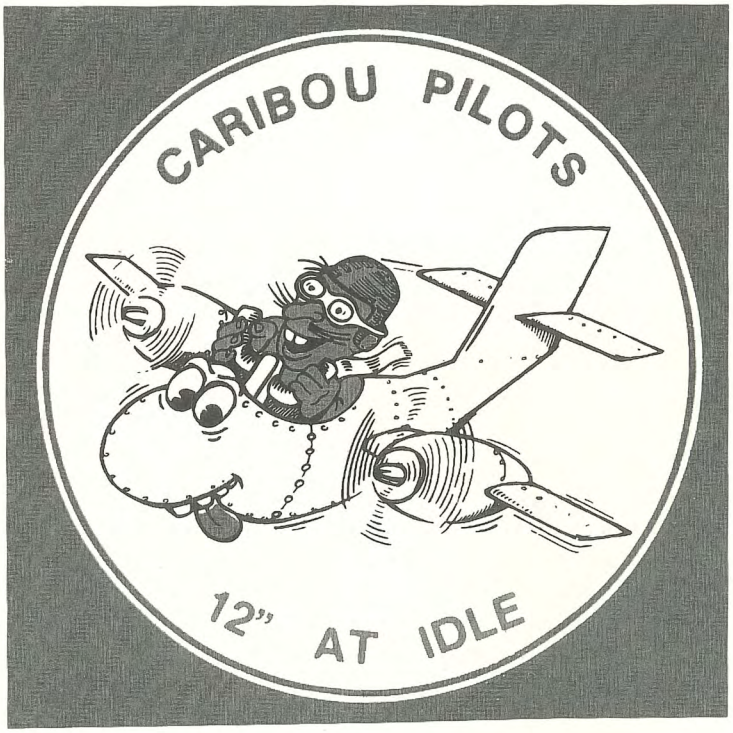
Flying in Papua New Guinea is regarded as being amongst the most difficult in the world with high mountains, low cloud bases, sometimes extremely heavy rain and short, high altitude strips to contend with. These strips are often carved into the tops or sides of mountains, sometimes incorporating enormous gradients and often one way operation. The experience gained under these conditions proved invaluable for both air and ground



A4-231 demonstrates a LAPES drop during a training sortie at the Londonderry drop zone near Richmond. (via Chas Van Hulsentop)



A4-173 (nearest camera) and A4-208 in formation displaying two of the several paint schemes which can be found on the RAAF's Caribou. As well has having an incident packed tour of duty in Vietnam (see previous chapter), '173' has been flown by HRH The Prince of Wales. '208' had its moments in Vietnam too, including surviving a mortar barrage shortly after landing. (via Chas Van Hulsentop)



crews, and personnel were regularly changed so that many of 38 Squadron's people were able to take advantage of that experience.

Detachment A remained in Papua New Guinea until late 1975, when, following the gaining of independence by the new nation, it was no longer required. During its ten years of operations the Detachment flew 26,500 hours, and since then training has been conducted in the area on a regular basis.

As one writer put it: "Flying in New Guinea is not for people with a nervous disposition. Most of the flying in the area has to be 'visual' because of the lack of reliable map references. Sometimes small towns and rivers are 10 to 15 miles from their map positions and pilots waste valuable time and fuel locating them. Because of this and the suddenness with which the clouds form, experienced Territory pilots say that anyone flying through cloud over the ranges has suicidal tendencies ... Tapini is a typically difficult strip. This is about 60 miles (100km) from Port Moresby in the Papuan Highlands. To reach Tapini you have to fly down a valley whose walls rise 6,000 feet, 1,500 feet above you. The floor of the valley is 3,000 feet above sea level. After several minutes of flying you make a hard left turn and there is Tapini, a strip which runs uphill with a mountain at one end ..."

Tapini in fact claimed the second of three 38 Squadron Caribou written off following accidents in Papua New



From the steamy humidity of South-East Asia to cold thin air of the more temperate regions, the RAAF's Caribou have seen it all. This is A4-235 over the Snowy Mountains. (via Chas Van Hulsentop)

Guinea. On 6 October 1968 Caribou A4-147 hit a large embankment some 150 metres short of Tapini's runway whilst attempting to land, slewing the aircraft around on impact and damaging it beyond repair. The landing approach had appeared normal until the aircraft was about 150 feet above the ground, whereupon it began to sink rapidly. The accident investigation report blamed difficult terrain, a rapid change in perspective and the possibility of a wind change or downdraught at the critical moment. Three of the four Army passengers on board were injured.

A4-147's usefulness to the RAAF did not end with that crash; the complete nose section was returned to 38 Squadron and the cockpit separated and transformed into a working systems trainer in the Field Training Flight classroom.

The first Caribou lost in Papua New Guinea was A4-202 on 3 June 1965. While attempting to deliver drums of aviation fuel and oil to Laiagam, the crew incorrectly identified Pogera airstrip as Laiagam. On the approach at about 200 feet above the ground, the captain became concerned that natives working

on the strip did not move as the aircraft approached and he applied power to attempt an overshoot. He continued looking at the threshold and did not notice the rising ground at the other end of the strip until the copilot warned him to raise the undercarriage and flaps.

Power was increased and the Caribou began to climb but the upslope at the far end of the strip was too great and the aircraft struck the ground approximately 400 metres uphill from the strip. The captain was seriously injured, the copilot only slightly and the Caribou was a write-off.

Papua New Guinea's terrain and weather combined to claim its third Caribou victim, A4-233, on 28 August 1972 at Kudjeru Gap. In this case the crash occurred as a result of the aircraft being caught in a narrowing valley with deteriorating weather conditions. A climbing turn was initiated – possibly in cloud – to turn back out of the valley but the starboard wing struck trees and the aircraft hit a ridge in a steep nose down attitude. Twenty six people were killed in this crash and five survived, although one died later. It took three days to find the survivors, who had attempted to walk out for assistance. Had there been



Caribou A4-152 on duty in Indonesia during 1974. (via Chas Van Hulsentop)



A formation led by A4-164 reveals some good detail of the Caribou's upper surfaces, including the slightly extended and drooped outer wing leading edge introduced during the type's certification trials. (via Chas Van Hulsentop)



Caribou on parade. A neat formation taxy of 38 Squadron aircraft at Richmond with loadmasters/engineers keeping watch from the cockpit hatches. (via Chas Van Hulsentop)

no survivors or only immobile ones, there is every possibility the wreckage may not have been found for months, years, or even at all.

One Caribou that Papua New Guinea tried its best to claim was A4-164, a 35 Squadron aircraft which suffered a major accident on takeoff from Eliptamin on 23 October 1978. The Caribou had landed at that strip instead of the planned Telefomin in the adjoining valley due to bad weather. When the weather lifted, a departure for Telefomin was attempted, but during the takeoff roll directional control was lost due to a combination of runway slope and wet grass.

The Caribou ran off the right hand side of the strip, suffering a burst tyre from hitting a large rock, contacting a wind sock with its starboard wing and snapping its nosewheel after dropping it into a drain. The nosegear folded back into its well, dropping the aircraft's nose onto the ground which in turn allowed the propellers (which were at power in reverse pitch) to strike the ground. The port engine reduction housing was torn off as a result.

The aircraft was assessed to have Category 4 damage (repairable, but at a major facility) and arrangements were made to have it shipped back to Australia for repair at Hawker de Havilland's Sydney workshops. This involved extensive dismantling of the Caribou *in situ* with few resources and a small team of men, the job being completed with no further





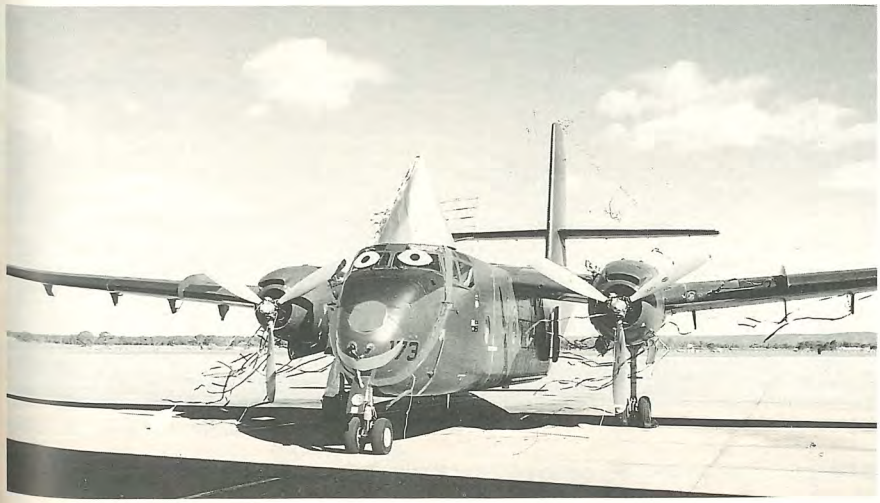
Caribou party trick. This is not easy to do ... down the runway on the nosewheel, as demonstrated by 38 Squadron's Sqdn Ldr Harrison, something of an expert in handling the Caribou. Do not try this at home! (via Chas Van Hulsentop)

RAAF CARIBOU ATTRITION

Date	Aircraft	Location	Remarks
1.7.64	A4-134	Nowra, NSW	crashed short of runway on landing
18.11.64	A4-185	A Ro, Vietnam	left runway on landing
3.6.65	A4-202	Pogera, PNG	hit rising ground during attempted overshoot
30.8.67	A4-171	An Thoi, Vietnam	hit sea short of runway on landing
6.10.68	A4-147	Tapini, PNG	crashed short of runway on landing
29.3.70	A4-193	That Son, Vietnam	destroyed on ground by mortar fire
28.8.72	A4-233	Kudjera Gap, PNG	hit ridge of valley in poor weather
4.7.86	A4-264	Camden, NSW	crashed attempting overshoot on landing



Caribou comes of age. The 21st anniversary of RAAF Caribou operations was celebrated in 1985. While Wng Cdr 'Noddy' Parsons speaks the appropriate words, a suitably decorated A4-173 provides his backdrop. (via Chas Van Hulsentop)



damage done. The stripped fuselage (with wing centre section and undercarriage still attached) was lifted – just – by a 12 Squadron Chinook helicopter and carried to the nearest port, from where it was shipped to Australia. On arrival in Sydney the Caribou was transferred to a barge, carried up the Georges River to near Hawker de Havilland's factory and then lifted by Chinook to the factory itself.

