### SOUTH AUSTRALIAN AVIATION MUSEUM

## SIGNIFICANT AIRCRAFT PROFILES

# LOCKHEED CONSTELLATION

In 1939, the brilliant but equally eccentric Howard Hughes was asked by Jack Frye, president of TWA (Transcontinental & Western Air), to join the airline's board. Hughes was able to bring financial security to TWA and, interestingly, he'd had previous involvement with aircraft manufacturer Lockheed in whose aircraft he had made a number of record breaking flights. Hughes quickly gained a majority stock holding in TWA and, with Frye, approached Lockheed with a design concept including the following:

- A four engine aircraft carrying 40 passengers, cruising at 300kt (555km/h, 335mph) at an altitude of 22,000ft (6,700m) and a range of 3,000 nm (5560km);
- Air conditioning and pressurisation;



Howard Hughes seen here in a Constellation cockpit. As a major shareholder in TWA, he was influential both financially and innovatively in the aircraft's development. [Photo – The World's Great Airlines]

- Power boosted flight controls to reduce pilot fatigue. Lockheed engineers had spent a number of years developing and perfecting the system, resulting in the Constellation being the first commercial aircraft to be so equipped;
- The triple tail design was low enough to enter the hangars then in use.

Lockheed commenced design work in June 1939 on what became known as the Model 49, soon to be named *Constellation*, and produced an aircraft with such classic lines that, for decades, has had few matching or comparable competitors. Lockheed chose the Wright Cyclone R-3350 C18/2, 200hp, 18 cylinder engine as the aircraft's power plant, which necessitated the use of a large, three blade propeller with a diameter of 4.62m/15ft 22in. To avoid long undercarriage legs and allow sufficient propeller ground clearance, the aircraft's nose was curved downwards; but even so the nose wheel well leg length was 2.75m/9ft. Consequently, no two bulkheads were the same due to the continuous curvature throughout the length of the fuselage. Conversely, Chance Vought overcame long undercarriage legs due to a large diameter propeller in its F4U Corsair by cranking the aircraft's wings. Another interesting feature of Model 49 was the wing construction based on Lockheed's P-38 Lightning fighter, which first flew in January 1939. In addition, Fowler flaps that extended from the trailing edges and increased the wing area were integrated

into the design, having previously been incorporated in both the Lockheed Hudson and P-38 Lightning.

With the outbreak of World War II, the Constellation's debut as a commercial passenger aircraft was delayed as future production would be designated the C-69 and destined for the United States Army Air Force (USAAF). The first prototype flew One of the young in January 1943. aeronautical engineers on board that day, "Kelly" Johnson, later created the famous "Skunk Lockheed Works" that conceptualised and developed a number of aircraft, including the P-80 Shooting Star, F-104 Starfighter, U-2 spy plane, and the SR-71 Blackbird strategic reconnaissance aircraft.

In April 1944, in what could best be described as a promotional venture, Hughes and Frye flew a C-69 from Burbank, California, to Washington DC in 6 hours, 57 minutes: 2,300mi (3,700km) at an average speed of 330mph (545km/h). Hughes annoyed the military by enhancing the



The first Qantas L749 Constellation to arrive in Australia, VH-EAA "Ross Smith" in Oct 1947. Prominent is the 2.75m (9ft) nose wheel leg. Later converted to L749A and eventually sold to BOAC in 1955. [Photo – From The Longest Hop]

aircraft in TWA livery and taking along his current girl friend, film star Ava Gardner. On the return flight, Hughes and Frye stopped at Wright Field, near Dayton, Ohio, and took Orville Wright for a short flight.

By the end of the war, 22 C-69 aircraft had been constructed. Lockheed continued to develop the Constellation, with production ceasing in September 1959. By that time, a total of 856 aircraft, including military derivatives, had been built. Following WWII, TWA bought back from the government as many C-69s as possible, converting them to reflect the TWA image, both internally and externally. After the long disruption of the war, TWA launched its first trans-Atlantic flight. On 3 December 1945, a L-049 Constellation departed Washington DC, arriving in Paris almost 15 hours later. Many others were to follow.

In the aftermath of WWII, the Qantas aircraft fleet was in a poor state due to the huge demands that had been placed upon the airline. The pre-war fleet of Short Empire flying boats had been reduced to one aircraft by 1945. In order to resume the Australia/Britain air service, Qantas and BOAC (British Overseas Airways Corporation) operated Avro Lancastrians (Lancasters converted to carry six/nine passengers) and Short Hythe flying boats (converted from MKIII Sunderlands). Qantas crew operated Lancastrians between Sydney/Karachi return, with BOAC crew on the Karachi/London sectors. The inaugural westbound service commenced on 2 June 1945. The slower Hythes, carrying up to 16 passengers, took a week to operate the Sydney/London route, as opposed to three days for the Lancastrians.



