

# jetliner pioneers



*Above: Colour shots of the Qantas 707-138s in their original form and colour scheme are rare. This one shows VH-EBF at Sydney's Mascot Airport in August 1961, just four months before it was converted to turbofan engines as a 707-138B.*

*Eric Allen*

**The introduction of jet airliners brought with it a new world of operational procedures, capabilities, problems - and regular moments of humour. The writer was one of the pilots involved when Australia's Qantas introduced the Boeing 707 into service in 1959 as the first outside the USA.**

IN THE EARLY 1950S, Qantas faced the question of which aircraft to purchase to replace the Lockheed L.1049 Super Constellation. The jet age was rapidly approaching and although the Connies had been upgraded with wing tip tanks to increase their range – especially on the Pacific route between Nadi and Honolulu, thus bypassing the Canton Island technical stop – and had weather radar fitted, it was realised that this was only a stopgap measure.

There were many contenders for the order – de Havilland Comet 4, Bristol Britannia, Vickers Vanguard, Lockheed L.1649 Starliner for later trade on 707s, the 707 itself, Douglas DC-8, DC-7C for

later trade on the DC-8, a combination of DC-7C and DC-8 and the Vickers V.1000 project.

The Comet was suffering from its recent history of tragic accidents and the redesigned Comet 4 was yet to arrive. On the other hand, New Zealand's TEAL – part owned by Qantas – was in favour of the Comet for trans-Tasman operations. The Britannia had the range but was considered too slow and had some engine problems. The Vanguard was never a serious contender except maybe as an alternative to the Electra.

Douglas had a long association with Qantas and was very experienced in civil aviation. Lockheed

also had a long association with the airline and had the L.1649 which had some commonality with the L.1049.

At this stage, Boeing was very much an unknown quantity in the civil aviation field, its only recent offering being the Stratocruiser (developed from the B-29 Superfortress) which never really lived up to expectations as an airliner but had been successfully developed into a tanker for the USAF. On the other hand, Boeing had considerable experience with large swept wing jet aircraft such as the B-47 and B-52 bombers plus the KC-135 tanker, basically simulator to the 707 airliner which Boeing was offering to the world. The V.1000 would never get off the drawing board.

Another factor was that Australian Government approval had to be obtained for whichever type the airline selected. At this time there were many parliamentarians, including Cabinet members, who still clung to the 'buy British' idea no matter what.

The British aircraft were gradually removed from the equation although the Comet 4 came very close to meeting requirements. Douglas was not prepared to compromise its DC-8 specifications in order to meet the Qantas requirement whereas Boeing agreed to modify the 707-120 aircraft by shortening the fuselage by 3 metres (10 feet) and swapping payload for additional range.

*Main: Qantas' first Boeing 707-138 VH-EBA photographed during pre-delivery testing and carrying the US registration N31239. It first flew on 20 March 1959 and was delivered to Qantas the following July. via Geoff Brown*

*Below: Brand spanking new – 707-138 VH-EBD at Mascot in September 1959, just a month after it was delivered to Qantas. Eric Allen*





A real gem showing the first Qantas turboprop-powered 707-138B (VH-EBK) on arrival at Sydney on 6 August 1961 following its delivery flight. Note the aircraft still carries the 'old' livery – the new V-Jet markings were applied shortly afterwards. The final leg of EBH's journey from the USA was the first non-stop flight between Honolulu and Sydney, the 5186 statute miles (8345km) taking 9hrs 46min.

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Boeing's willingness to produce tailored versions of the 707 for specific customers helped greatly in putting it ahead of the DC-8 in the sales race. A final evaluation of the 707 and Comet 4 came down on the side of the Boeing aircraft.

### A DIFFERENT AEROPLANE

The Australian Government announced an order for seven Boeing 707-138s on 6 September 1956 and the first aircraft, VH-EBC *City of Canberra*, arrived in Sydney on 2 July 1959. The flying time from Seattle was 16 hours 10 minutes compared to the previous best of 27 hours 30 minutes by a Pan Am DC-7C. The first scheduled flight, to San Francisco, departed on 29 July 1959 under the command of Captain Ian Ralph.

On first inspection (permission for which required a pass signed in quadruplicate from somebody 'up there'), one's impression was that it was smaller than expected. The 707-138 was only 5.5 metres (18ft) longer than the Super Connie and its wing span was just 3 metres (10ft) greater.

Next, one noticed the low ground clearance of the numbers 2 and 3 (inboard) engine pods. What was going to happen during a maximum crosswind landing? Would they scrape the ground? In actual fact, except for one or two minor scrapes in extreme conditions there was no problem.