The whole recovery exercise was a remarkable one considering the logistics involved. As the strip from which the 11,000lb Caribou fuselage was lifted is 5,000 feet above sea level, the value of the heavy lift Chinook was well illustrated.

United Nations Service

In February 1975 the Minister for Defence (Lance Barnard) announced a Caribou would be provided to operate in support of the United Nations Military Observer Group in India and Pakistan (UNMOGIP) following an approach made to the Australian Government by the UN. The Caribou came from 38 Squadron and as Detachment 'B' ('A' was of course the Papua New Guinea detachment) departed Richmond on 4 March 1975 bound for Rawlpindi in Pakistan where it replaced a Canadian aircraft. The CO was Sqdn Ldr Baillie McKenny.

The duties of the UNMOGIP revolved around monitoring the ceasefire line in the Kashmir region, UN officers being located in observation posts along the border. These posts were usually in isolated, mountainous terrain which made movement by road very slow or impossible. A journey which took 30 minutes by air could take up to three days by road. The RAAF Caribous' duties included resupplying the observation posts and changing over United Nations personnel. In this kind of environment and with the airstrips usually way above sea level (the highest was at 8,000 feet), the Caribou was the perfect aircraft for the job.

The single aircraft detachment's base alternated between Rawlpindi on the Pakistan side of the ceasefire line (between May and October) and Srinigar on the Indian side for the remaining six months of the year.

The first RAAF Caribou sortie was flown on 1 April 1975, and although initial planning assumed the detachment would remain in the area for "at least a year", it actually remained there until near the end of 1978. It wasn't until January 1979 that the last personnel and the Caribou returned to Australia.

Three 38 Squadron Caribou were involved in the UNMOGIP operation, working on a four monthly, one at a time rotation. The aircraft involved were A4-199, 264 and 152 (in that order), the latter being a Vietnam veteran which had been returned to Australia in 1968 for major repairs. Each of the Caribou served on three tours of the India/Pakistan duties.

Repainting the aircraft into United Nations markings had to be performed before the aircraft left for the region. The UN's instructions on this were quite clear: "Entire aircraft will be painted white with solar white lacquer or other suitable, durable lacquer. Paint in black or dark blue the letters "UNITED NATIONS" on the left and right sides of the fuselage. Paint in black or dark blue the letters "UNITED NATIONS" proportionately on the underside and the top side of the left and right wings. Paint in black or dark blue the United Nations emblem, to scale, on each side of the rudder control surface. Paint in black or dark blue the aircraft serial number (in small lettering) on both sides of the vertical stabiliser in the usual position. Emphasise dimensional scale and in flight legibility on all exterior letterings".

All three Caribou reverted to more standard colour schemes when their time with UNMOGIP was over, the repaint usually occurring at the next major servicing. In the meantime, the aircraft remained overall white but with RAAF insignia reapplied.



Caribou quarter century. A4-191 taxies in during the Caribou's 25th anniversary celebrations at Richmond in April 1989. The occasion brought together hundreds of current and former Caribou air and ground crew. (Stewart Wilson)

Timor and the Red Cross

In 1975, Portuguese Timor erupted into what was basically a civil war, rival political groups indulging in gun battles and causing many refugees to flee the troubled country. The International Red Cross called for help in moving some of the refugees and in supplying first aid for people wounded in the fighting. In August 1975, Qantas Boeing 747s, chartered light aircraft and a RAAF Douglas Dakota moved refugees, some to Portugal (the 747s were chartered by the Portuguese government) and others to Australia.

In August 1975, 38 Squadron Caribou A4-140 was sent to Darwin to fly Red Cross personnel and supplies to East Timor, establishing a kind of shuttle service between the two locations. To emphasise its medical aid role, the Caribou's roundels and fin flash were hurriedly painted out in white and replaced with red cross markings and the RAAF markings on the fuselage sides removed. The remainder of the aircraft was left in its standard dark green colour. It was during one of these flights that the Caribou created history by becoming the first RAAF aircraft subjected to a hijack. An armed soldier took over the aircraft at Baucau, Timor, and demanded that 48 people be flown to Darwin. The Caribou landed safely at Darwin and the soldier was arrested.

A4-140 was quickly replaced by A4-199, freshly returned from a stint with the United Nations in India/Pakistan and therefore painted in a more appropriate all white colour scheme. Red Cross insignia replaced the United Nations logo and this Caribou continued the services until they ended in October.

Caribou Colours

The RAAF's Caribou have worn several different colour schemes over the years, some of them permanent or semi-permanent and others experimental. Variations in unit tail logos and the colour of lettering are also evident. The aircraft were delivered in the standard US Army olive green finish of the period, but Australian based aircraft were repainted in dark green at their first major servicing.

Aircraft based in Vietnam had their major servicings performed by US units in either Thailand or the Philippines and the US 'South-East Asia' green/brown camouflage was usually applied at the time. After 35 Squadron's aircraft returned to Australia, the green colour scheme was reapplied.

The overall white applied to aircraft serving the United Nations in India and Pakistan has already been described above, as have the colour schemes of the two Caribou used in the Timor Red Cross operations. Between 1984 and 1988 a variety of camouflage schemes were applied to different aircraft for experimental purposes. A4-152, 159,



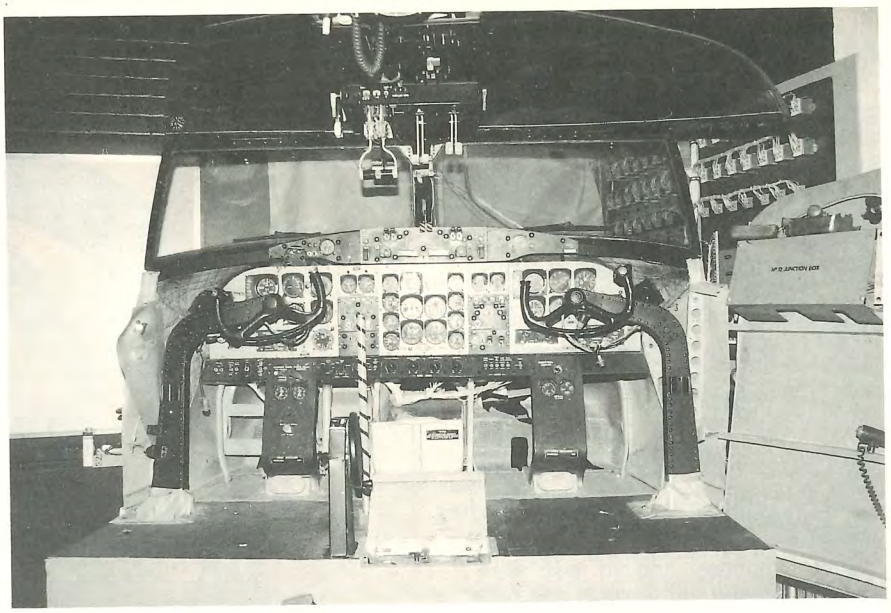
Past the vertical! Officially, this is a 'steep turn'. Unofficially it's a wingover, as demonstrated during the 25th anniversary celebrations at Richmond. (Chas Van Hulsentop)

165, 231, 210 and 225 were given variations on a green/tan with black undersurfaces combination; A4-264 received a two tone green/tan with black undersurfaces scheme; A4-285 and 179 a two tone green/black camouflage (with the colours reversed from one to the other) and A4-208 was lumbered with the distinctive desert pink/tan/black combination which apparently works very well over the Sahara or Sinai but looks very strange at Richmond! Other aircraft retained (and still do) the until then standard overall dark green.

The scheme applied to A4-179 was deemed to become the 'standard' one, and all Caribou will eventually be repainted in these colours as the opportunity arises.

Replacing the Caribou

The question of replacing the Caribou in RAAF service is one that has been kicked around for some years. It was in September 1976 that the Department of Defence first announced it was seeking a replacement for the aircraft "in the mid 1980s".



A4-147 crashed at Tapini, PNG, in October 1968 and was written off. Its cockpit was salvaged and turned into a working systems trainer. (Chas Van Hulsentop)



This June 1965 crash in New Guinea ended A4-202's brief (eight month) life with the RAAF. The aircraft hit rising ground whilst attempting an overshoot. (via Chas Van Hulsentop)



The salvage of A4-164 after its crash at Eliptamin during an attempted takeoff in October 1978 was a major achievement by the ground crews involved. Its 11,000lb fuselage (complete with undercarriage and centre section) was lifted out by Chinook helicopter and then shipped to Australia for repairs. (via Chas Van Hulsentop)



Battered and broken, Caribou A4-264 lies at Camden NSW after a landing accident in July 1986. The aircraft drifted off the runway centreline before touchdown and crashed, despite attempts to go around. (Chas Van Hulsentop)

The then Minister of Defence, Mr Killen, stated at the time that "Australia's requirement is for a robust aircraft able to carry out tactical transport tasks ranging from supporting troops in the field to supply drops and aeromedical evacuations. It will also be capable of civil aid tasks, such as flood relief work. The replacement aircraft should have significant but not major (a contradiction in terms, surely – author) load and performance improvements compared with the Caribou".

A decade and a half later, there is still no sign of a decision regarding replacing the Caribou!