Qantas L749 "Harry Hawker", one of four initially ordered by the airline. Delivered in October 1947, the Constellations soon proved their value. Qantas operated 16 Constellations and Super Contellations over a 16 year period. [Photo – From the Dawn of Aviation, The Qantas Story 1920-1995]

At this time, the British and government BOAC attempted to coerce Qantas into "buying British", BOAC 50 being а per cent shareholder in Qantas. Britain had built two prototype aircraft. the Saunders Roe Princess flying boat and the land-based Bristol Brabazon, neither of which went into commercial production. Another two aircraft being developed were the jet engined de

Havilland Comet and turboprop powered Bristol Britannia, although the Comet did not enter service until 1952 and the Britannia in 1957. BOAC, however, with British government backing, pushed Qantas to consider another type, the Avro Tudor II. In late 1944, BOAC, Qantas and South African Airways had agreed to standardise on the Tudor II. But the aircraft suffered from being overweight and failed to meet design performance levels, with the result that none of the three airlines ordered the Tudor II.

In the early post WWII period, Qantas sent senior pilots and technical staff to the United Kingdom to analyse and evaluate the aircraft being proposed for Australia. The reports were not encouraging. Qantas wanted an aircraft that could fulfil its immediate requirements, leading decision-makers to one in particular, the US built Lockheed Constellation. Lockheed had begun the design work on the L-049 in 1939 and by 1947 had developed the long range L-749. Accordingly, in September 1946, the Australian Government gave Qantas approval to purchase four L-749 Constellations, later increased to

six.<sup>1</sup> The decision reflected Qantas' ability to accurately assess the technological and commercial capability of the aircraft on offer and to resist the political pressure being applied by Britain. Qantas would have aware that been KLM (Royal Dutch Airlines) was operate planning to Constellations on the Netherlands/Batavia route



L749 Constellation VH-EAF "Horace Brinsmead", one of two purchased from Air India in 1950 and 1951 due to fleet expansion needs. In this photograph, the curved fuselage and cabin portholes show up to good effect. Also of interest is the metre high mesh security fence in the foreground – reminiscent of a previous era.

[Photo – From the Dawn of Aviation, The Qantas Story 1920-1995]

<sup>&</sup>lt;sup>1</sup> Qantas initially ordered four L749 Constellations, arriving Sydney in October 1947. However, within a short time it was realised that two additional aircraft were required. Difficulties with funding arrangements had to be overcome before Qantas was able to purchase the aircraft from Air India. The aircraft arrived in January 1950 and April 1951.

with extension to Australia.

Qantas' first L-749 (VH-EAA Smith) arrived Ross in Sydney on 3 October 1947 and on 1 December the operated first Constellation service to 29 London. carrying passengers. The passenger cabin was configured to carrv 38 first class passengers, with а Sydney/London one-way fare costing £325 and a return fare £525, the equivalent in 2014 dollars of \$33,415 \$20,685 and



Qantas L749 Constellation "Lawrence Hargrave" in an almost all-metal livery. Visibly below the fuselage is the detatchable speedpack container that could carry up to 3,725kg/8,200lb of cargo. [Photo - From the Dawn of Aviation, The Qantas Story 1920-1995]

respectively. The average wage at the time was £7 a week! To increase freight capacity, a Speedpack freight container was designed to attach to the aircraft's lower fuselage. With an internal volume of 11.3m<sup>3</sup> (400cubft), it could carry up to 3,725kg (8,200lb) of freight. Elapsed time was just under four days, with overnights in Singapore and Cairo and in the air. Initially, the Kangaroo Route, as it had now become known, operated monthly but quickly increased to three a fortnight then, from October 1945, to twice weekly.

With the arrival of the Constellation, Qantas introduced two new categories of crew: flight engineers and a flight hostess, the latter being a much coveted position. Only nine positions were available for the role of "hostess" on board Qantas aircraft, as the airline continued the practice of employing flight stewards to perform most of the duties in the cabin through until the 1980s. Even so, the airline received some 2,000 applications for those nine positions such was the status and prestige of the role with the women chosen to be, quite literally, the hostess, the lady, on board. The crew complement comprised three pilots, two flight engineers, one navigator, one radio operator and three cabin crew. Duty periods were rostered up to 24 hours, which the captain could extend to 30 hours if operationally necessary, with crew members rotating rest breaks throughout the tour.