Of course the big difference was hidden. Performance capabilities were chalk and cheese – the 707 would cruise at 480kt (890km/h), twice as fast as the Lockheed. The Connie could cruise at 20,000 feet (but only when necessary due to engine overheating problems in high blower) while the 707 would happily cruise at 35,000-40,000 feet.

Range and payload were almost exactly the same at 3500 statute miles (5630km) and 15,420kg (34,000lb). The maximum takeoff weight of the 707 was considerably higher, however, with its maximum fuel load the same as the Connie's gross mass. This was a bit difficult to take in at the time, a 1049 in the fuel tanks of a 707!

As with all jet engines, the Pratt & Whitney JT3C was simple to operate with no real traps. The jet pipe temperatures (JPTs) had to be watched, and that's about all. Just push the thrust levers forward and it went. Note that we talked of thrust levers now, not throttles!

All pilots and engineers had to do a basic gas turbine course prior to doing the endorsement engineering course. The main topic of conversation was convergent and divergent ducts and their effect on airflow through the engine. Most found the concepts a bit hard to accept at first and one of the first things the instructor said was: "don't try to understand it, just take my word for it". A very sensible man.

The JT3C was fitted with water injection to increase the density of the air passing through the engine and so increase the thrust. This it certainly did but it also enveloped the airfield in clouds of black smoke. Water consumption was greater than fuel consumption on takeoff – 570 gallons. Should all water not be consumed on takeoff, provision was made for dumping the excess, resulting in an interesting white plume behind the aircraft.

Mr Boeing in his wisdom had fitted the water pumps in line ahead, one for Nos 1 and 2 engines and another for Nos 3 and 4, so that on initial climbout the forward pump ran out of water first

causing a very distinct swing with the loss of 7 per cent power on one side. Not dangerous but disconcerting at first. Why on earth they weren't connected to 1/4 and 2/3 is anybody's guess.

Each engine was fitted with an 'organ pipe' at the rear end, optimistically called a noise

suppressor. These pipes, despite their name, produced a distinctly unmusical note. How much noise they actually succeeded in suppressing is open to argument.

When the first aircraft departed for crew training at Avalon the press and general public were not impressed by the noise and smoke and the local councils were vociferous in their criticism. So what's changed in the last four decades? Once the turboprop fan engines were introduced, noise and smoke were both greatly reduced.

### IN THE AIR

It was realised early that a large amount of power must be used during approach to counteract the time taken for the engines to spool up in the event of an overshoot. This required lots of drag so gear down and full flap was the order of the day from the outer locator.

Initially, prior to the introduction of the fan engines, flight planning could be a tedious procedure, often done backwards from destination to departure point. The aircraft could never be climbed straight to the desired altitude and a step climb had to be planned using the forecast temperatures. The flight engineer (or second officer who relieved the FE) was constantly monitoring aircraft weight and taking into account outside air temperature, advising the pilots when a climb to higher altitude could be made.

It could take over 30 per cent of the trip to achieve final cruise altitude. After reaching altitude, power was progressively reduced to maintain Mach number. With the advent of the fan engines this problem was finally overcome. It is interesting to note just how much more fuel efficient the fan engines were. As an example, with JT3Cs a good ball park flight fuel requirement figure was 12,000lb (5445kg) for each hour of flight. With the JT3Ds this was reduced to 10,000lb (4535kg).

The aircraft was pleasant to fly once one became used to things like Dutch Roll and the new-fangled all-flying tail. Dutch Roll was overcome by the fitting of a yaw damper and this was engaged almost immediately after takeoff. These days of course, all-flying tails are commonplace but it took a little getting used to initially.

The old trim wheel was gone as such and the horizontal stabiliser was faired with the elevator. Control was electric with a slide button on the yoke to activate it. The trim wheel, which was still there for emergency use, would spin rapidly in response to trim input. In the event of a runaway trim, one was supposed to grab hold of this rapidly spinning wheel and stop it. Easier said than done.

After takeoff, particularly if one was unfortunate enough to become asymmetric, it was important not



to raise the undercarriage until the aircraft was stabilised in positive climb as the drag associated with the undercarriage doors opening and closing was greater than that created by the gear being down.

The original 707-138 did not have a fully boosted rudder. Boost did not come in until 20 degrees of rudder deflection had been achieved. Controlling the aircraft was no mean feat under asymmetric conditions (particularly two on one side) considering the size of the rudder and it did wonders for the leg muscles.

The turboprop 707-138B with fully boosted rudder and additional fin area was a totally different proposition in that one only had to gently push the appropriate foot out. As part of the conversion to 138Bs, dynamic cuts were carried out in the circuit with two thrust levers on one side pushed all the way up and the other two simultaneously fully retarded. Not a problem!