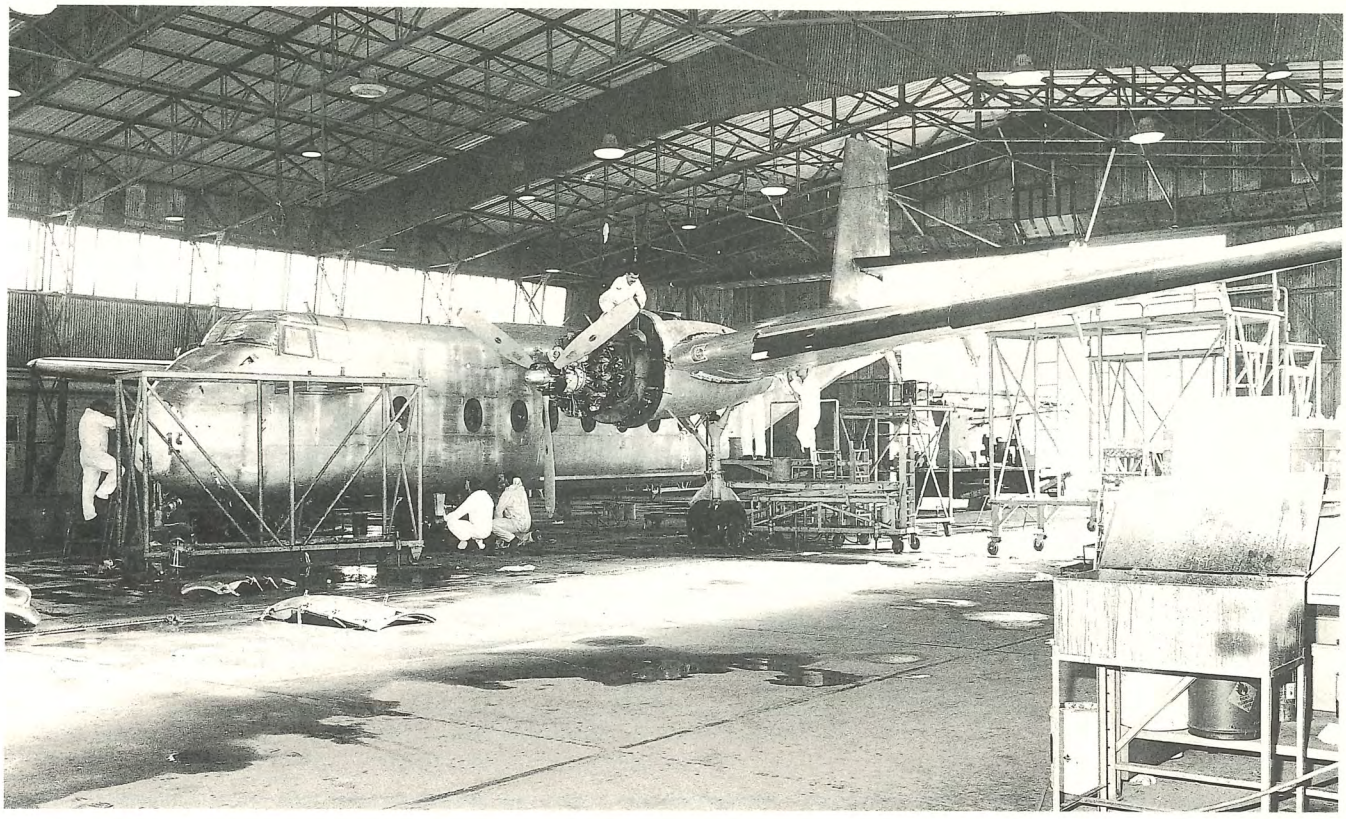
A decision one way or the other has to be made sooner rather than later. The problem lies not with the Caribou airframe – which is good for many more years yet – but with its powerplants. The Pratt & Whitney radials are becoming increasingly difficult to maintain as the supply of spare parts dries up. Cylinder crankcases, for example, are as rare as the proverbial hen's teeth, and as with many other of the engines' components, rebuilding rather than replacing has become the standard procedure. And engine components can only be rebuilt so many times.

One of the options which has been available for some time has been that of re-engining the Caribou with turboprop engines, the advantages of this including greater reliability, longer times between overhaul and the ability to use cheaper and more readily available fuels.

Attractive though these features are,



(left) How lucky can you get! The interior of A4-264 after its Camden crash, showing the port inner flap which was driven through the fuselage side. Its progress was impeded by the parachute static line, saving the life of an Army despatcher who was sitting right where the flap ended up. It nevertheless hit him in the head, and one of his hairs was found stuck to a rivet on the flap. The appropriate piece was subsequently presented to him as a momento! (Chas Van Hulsentop)



Three RAAF Caribou were allocated to United Nations duties on the India/Pakistan border between 1975 and 1979, operating in rotation. Here one of them (A4-152) is stripped and ready for a repaint in the UN's all white colour scheme. (via Chas Van Hulsentop)



In full UN livery, an RAAF Caribou performs a LAPES. The aircraft were used to support observer's posts along the ceasefire line. (via Chas Van Hulsentop)

there are also some drawbacks. The much lighter turboprop engines, although ostensibly providing an increase in payload, require compensation to restore the aircraft's centre of gravity, which can take the form of mounting the engines much further forward (and radically changing the propeller line in the process) or lengthening the aircraft's forward fuselage, a process which would be very costly and negate the payload gained. Another option would be to instal ballast in the forward fuselage, again resulting in loss of payload.

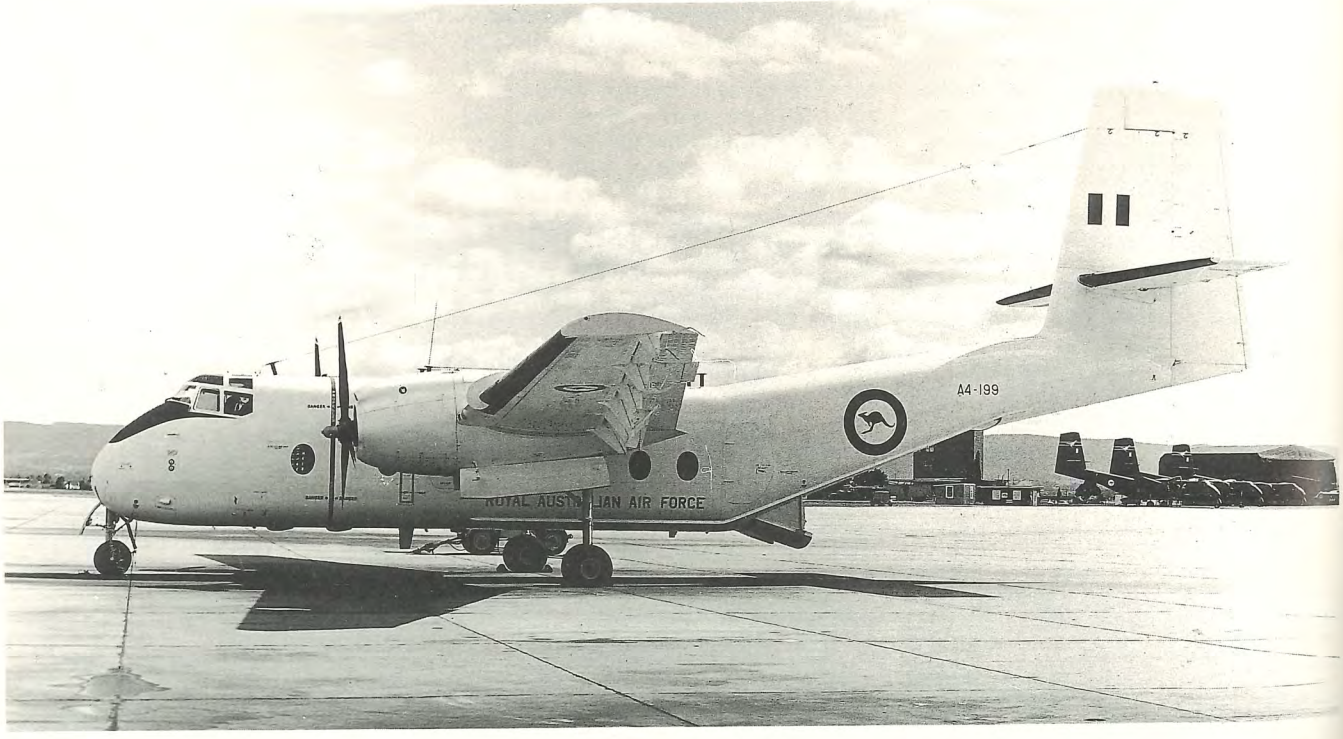
Balancing that to some extent would be reduced operating costs with turboprops installed, but the question of a turboprop's 'hot and high' performance also has to be considered.

In 1982, Hawker de Havilland prepared a submission for the Royal Malaysian Air Force to convert its Caribou to turboprop power, and naturally the same proposal was made to the RAAF. HDH considered three engines as possibilities for the conversion, the PWAC PW115 (1,700shp), the General Electric CT7-5 (1,630shp) and the Garrett AiResearch TPE331-15 (1,645shp), with the latter favoured due to it requiring fewer structural changes. Hawker de Havilland estimated the cost of such a conversion at approximately $A4.6m to prepare a design study, prepare the necessary engineering and design data and to convert a prototype aircraft. 'Production' conversions were estimated at $1.5m each.

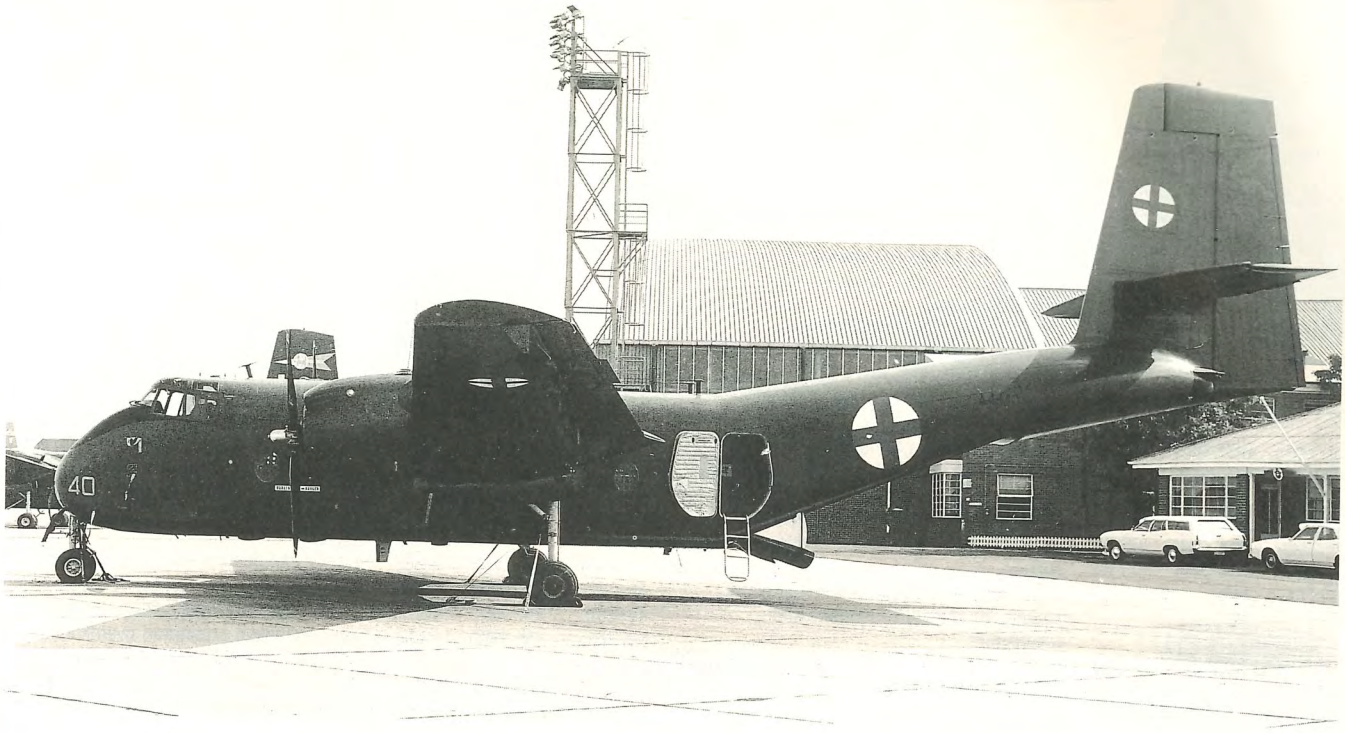
The obvious first choice to replace the RAAF's Caribou was the Buffalo, de Havilland Canada's larger, heavier and turboprop powered successor to the piston engined aircraft. Talks on the Buffalo reached the stage of discussing co-production in 1978, but it all came to nought and the aircraft is now out of production.