Today's modern jet aircraft are usually crewed by 2-3 pilots. Flight engineers, radio operators and navigators have been replaced at "the sharp end" by technology, although, until the early 1960s, into the jet era, Qantas retained navigators. Constellations operating the Kangaroo Route flew over vast tracts of ocean and landmass devoid of any navigation aids. To plot the aircraft's position at night, the navigator used a sextant to read the angles between the stars in relation to an artificial horizon, and then checked them according to the recorded time of the observations against tables to obtain position lines. The small triangle resulting from intersecting position lines from three star shots determined the aircraft's position; under good conditions it was accurate within five nautical miles (nine km approx). During daylight, the navigator would take a sun sight or use the moon or one of the planets if visible. From these readings, he would check the position against the planned course, advising any necessary correction. If neither sky nor ground were visible, the

navigator would plot a course by dead reckoning (DR). Allowing for the effect of forecast winds on the aircraft's speed and heading, he would confirm the DR position with the first visual sighting.



The Wright R-3350 Cyclone twin row, 18 cylinder radial engine. Providing a huge power output, the engine was not without its problems, requiring close monitoring. Nevertheless, Qantas was still able to maintain a reliable schedule. [Photo – From High Corridors]

One shortcoming arose from the high failure rate of the Constellation's Wright Cyclone engines, with aircraft often being stranded somewhere 'up the track' between Sydney and London. To address the problem, Qantas positioned 20 engines at various locations along the Kangaroo Route. It was not uncommon at enroute stops for ground engineers to change spark plugs and, at times, cylinders. Initially, Liberators were used to transport engines until Qantas modified a Lancastrian to carry an engine in a purpose built pod beneath the fuselage. These logistical efforts were rewarded as the Kangaroo Route grew in popularity. Average sector times were around ten hours, compared to today's jet sectors of some 15 hours Adelaide/Dubai, or Hong Kong/Adelaide in nine and a half hours. The significant difference, of course, was the multiple sectors flown by the Constellations.

Re-equipping with Constellations saw an expansion of Qantas engineering and overhaul workshops at Mascot

Airport in Sydney. Engineering staff had gained experience working on US aircraft during the war; but the arrival of the Constellations took technical knowledge to another level. The L749's features included advanced automatic pilot, gyroscopic compass and full feathering and reversing props. It was the first commercial aircraft equipped with power assisted flight controls, requiring duplicated hydraulic systems backed-up by electrical pumps. Another first for Qantas was the aircraft's pressurisation system. Its control unit was built by US firm, Bendix, and normally was returned to them for repair/overhaul. To avoid this lengthy process, Qantas' instrument workshop analysed the units and eventually was able to perform the work in-house.

Throughout 1952, Qantas converted its L749s to 749A standard by reinforcing the wing centre section and adding new undercarriage. The Constellation's MTOW (Maximum Take Off Weight) had increased to 48,600kg (107,000lb), cruising speed at 18,000ft was 230kt (442km/hr, 267mph), with a range of 2,650nm (4,900 km, 2,960m). Some of the 749As

were later converted to carry 60 passengers when Qantas introduced tourist class in April 1954.

In 1950, Qantas L749s began operating the Wallaby Route to Johannesburg, South Africa, via Mauritius, with a weekly schedule. As 749As became available in November 1954, they were used on the Cherry Blossom Route from Sydney to Tokyo, replacing the original DC-4 Skymasters and then DC-6s, the latter on charter from TEAL (Tasman Empire Airways Ltd). In February 1954, Qantas Constellation VH-EAF was temporarily removed from international flying to operate as a VIP aircraft for the Royal Tour of Australia.

From the early 1950s, Qantas was contemplating a future replacement aircraft for their L749As, posting senior engineering and operations staff to the US to observe developments. Qantas decided to stay with Lockheed and its latest Constellation variant, the L1049 Super

Constellation. The aircraft, they felt, would facilitate their planned expansion and take the airline through to the jet era in 1959-60. Once again, Britain placed political pressure on Australian decision-making, pushing the de Havilland Comet as the preferred option. Inopportunely, during the assessment period, a series of fatal Comet crashes exposed a structural fault in the aircraft's design.