While talking about training, there was one training captain who insisted that everyone did at least one circuit with his head out the sliding window to simulate landing with a totally obscured windscreen. There was a pocket of relatively dead air outside the window but it still tended to straighten your hair a bit.

The change to JT3D fan engines improved the performance more than somewhat as it was the equivalent of adding an extra engine to the aircraft. There was no drama going around again on three engines and, given reasonable conditions, going around on two was quite feasible. Quite a hot rod.

Initial training was done on the newly acquired simulator, at least after they got the bugs out of it. One disconcerting bug was that unless one poled forward immediately after takeoff, the 'aircraft' would pitch up, stall and return to earth with a resounding thump. Not like the real aircraft at all.

Top: 707-138B VH-EBK on approach to Mascot in June 1965. Delivered in August 1961, this aircraft was sold to British West Indian Airways in 1969 and after passing through several other owners is still listed on the strength of the Royal Moroccan Air Force.

Eric Allen

Above: VH-EBA at Brisbane's Eagle Farm Airport in December 1964, three years after conversion to a 707-138B and carrying the V-Jet livery. The 'V' is for 'vannus', Latin for fan. The cars parked in front of the 707 well illustrate the period – a Simca, Morris 1100 and Vauxhall Viva! Eric Allen



Qantas 707-138Bs at Sydney: VH-EBE in December 1965 (top) and VH-EBD in December 1964 (above).  
Eric Allen

They eventually got the simulator working properly and many a 'pleasant' hour was spent trying to keep in front of the instructor who was prone to feeding in emergencies at his whim. I am sure some of them lay awake at night thinking up new means of torture.

Cockpit instrumentation was, of course, all analogue, none of your 'glass' cockpits for us. Engine instruments were quite small (about one-and-a-half inches in diameter) and someone dreamed up the excellent idea of angling them so that in cruise, all needles pointed in the same direction to make any aberration very evident.

### FLYING THE LINE

In the early days of jet operation there was some concern about jet aircraft mixing it with the slower piston-engined aircraft, particularly in the vicinity of an airport. A system of 'jet penetration corridors' was introduced as a result. Whether this made it any easier or safer I know not. However, as the number of piston-engined airliners decreased, this fell into disuse.

The obvious development of the aircraft was of course fitting JT3D fan engines, each with 17,500lb (77.8kN) of thrust. Chicken feed by today's standards but big time then. At the same time, wing root fillets were installed along with a ventral fin and fully boosted rudder. Qantas' aircraft were designated 707-138B and six new ones were delivered from July 1961. The original seven turbojet powered -138s were converted to the later specification.

Along with the fan engines came a livery change. The fin now sported a very large V. This signified 'vannus', the Latin for fan. Aircrews soon found other meanings for the V.

Quite a bit of 'investigative' flying was done en route. Capt A A E (Bert) Yates was responsible for development and one never quite knew what to expect. One trip was done from Sydney to Nadi at 10,000 feet to check the fuel consumption difference at low altitude. There was quite a difference of course, but surprisingly, not as great as anticipated possibly as a result of reduced power to maintain airspeed limitations.

Another time between Hong Kong and Tokyo, it was decided to leave the power up in cruise with the altitude lock in and ignore the Mach number increase. One eventually got used to the Mach warning bell ringing. This was continued until Mach tuck started to become too evident for comfort. On one occasion, the Honolulu office received a signal from the San Francisco bound aircraft saying: "All systems operating normally at 42,000 feet. Situation normal. All fingers uncrossed."

As an indication of how the 707 was accepted and treated as just another aircraft, albeit a potent one, there is the anecdote regarding a certain captain who was landing in Cairo one time. Just into the flare, the tower operator advised that the first 2000 feet of the runway was unserviceable due to work in progress. There were no warning markers on the runway and the work had not been notified by NOTAM.

No problem – full power, proceed at dot feet until the serviceable part of the runway is reached, land. Needless to say, all this was accompanied by a profusion of epithets and well chosen words dealing with the tower operator's ancestry!

There are numerous other stories, like the time a 707 departed Manila for Hong Kong. Immediately in front of us was a Caravelle on a world demonstration flight. Naturally the captain wanted to show what his aircraft could do and executed a particularly spectacular climb out after take off. This was a mistake.

Our captain was one of the WWII school who enjoyed getting the utmost performance from his aircraft. We were light, only about 35 passengers and with only a 1hr 30min flight to Hong Kong, not a lot of fuel on board. Stand on brakes, spool up to full power, release brakes, rotate and then best gradient climbout. Even more spectacular. Eat your heart out Caravelle!