Other possible replacements which have been mentioned in recent times include the CASA CN-235 and smaller C-212, a derivative of the Shorts 330/360 family, or simply purchasing another squadron of Lockheed Hercules. All of these aircraft have their advantages, but none can perform all the roles the Caribou is currently fulfilling. Some don't carry enough, others more than enough and none can touch the Caribou's short, rough, hot and high airfield capability.

It all depends on the requirements of the Australian Army, the branch of the armed forces the Caribou is there to serve, after all. Perhaps the Army will want helicopters instead, perhaps more Hercules, or perhaps nothing at all. Or perhaps the Caribou will be allowed to simply fade away as the 1990s progress, unable to fly due to a lack of powerplants.



While serving on normal duties in Australia between United Nations tours of duty, the three white Caribou reverted to national insignia. (via Chas Van Hulsentop)



To quickly establish a Darwin-East Timor shuttle service of Red Cross personnel in August 1975, A4-140 had appropriate markings hurriedly applied over the RAAF roundels and fin flashes. During these operations, this Caribou became the so far only RAAF aircraft to be hijacked. (via Chas Van Hulsentop)



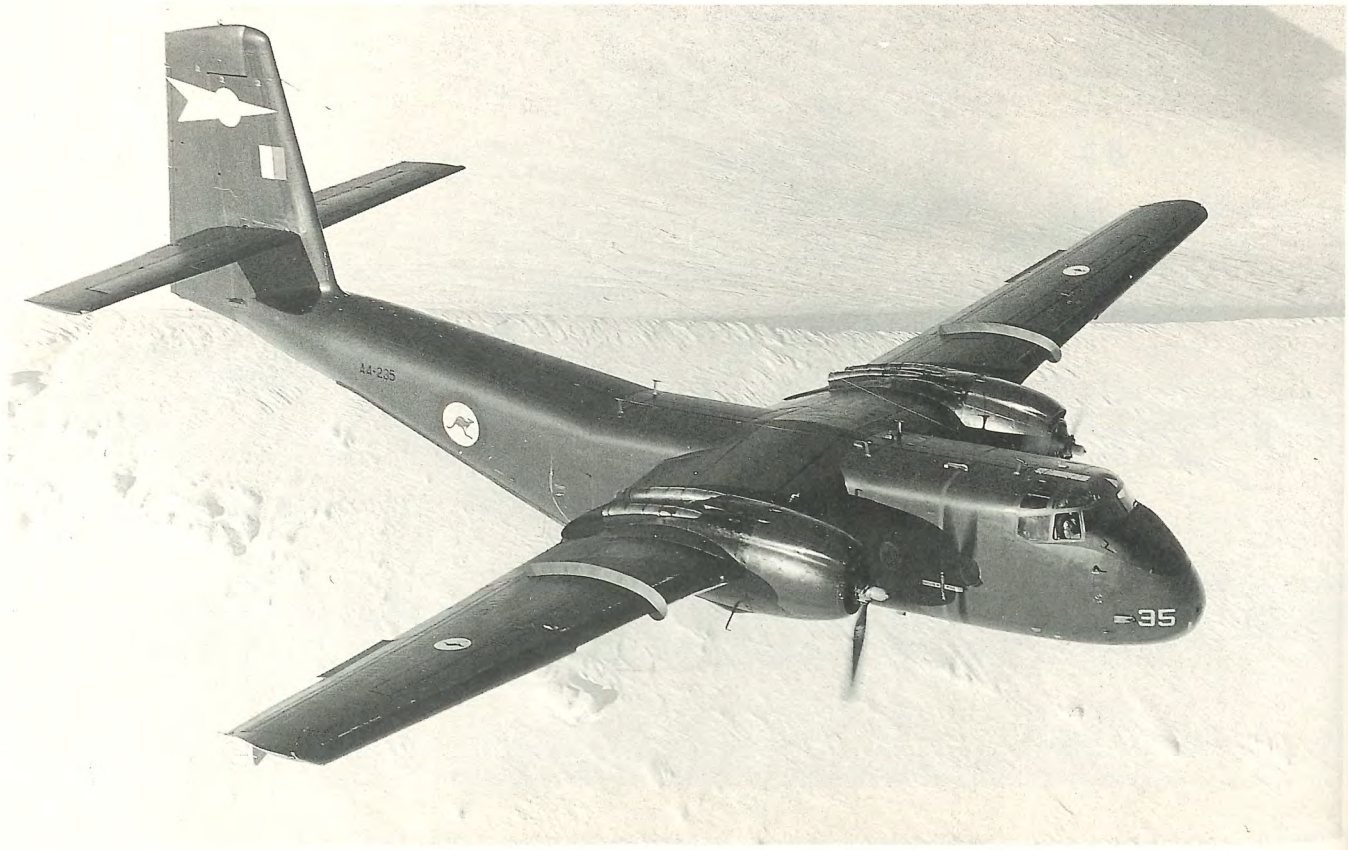
A4-199 (with its more appropriate all white United Nations finish) soon replaced A4-140 on the East Timor Red Cross duty. (via Chas Van Hulsentop)

RAAF DE HAVILLAND CANADA CARIBOU

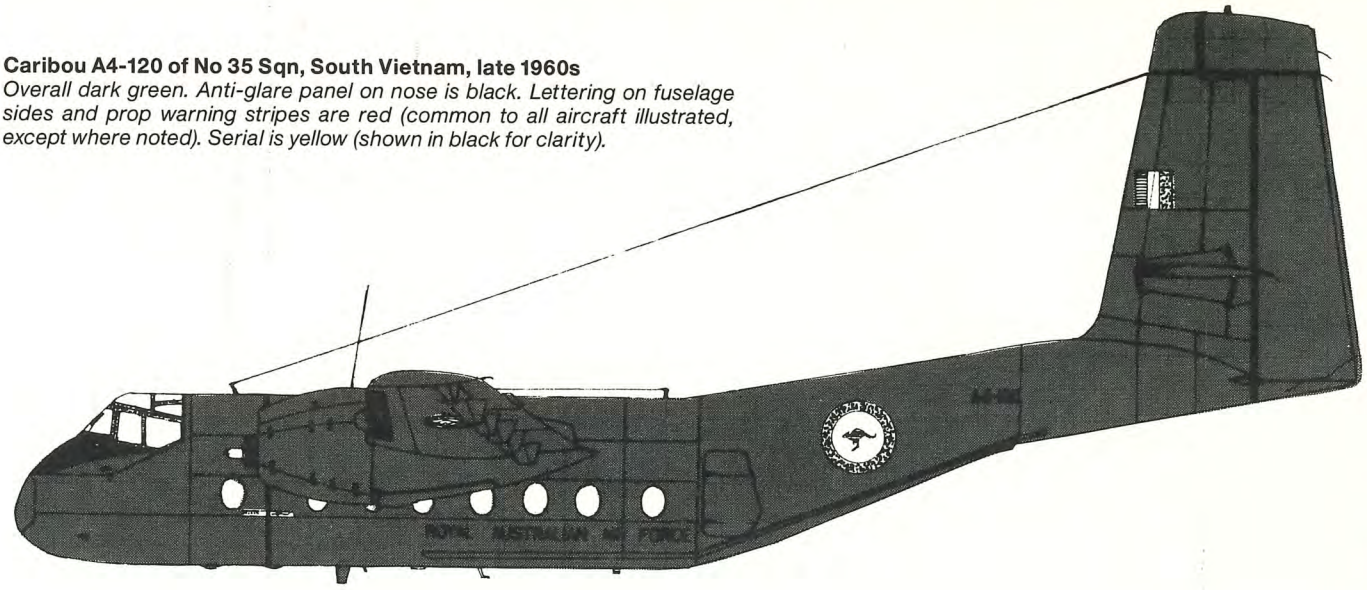
Abbreviations: w/o – written off; u/c – undercarriage; Deliv – delivery; cvtd – converted; t/o – takeoff; n/a – not available/applicable.

Notes: All RAAF Caribou were of the DHC-4A variant. The stated delivery dates reflect the aircraft's departure from Canada on delivery to Australia, although some (as noted) were diverted direct to Vietnam during this flight. The last three digits of the RAAF serial number reflects de Havilland Canada's constructor's number for that particular aircraft.