Qantas Super Constellation VH-EAD "Southern Dawn". Delivered in Nov 1955 as an "E" model, the aircraft was upgraded to "G" standard in 1958. This included the fitting of weather radar and wingtip tanks. [Photo – From High Corridors"]

The Super Constellation evolved from Lockheed's desire to stretch the L749 model. In the late 1940s, Lockheed bought back the original L049 that had been sold to Howard Hughes and began converting the aircraft into the L1049 Super Constellation prototype that first flew in October 1950. More than 550 design improvements were made, most notably the 5.62m (18ft 5in) lengthening of the fuselage and enlarged tail surfaces, along with the strengthening of the wing structure. When the first production L1049 flew, other modifications had been made, including enlarged rectangular windows in the cabin that increased visibility by 85 per cent, and larger cockpit window panel size. New de-icer boots were fitted to the wing leading edges and fixed tail surfaces. Fuel capacity increased to 24,800l (6,550 USgal) with the addition of a seventh centre wing tank, an increase on the L479s six tanks, giving a range of 5,150ml (8,290km). The majority of L1049s were powered by the Wright turbo compound Cyclone R-3350, developing 3,250hp. Exhaust gases from six of the 18 cylinders flowed through three ram air-cooled turbines, providing added power to the propeller shaft and resulting in a 15 per cent reduction in fuel consumption. Cruising speed was about 290kt (550km/h, 320mph).

The US military were first to the use the turbo compound in their version of the Super Constellation. Not until 1953 did this power plant become available for commercial use in the L1049C model. Qantas initially ordered five of the type with the first, VH-EAG Southern

*Constellation,* arriving in March 1954. By November 1955, Qantas had sold off its L749s, eventually operating a fleet of 16 Super Constellations. The aircraft could carry up to 80 passengers in an all tourist class cabin, although Qantas L1049C cabins were usually configured to about 27 deluxe/30 tourist passengers.



L1049C Super Constellation VH-EAG "Souther Constellation" about to depart on the inaugural Sydney-San Francisco service on 15 May 1954. The route soon became popular, with Pan Am flying the DC-7C in competition. [Photo – From The Dawn of Aviation , the Qantas Story 1920-1995]

short period had increased to three flights/week. August 1954, Super In Constellations began taking over the Kangaroo Route and in 1955 services to Tokyo and Johannesburg, followed by Hong Kong from January 1957. On the Kangaroo Route, Qantas introduced a twin cabin service of first and tourist class, although the Saturday departure remained one class, the Connoisseur Service, as the flight carried mostly government and business travellers.

L1049s were proving their worth when figures for 1956 reveal 44 per cent of passengers travelling on the Kangaroo Route were tourist class, an unimaginable ratio in the years before and immediately after WWII. Overall passenger numbers were also up 30 per cent on the previous year. Similarly, the Southern Cross Route increased by a 50 per cent, while revenue on the South African service rose by 42 per cent. To cater for the demand, Qantas increased flight frequencies on the Sydney/London and Sydney/San Francisco services to four/week.

By the end of 1955, Qantas had 12 Super Constellations, either L1049C or L1049E

With the acquisition of the Super Constellations. Qantas looking was to expand its services. particularly on the Southern Cross Route to the west coast of the US. Qantas was seeking to compete with Pan Am's DC-7s over the route and in May 1954 launched the inaugural Sydney/San Francisco service with а Super Constellation. The service proved popular and within a



L1049H Super Constellation VH-EAM, a type of which Qantas operated two. A large rear cargo door contained a smaller passenger door. A strengthened floor allowed the aircraft to operate in either passenger or freighter configuration. Qantas used four Constellations in their latter years between Sydney and London to carry express freight.

[Photo – From High Corridors]

models, the former having been upgraded to "E" standard with some bunks, an improved galley and toilet upgrades and the latter to L1049G standard by strengthening the floor in the forward freight compartment to increase freight uplift from 5,000lb (2,270kg) to 9,000lb (4085kg). A section of the forward cabin floor was also strengthened to allow a loading of 100lb (45kg) per square foot to cater for heavy freight as required.

With further route expansion forecast, Qantas ordered another four Super Constellations. The addition of two "H" models in late 1956 and two "G" models in late 1957 brought the total to 16 Super Constellations. Qantas was the first airline to order the 'H" model, which was configured as a freighter/passenger type with a strengthened floor and a large aft cargo door. Qantas later converted two of the "G" models to "H" standard to operate a Sydney/London all freight service.