Another instance comes to mind. It was a dark and stormy night approaching Tokyo. First officer in left hand seat, second officer (Space Cadet – me) in right hand seat. It's the captain's landing so the FO climbs out of the seat to let the captain in. FO then decides to go to toilet before getting in right hand seat (you can't fly an aircraft with your legs crossed). Captain waylaid by engineer before he can get in seat.

Picture the situation – rainy night, approaching the ILS, sprog second officer at controls. Asks captain does he want to get in seat and take over. Captain replies: "You've got an endorsement haven't you? Fly it yourself until I get in". Second officer's cap size immediately goes up by four and shirt buttons strain as chest swells.

Anyway, white knuckled, he copes with the elements, flies the plane and works the radio for about five minutes until the captain spoils it all by getting in his seat and taking over. It was fun while it lasted!

There was considerable rivalry between the BOAC (Boys Own Aero Club) crews with their Comets and the Qantas crews. We would take off from Calcutta, for example, bound for Karachi half an hour later than the Comet and overtake it about half way across India. It was customary to pick up the microphone and ask them how they were going in their 'mini jet' down there some 8000 feet below.

We were inevitably enjoying our 'Sector Grog' in the lounge (a large marquee at that time until it mysteriously burned down) at Speedbird House when they arrived. Can't think why, but they didn't like us at all!

One other thing we had to get used to was walking across the tarmac to our aircraft, particularly at a place like San Francisco. It was in the days before aerobridges were common and inevitably your aircraft would be at the far side of the tarmac. It wasn't too bad when we were all flying piston-engined aircraft as, if you heard an aircraft starting up, it was simple to have a quick look around to see which aircraft had its propellers spinning. Avoidance was then easy.

With the jets, however, there were no tell-tale propellers and it was quite an art to identify the particular aircraft in question. It was after a few near misses that it became the rule to turn on the aircraft's rotating beacon prior to start up.

A sideline to the introduction of the 707 on the Pacific route was the fact that the Connies were still operating some flights. A Connie pilot could find himself waiting in Honolulu for about six days for the next Connie to come through. As you can imagine, six days lolling about in that part of the world was real tough!

At this time those Connie crews who were making their last Pacific trip were consoling themselves with a grand party in Honolulu (the only place to party). The writer attended one party twice, once on the way to London and once on the way back! Same party different faces. It went for over three weeks.



At one stage the manager of the hotel came up and asked the participants to keep the noise down a bit, Well he wasn't a bad bloke and Australian to boot so he was offered a drink. Three days later he got back to his desk, so the story goes.

They were great and exciting times for those of us lucky enough to be flying the line during the 1950s and early '60s. The transition from piston to jet power represented substantial changes in all areas including handling, training, logistics, maintenance, finances and customer service.

When first introduced to the 707 we felt we were the pioneers of an important new era, and I suppose we were. The best part was flying a great airliner, and I hope the above gives readers at least some idea of what it was all about.

Geoff Brown gained his commercial pilots' licence in 1953 and subsequently flew Bristol Freighters and Douglas DC-3s for Australian National Airways, DC-3s and Fokker F27s for East-West Airlines and Lockheed Constellations and Boeing 707s for Qantas among many other types. He retired in 1977 with 14,000 hours in his logbook including 3000 on the 707.

Aero AUSTRALIA •

### QANTAS BOEING 707-138/Bs

REGN	MODEL	CON/LINE NO	DELIV	NAME/NOTES
VH-EBA	138	17696/29	7/59	City of Melbourne, cvtd -138B 9/61, sold 11/69
VH-EBB	138	17697/39	6/59	City of Sydney, cvtd -138B 10/61, sold 5/67
VH-EBC	138	17698/44	7/59	City of Canberra, cvtd -138B 11/61, sold 4/67
VH-EBD	138	17699/54	8/59	City of Brisbane, cvtd -138B 11/61, sold 1/68
VH-EBE	138	17700/59	8/59	City of Perth, cvtd -138B 11/61, sold 5/68
VH-EBF	138	17701/60	9/59	City of Adelaide, cvtd -138B 12/61, sold 3/68
VH-EBG	138	17702/64	9/59	City of Hobart, cvtd -138B 1/62, sold 3/68
VH-EBH	138B	18067/201	7/61	City of Darwin, sold 9/69
VH-EBI	138B	18068/227	8/61	City of Winton, sold 6/69
VH-EBJ	138B	18069/228	8/61	City of Longreach, sold 7/69
VH-EBK	138B	18334/229	8/61	City of Newcastle, sold 9/69
VH-EBL	138B	18739/385	8/64	City of Geelong, sold 6/69
VH-EBM	138B	18740/388	9/64	City of Launceston, sold 6/69, current with John Travolta as N707JT