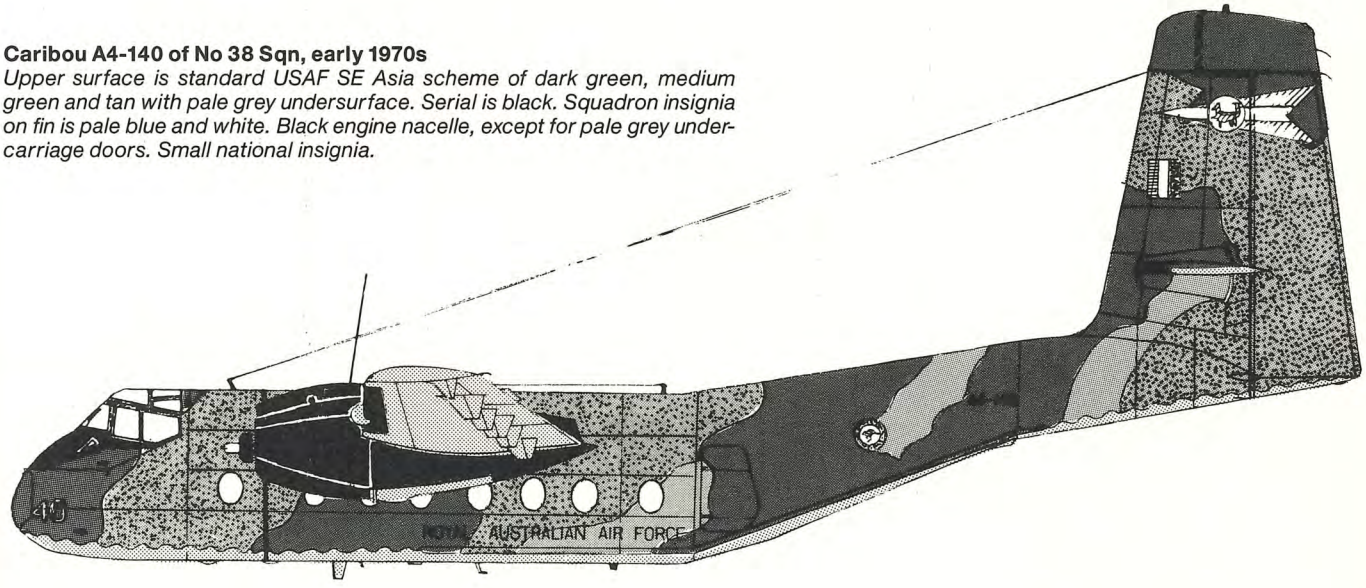
RAAF No	Callsign	Deliv	Disposal/Remarks
A4-134	VM-JMA	03/64	crashed on landing Nowra NSW 07/64, fuselage used for paratroop training, to Army Transportation Museum Albury NSW 1987
A4-140	VM-JMB	03/64	served Vietnam 11/68-06/71, current
A4-147	VM-JMC	03/64	undershot on landing Tapini PNG 06/68 and w/o, cockpit became systems trainer
A4-152	VM-JMI	05/64	served Vietnam 10/67-09/68, current
A4-159	VM-LWK	05/64	served Vietnam 07/68-06/71, current
A4-164	VM-JMN	05/64	current
A4-171	n/a	07/64	deliv direct to Vietnam, undershot while landing An Thoi 08/67, hit sea and abandoned
A4-173	VM-LWB	07/64	deliv direct to Vietnam, to Australia 02/72, current
A4-179	VM-JMD	07/64	deliv direct to Vietnam, to Australia 02/72, current
A4-185	n/a	07/64	deliv direct to Vietnam, landing accident A Ro 11/64 and w/o
A4-191	VM-JMM	07/64	deliv direct to Vietnam, to Australia 07/71, current
A4-193	n/a	07/64	deliv direct to Vietnam, destroyed by enemy mortar fire That Son 03/70
A4-195	VM-LWY	09/64	current
A4-199	VM-JMZ	09/64	current
A4-202	n/a	09/64	crashed Pogera strip PNG 03/65 and w/o
A4-204	VM-JMT	11/64	current
A4-208	VM-JMG	11/64	served Vietnam 06/65-02/72, current
A4-210	VM-JMU	11/64	served Vietnam 06/65-07/68, current
A4-225	VM-JMA	06/65	current
A4-228	VM-JME	06/65	current
A4-231	VM-JMK	06/65	current
A4-233	n/a	08/65	crashed into hill Kudjero Gap PNG 08/72 and w/o
A4-234	VM-LWH	08/65	served Vietnam 05/70-02/72, current
A4-235	VM-JMV	08/65	current
A4-236	VM-JMF	08/65	current, also VM-LWF callsign
A4-264	VM-JMQ	05/68	crashed during attempted overshoot Camden NSW 07/86 and w/o
A4-275	VM-JMW	07/69	current
A4-285	VM-JMJ	12/69	current, also VM-LWJ callsign
A4-299	VM-JMP	05/71	current



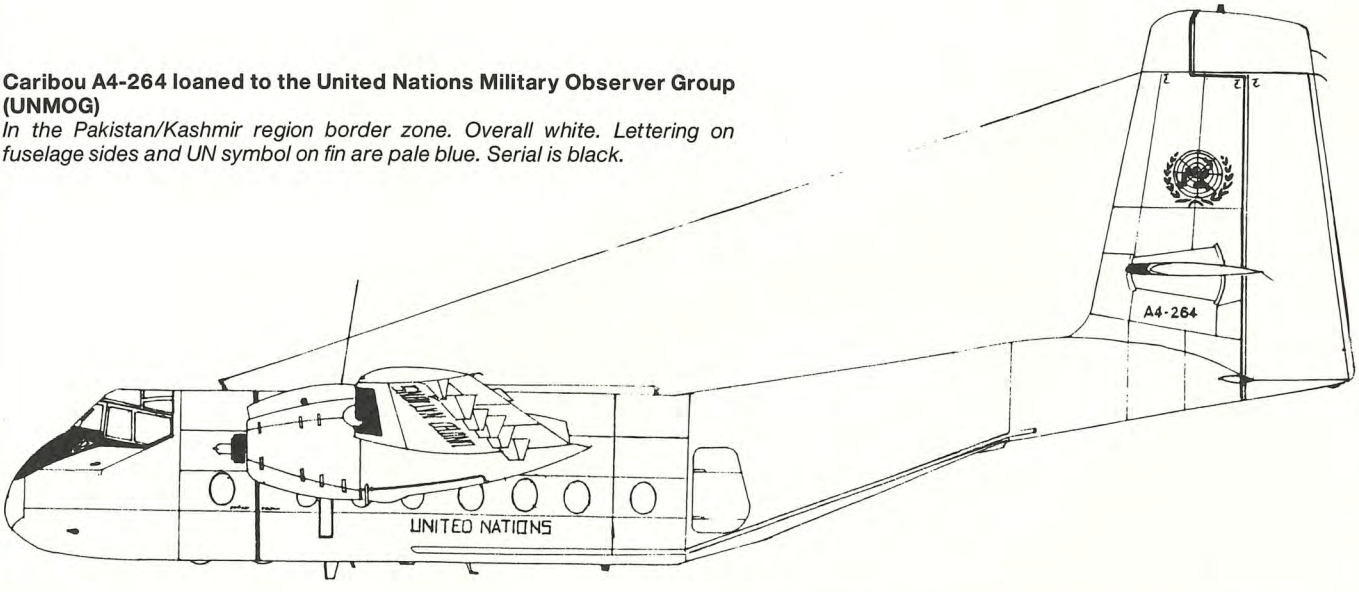
Caribou A4-120 of No 35 Sqn, South Vietnam, late 1960s
Overall dark green. Anti-glare panel on nose is black. Lettering on fuselage sides and prop warning stripes are red (common to all aircraft illustrated, except where noted). Serial is yellow (shown in black for clarity).



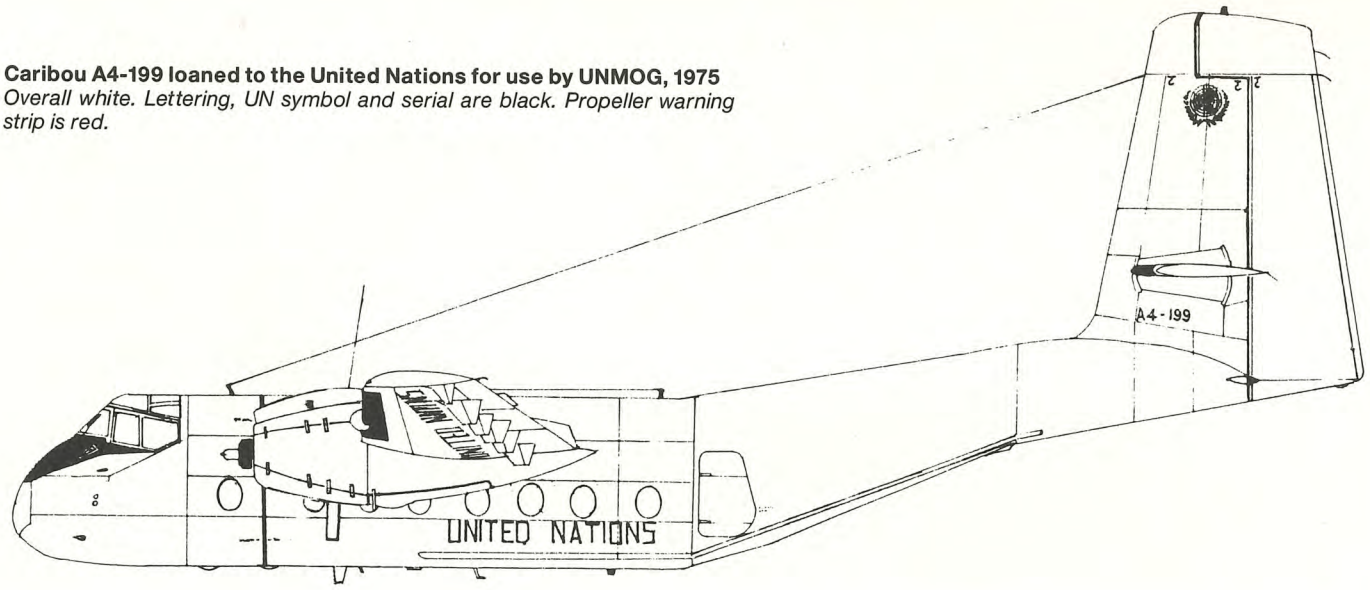
Caribou A4-140 of No 38 Sqn, early 1970s
Upper surface is standard USAF SE Asia scheme of dark green, medium green and tan with pale grey undersurface. Serial is black. Squadron insignia on fin is pale blue and white. Black engine nacelle, except for pale grey undercarriage doors. Small national insignia.