L1049G Super Constellation VH-EAO on arrival Sydney in Oct 1957. It was the first Constellation in the Qantas fleet fitted with wingtip fuel tanks. Holding 600gal/2,270Lt, they extended the aircraft's range our to 3,470nm/6,430km. VH-EAO's flight time Honolulu-Sydney was 22 hours 18 min – a record at that stage.

[Photo – From High Corridors]

September 1956, the Australian In Government gave Qantas approval to purchase seven Boeing 707-138 jet aircraft, with delivery about mid 1959. Qantas confirmed that it would continue with the Super Constellations through to this date but would equip all of the aircraft with nose mounted weather radar and fit wing tip fuel tanks to the five Constellations flying across the Pacific to improve operating range. A comparison of the L1049 and the proposed B707-138 reveals similarities and differences. Length and wingspan were not dissimilar, so too range, ie about 3,500m (5,818km, 3,140nm), and also payload of 34,000lb (15,436kg). The differences were, of course, the Constellation's cruising speed of 280mph (465km, 250kt) versus the B707's 550mph (925km, 500kt) and the cruising altitude of the two aircraft: the Constellation at 20,000ft (6,096m) and the B707 at 35,000ft (10,500m).

Accordingly, flying time between Sydney/London via the Middle East was reduced from 50 hours to 31 hours.

Apart from the obvious route expansion, other considerations had come into play in this period. Despite the Kangaroo Route's popularity, the flight path crossed several politically unstable countries. Tensions in the Middle East were inflamed in 1956 when Egypt nationalised the Suez Canal. Israeli forces invaded Sinai and a combined British/French force blockaded the canal. To avoid Cairo, a slip port on the route, Qantas rescheduled its flights through Iran, Turkey and Greece. With the shooting down of MH17 some 60 years later, it seems little has changed. In addition, riots over independence in Singapore and Malaya saw Qantas passengers taken to their hotels in armed convoys and, in Indonesia, two aircraft were stranded in Djakarta due to strike action. Among this mayhem, a Qantas Constellation

carried the Olympic flame from Athens to Darwin, then on to Melbourne for the XVI Olympic Games. During this intense period of passenger traffic, there were times when every Qantas Super Constellation was in the air simultaneously.

In 1957, after successful negotiations with the US Government, Qantas gained approval to operate across the US and the Atlantic to London, the airline effectively then offering a round-the-world network. On 14 January 1958, two Super Constellations departed Melbourne, following an official ceremony hosted by Qantas founder, Sir Hudson Fysh, for some 300 guests. The aircraft flew to Sydney for another farewell function then, after takeoff, orbited the city before parting to track east and west on their separate courses. VH-EAP headed west to London via Djakarta, Singapore, Bangkok Calcutta, Karachi, Bahrain, Athens and Rome. VH-EAO flew eastward to London via Fiji, Honolulu, San Francisco and New York. From London, both aircraft continued onwards, arriving back in Sydney on 20 January 1958. Although regarded as a major achievement, the route across the US, like the South African operation, did not prove successful, being profitable only as far as San Francisco.



Qantas Super Constellation L1049H VH-EAM "Southern Spray" was the first of a type to be fitted with AVQ10 weather radar in early 1957. Ranges could be adjusted to 150, 50 or 20 miles (250/85/33km) in flight. The "Super Connie", one of two "H" models, was configured as a freighter/passenger aircraft with a large cargo door positioned on the aft port side.

[Photo – From Airlines in Australian Service Vol 2]

The Super Constellations' popularty was reflected in the 1958 statistics: of the nine international airlines operating into Australia, Qantas carried just under a third of all passengers and almost half of the freight and mail. That Qantas could achieve such results, despite the ongoing problem of the Constellation engines, is testament to the efforts of the flight crew and engineering staff. After the acquisition of the B707 jets,

Captain Bert Ritchie, former pilot and then CEO, commented on the comparative engine performance of the Pratt & Whitney JTD-7 jet engine and the Wright turbo compound R-3350. During 1958, their last full year of service, the Super Constellations underwent 58 unscheduled engine changes en route compared with three for the B707 jet fleet in 1963. A total of 71 R-3350 piston engines were removed and completely overhauled at the Sydney workshops, as opposed to none of the JTD-7s. Moreover, there had been 136 engine shutdowns during flight for the Super Constellations and only 13 on the B707. Other major considerations were the huge cost of the engineering delays and the subsequent flow-on effect of accommodation and rescheduling, as well as the need to carry a large inventory of aircraft components.