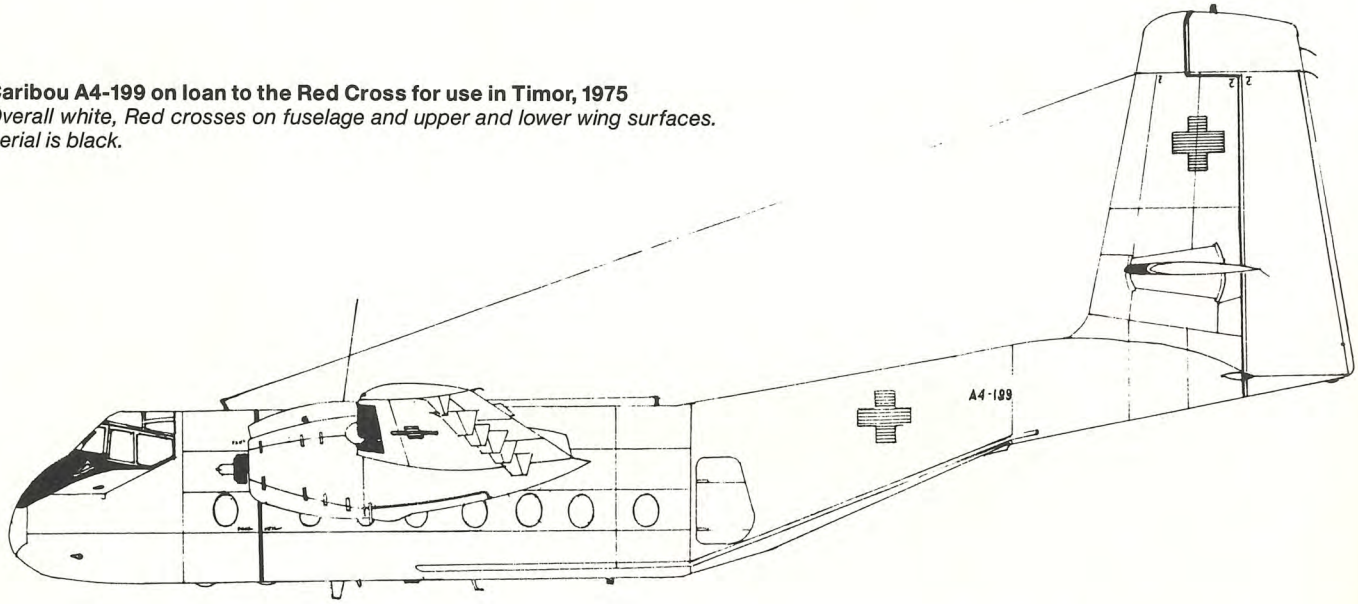
Caribou A4-264 loaned to the United Nations Military Observer Group (UNMOG)
In the Pakistan/Kashmir region border zone. Overall white. Lettering on fuselage sides and UN symbol on fin are pale blue. Serial is black.



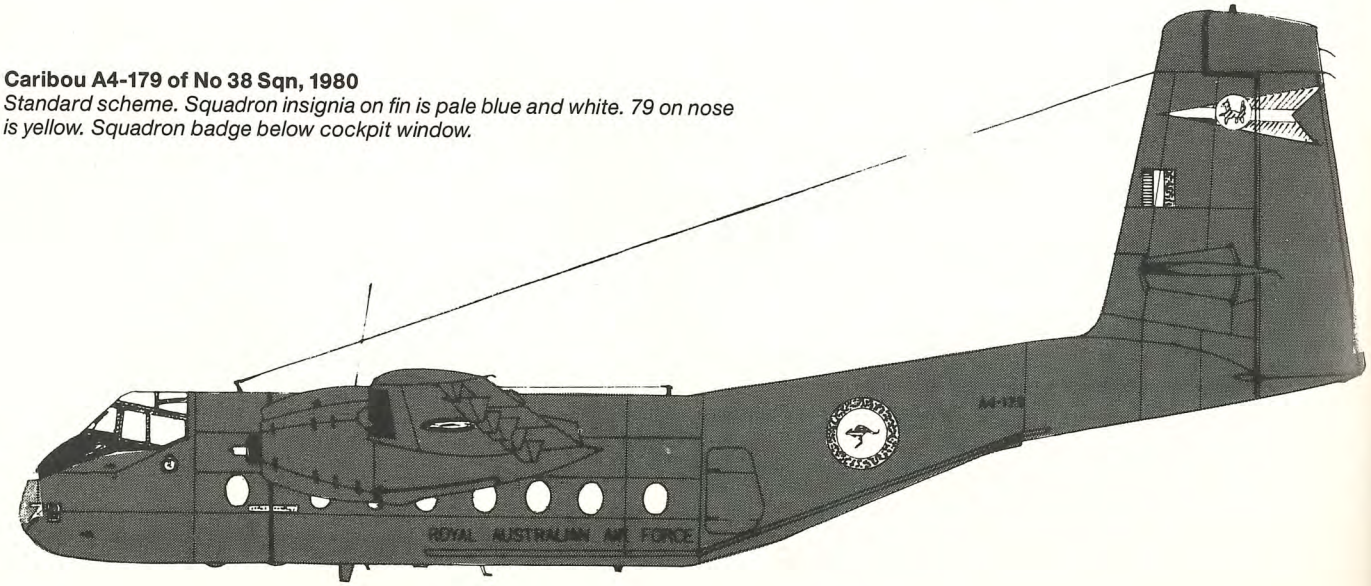
Caribou A4-199 loaned to the United Nations for use by UNMOG, 1975
Overall white. Lettering, UN symbol and serial are black. Propeller warning strip is red.



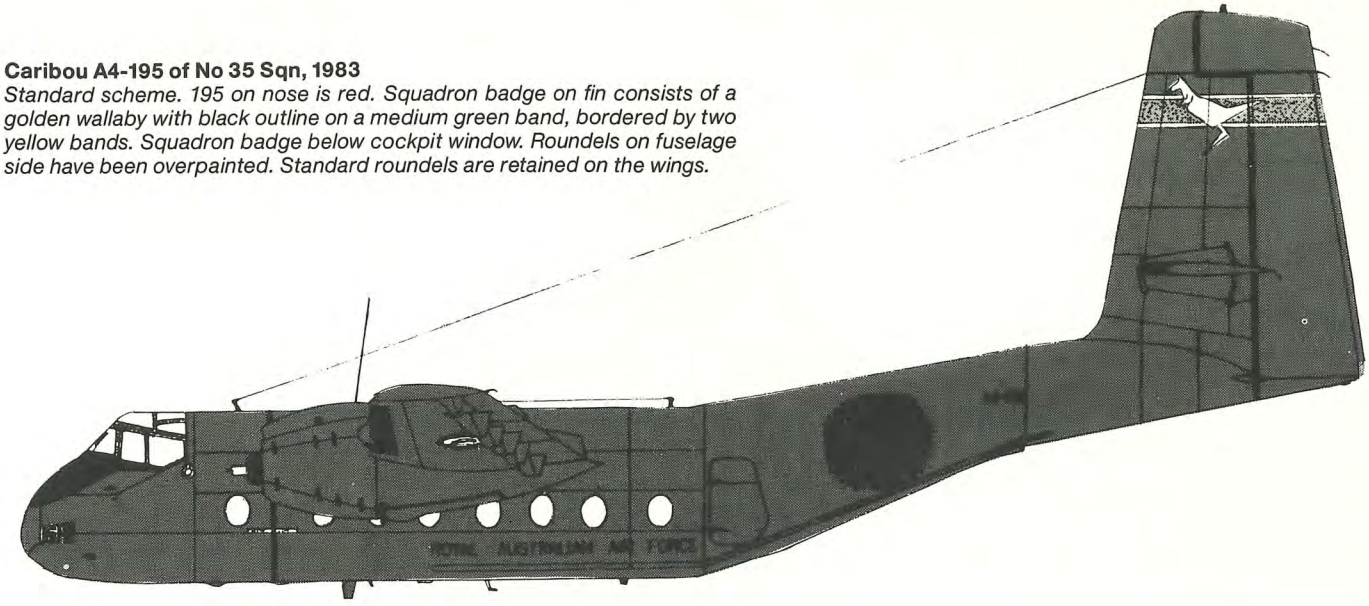
Caribou A4-199 on loan to the Red Cross for use in Timor, 1975
Overall white, Red crosses on fuselage and upper and lower wing surfaces. Serial is black.



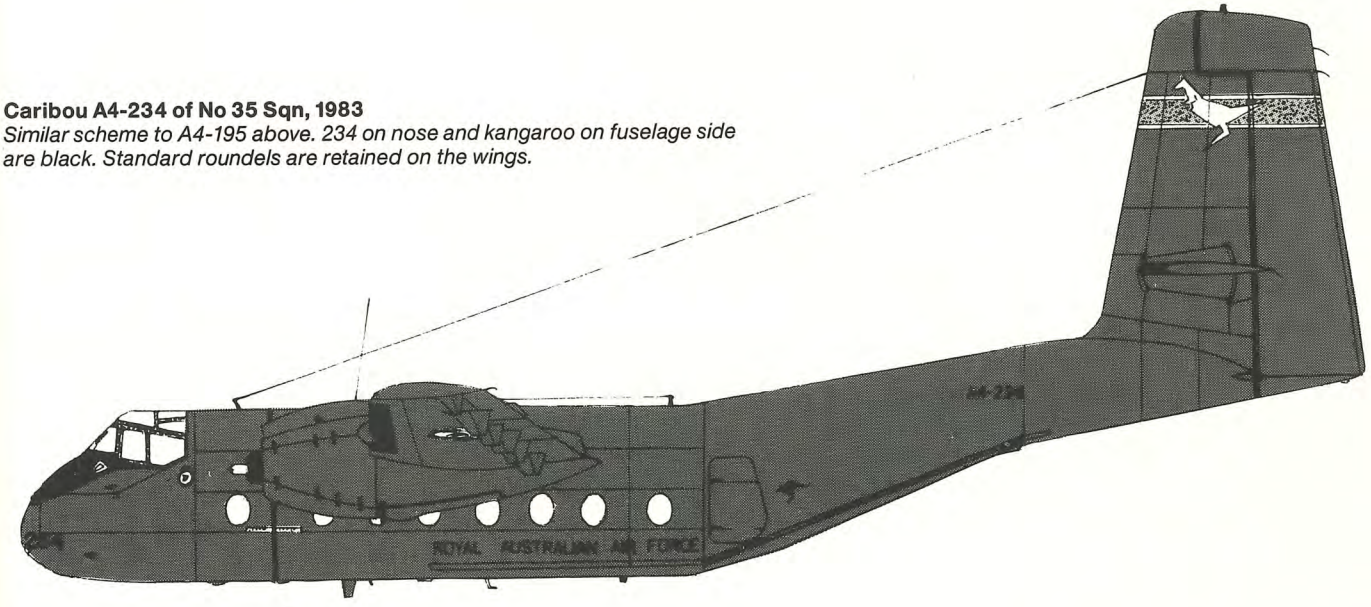
Caribou A4-179 of No 38 Sqn, 1980
Standard scheme. Squadron insignia on fin is pale blue and white. 79 on nose is yellow. Squadron badge below cockpit window.



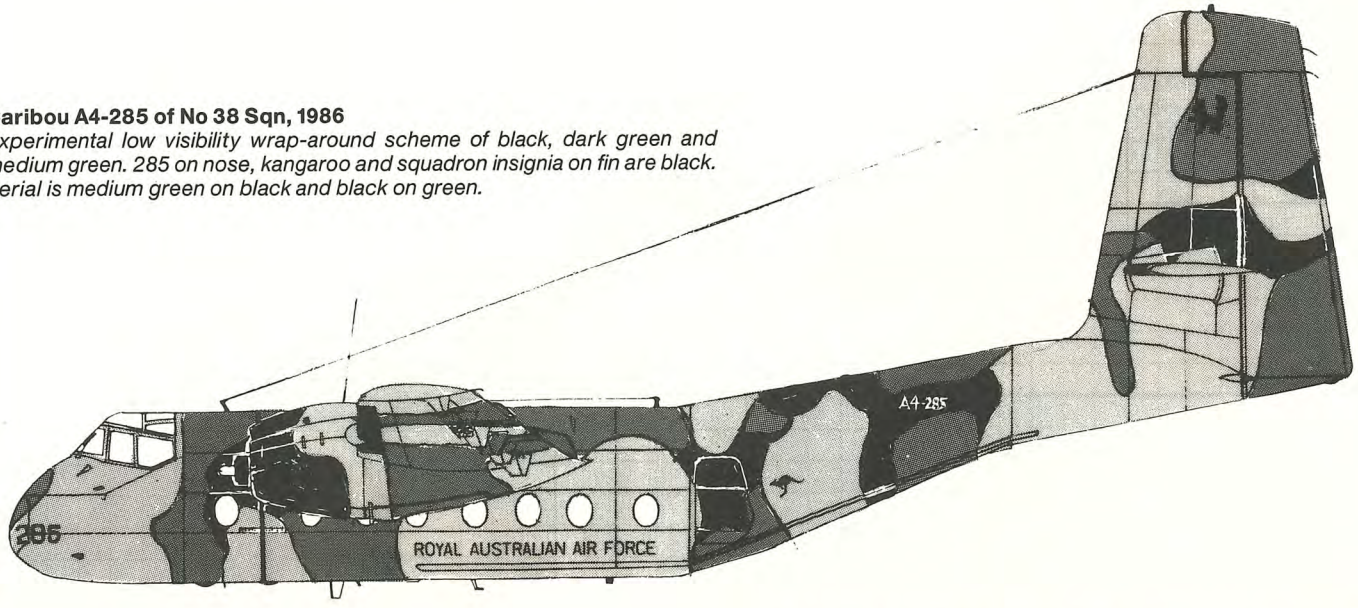
Caribou A4-195 of No 35 Sqn, 1983
Standard scheme. 195 on nose is red. Squadron badge on fin consists of a golden wallaby with black outline on a medium green band, bordered by two yellow bands. Squadron badge below cockpit window. Roundels on fuselage side have been overpainted. Standard roundels are retained on the wings.



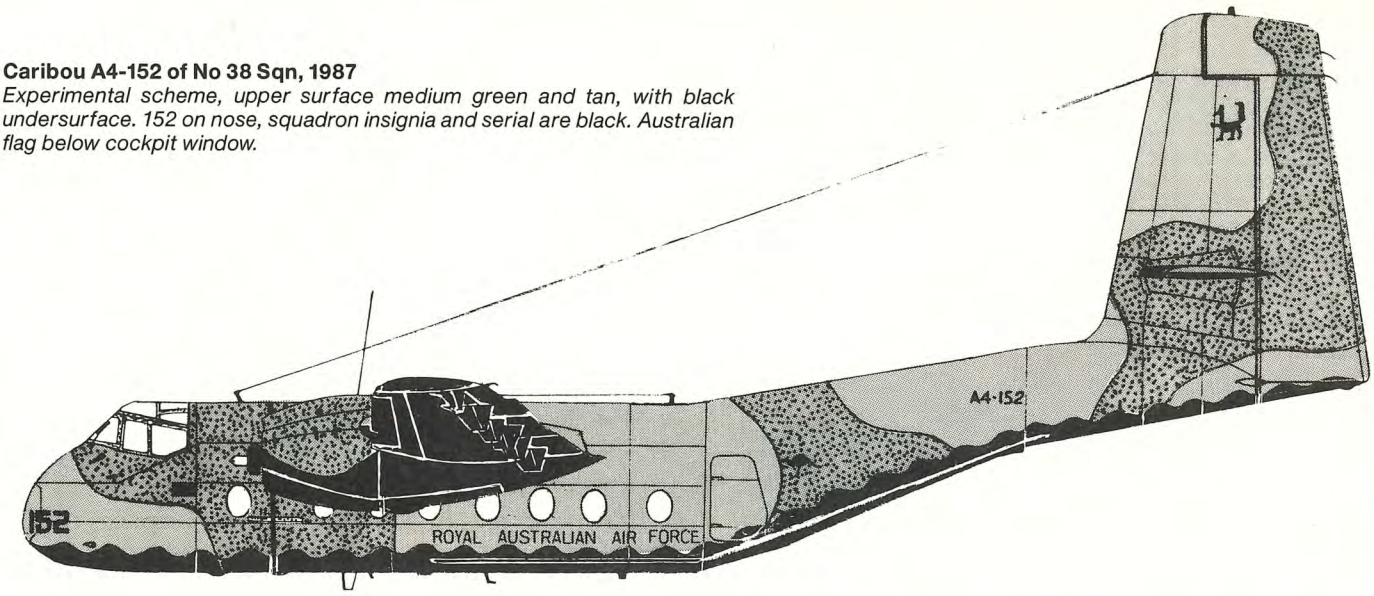
Caribou A4-234 of No 35 Sqn, 1983
Similar scheme to A4-195 above. 234 on nose and kangaroo on fuselage side are black. Standard roundels are retained on the wings.



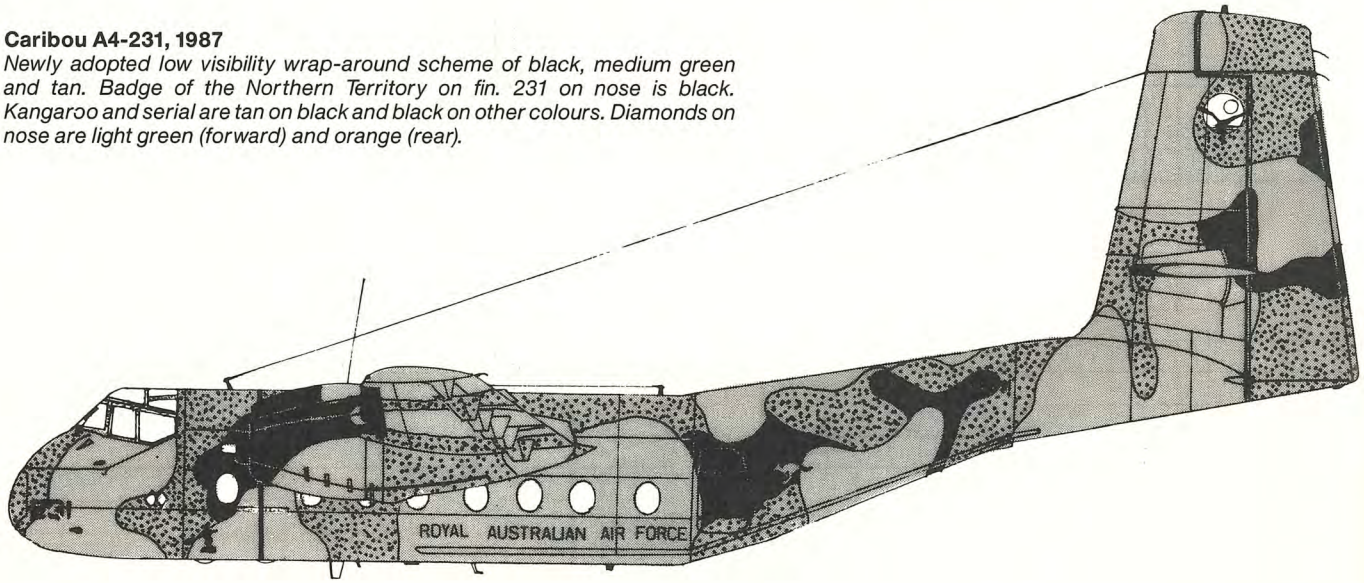
Caribou A4-285 of No 38 Sqn, 1986
Experimental low visibility wrap-around scheme of black, dark green and medium green. 285 on nose, kangaroo and squadron insignia on fin are black. Serial is medium green on black and black on green.