An engine failure in VH-EAC (L1049E Super Constellation *Southern Wave*) in August 1960 resulted in the loss of the aircraft. On a return flight from Johannesburg, the aircraft had commenced its takeoff run from Mauritius when the No 3 engine failed. The aircraft ran off the end of the runway before it could be halted, incurring substantial damage before being

destroyed by fire. Fortunately all 12 crew and 38 passengers were evacuated without serious injury.

1959 marked the end of the era of the Super Constellations. In that year, the first of seven Boeing B707-138 jet aircraft arrived in Sydney in July and four Lockheed L188c Electra turbo prop aircraft in November/December. By early 1960, nine of the Super Constellations had been disposed of, while other Constellations were redeployed. Malayan Airways and TEAL each operated two Constellations under charter for a period of time. Commencing in December 1960, Qantas Electras and those operated by Ansett ANA and TAA were recalled to Lockheed in the US to undergo strengthening modifications. To cover their absence, Qantas leased back for six months one of their L1049s, VH-EAJ, that had been traded to Lockheed. Qantas operated three L1049H models, with strengthened floors and large aft cargo doors, on a Sydney/ London express cargo service until 1963.

In May of that year, the last Super Constellation, VH-EAG departed Sydney for its new owners, so ending a 16-year association with Qantas. The aircraft's Wright R-3350 turbo compound engines remained a constant challenge, a problem that was never resolved. Credit must go to the Qantas pilots and flight and ground engineers responsible for their

operation and maintenance. As one wag said: "It was the best four engine tri motor aircraft ever built". Even so, the Constellation and Super Constellation, with their speed and long range, were ideally suited at that time to connect Australia to far-off destinations. Constellations were not hostage to the vagaries of weather and the hazards of water takeoff and landing like the earlier Empire flying boats. The era



Super Constellation VH-EAG was the first L1049 to enter the Qantas fleet in April 1954 and the last to depart on 3 May 1963. The L1049 introduced both larger rectangular passenger windows and increased cockpit pane size. [Photo – From The Dawn of Aviation , the Qantas Story 1920-1995]

of the Constellations, between those leisurely flying boats and the jet age, saw them carry the first tourist (later economy) class passengers, a concept that was greatly expanded by the B707, B747 and A380. A generational aircraft, its advanced features and stylish design remain a classic even today.

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	<b>L749A CONSTELLATION</b>	L1049C SUPER CONSTELLATION
Span	37.52m (123'0")	37.52m (123'0")
Length	28.98m (95'2")	34.64m (113'7")
Height	6.84m (22'5")	7.55m (24'9")
Wing area	153.45m² (1650sq ft)	153.45m² (1650sq ft)
Powerplant	Wright R3,350 C-18 BD-1	Wright R-3350 972 TC-18DA-1
	developing 2500hp (1875kW)	developing 3250hp (2435kW)
Fuel capacity	21,934 I (5795 US gallons)	24,603 I (6500 US gallons)
Max speed	301kt (558km/h)	326kt (603km/h)
Cruising speed	239kt (442km/h)	291kt (539km/h)
Initial rate of climb	1,620ft/min	1,125ft/min
Service ceiling	27,300ft (8327m)	27,600ft (8418m)
Range	2647nm (4907km)	4288nm (7948km) (full fuel,
	(with reserves)	no reserves at 10,000ft)
Max takeoff weight	48,578kg (107,000lb)	61,290kg (135,000lb)
Max landing weigh	t 40,633kg (89,500lb)	49,940kg (110,000lb)
Max zero fuel weig	ht 39,255kg (86,464lb)	46,989kg (103,500lb)
Passengers	38 all first class or	Deluxe 27 plus
223) 101	60 all tourist	tourist 30
Crew	10	10-12

### SPECS FOR QANTAS LOCKHEED L749A & L1049C CONSTELLATIONS

#### **BIBLIOGRAPHY**

Eric Allen, Airliners in Australian Service, Vol 1, 1995

Eric Allen, Airliners in Australian Service, Vol 2, 1996

Samuel Brimson, The Worlds Great Airlines, 1989

John Gunn, High Corridors, 1988

Michael Prophet, The Lockheed Constellation, www.michaelprophet.com/

Margaret Robinson, Qantas Cabin Crew and Their Union, PhD Thesis, 1996

John Stackhouse, ... from the dawn of Aviation: The Qantas Story 1920-1995, 1995

John Stackhouse, The Longest Hop: Celebrating 50 years of the Qantas Kangaroo Route 1947-1997, 1997

Stephan Wilkinson, The Legendary Lockheed Constellation, Historynet

Wikipedia, Lockheed Constellation

Wikipedia, Trans World Airlines

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