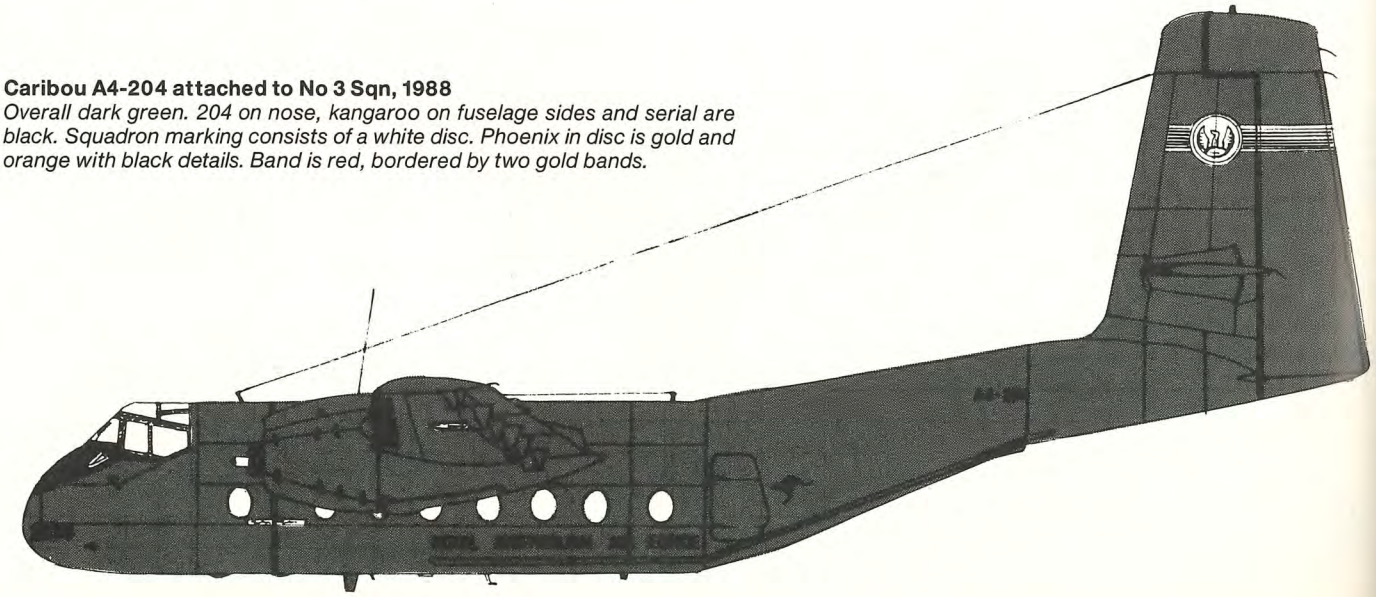
Caribou A4-152 of No 38 Sqn, 1987
Experimental scheme, upper surface medium green and tan, with black undersurface. 152 on nose, squadron insignia and serial are black. Australian flag below cockpit window.

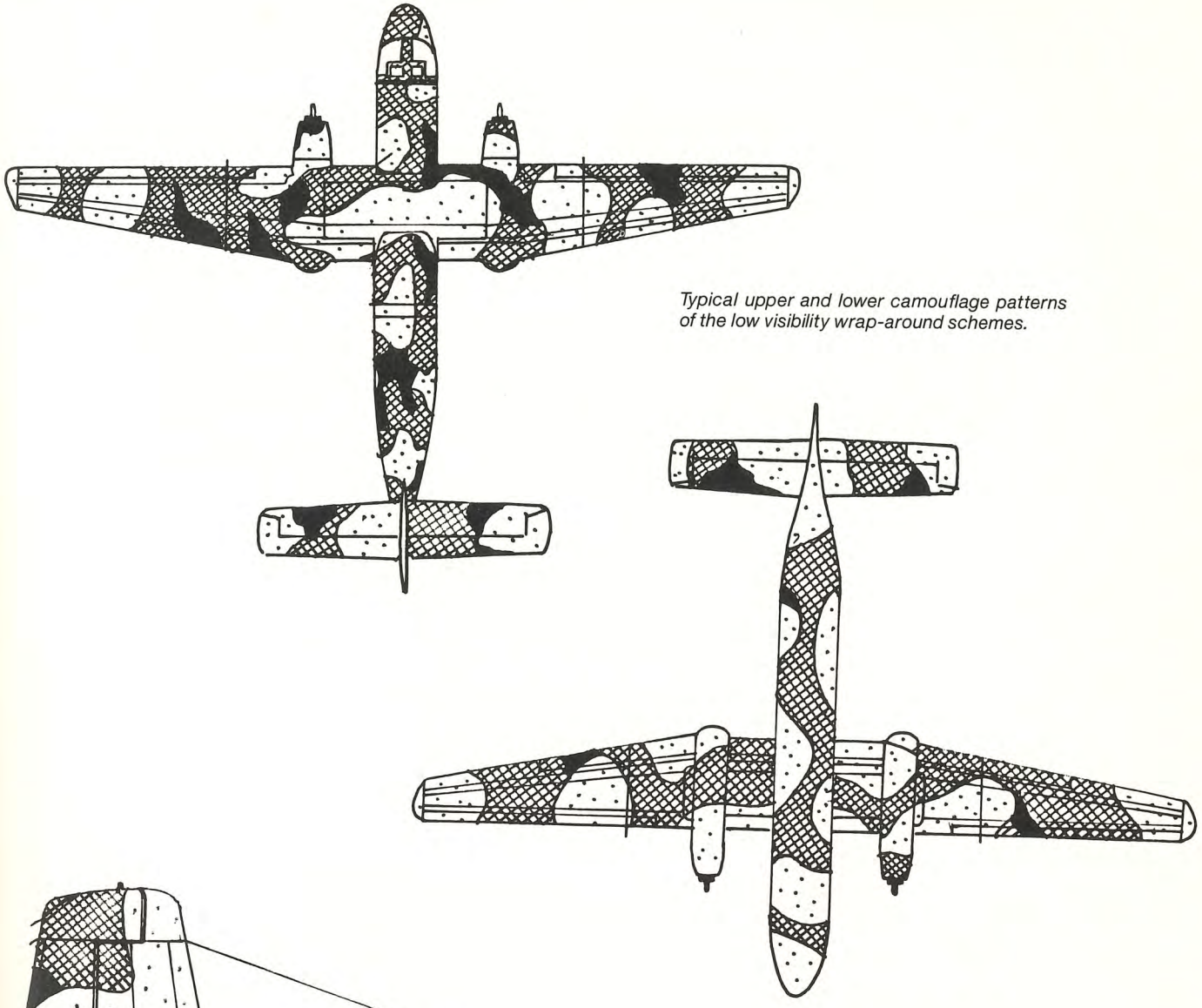


Caribou A4-231, 1987
Newly adopted low visibility wrap-around scheme of black, medium green and tan. Badge of the Northern Territory on fin. 231 on nose is black. Kangaroo and serial are tan on black and black on other colours. Diamonds on nose are light green (forward) and orange (rear).

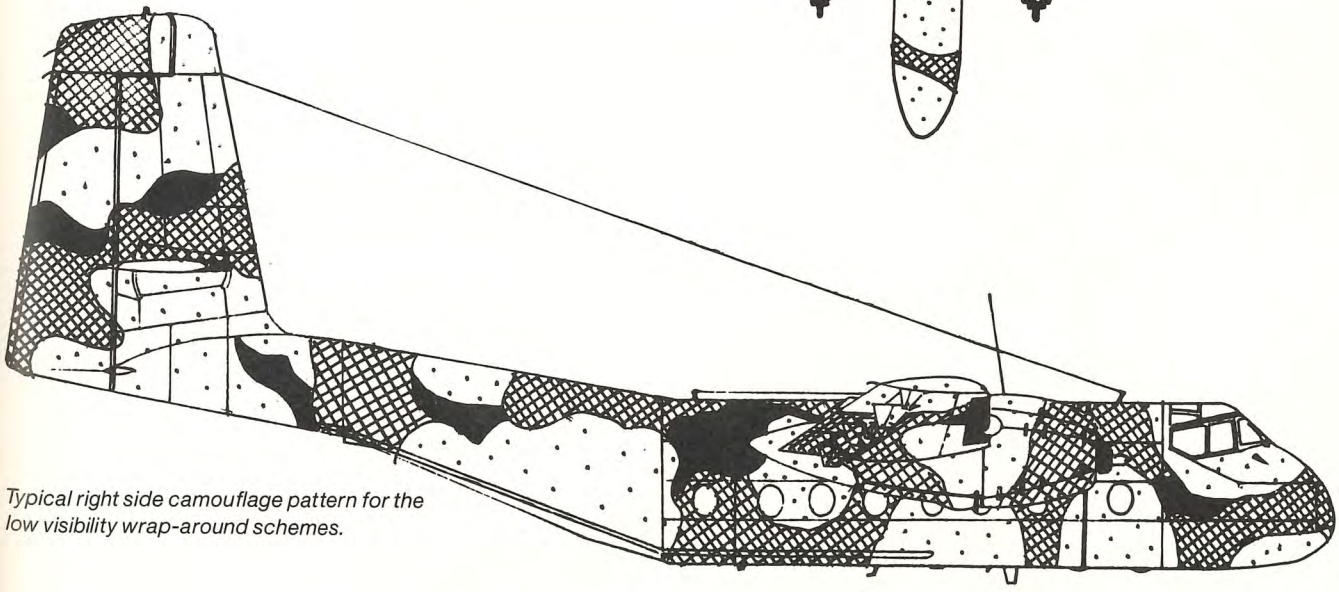


Caribou A4-204 attached to No 3 Sqn, 1988
Overall dark green. 204 on nose, kangaroo on fuselage sides and serial are black. Squadron marking consists of a white disc. Phoenix in disc is gold and orange with black details. Band is red, bordered by two gold bands.

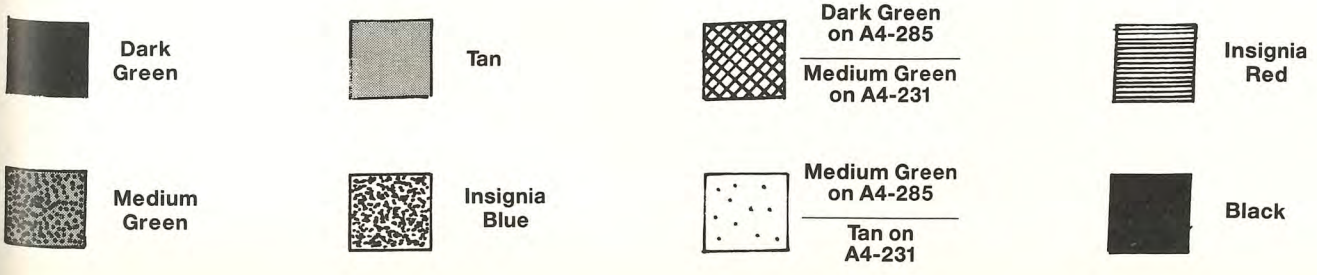




Typical upper and lower camouflage patterns of the low visibility wrap-around schemes.



Typical right side camouflage pattern for the low visibility wrap-around schemes.









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