

Rolls Royce RB211-524G Package 3 Engine Programme.

The RB211-524G2 engine, first entered service on the Qantas 747-438 aircraft in 1989 and suffered a significant performance shortfall relative to the fuel burn levels guaranteed by Rolls Royce.

A number of modifications were proposed by Rolls Royce to address this shortfall and in June 1991 a certification plan was submitted to the FAA. In July 1991, the FAA assigned Project Number ANM-100S-2094 to the Package 3 Certification project.

The certification plan involved Rolls Royce conducting engine certification testing in the second half of 1991 and building four RB211-524G5 Package 3 standard engines for flight testing and aircraft certification in 1992.

The aircraft selected for the flight test programme was Line No 894, Variable RT565 and registration VH-OJO. The aircraft was scheduled for delivery in March 1992 but Qantas, Rolls Royce & Boeing agreed to delay the delivery until October 1992. This revised delivery schedule allowed VH-OJO to carry out the required aircraft certification flight testing, time for Boeing to complete the certification documentation and then submit the documentation for FAA approval. Once FAA approval was granted for the 747-400 with the Package 3 engine configuration VH-OJO was to be delivered with RB211-524G5 engines fitted.

In December 1991, a Rolls Royce certification engine being tested on a development test bed in Derby, England suffered a major engine failure. The damage to the test engine was so significant and an investigation into the cause would be very difficult and potentially lengthy. Due to the schedule constraints on the planned Package 3 Certification programme Rolls Royce and Boeing cancelled the Package 3 certification programme on 7th January 1992.

Qantas also had three other 747-438 aircraft scheduled for delivery in 1992 and as a result did not require VH-OJO in-service until October 1992. The initial plan was to place VH-OJO in long term storage from March to October 1992 but an alternative plan was developed which placed each of the four aircraft scheduled for delivery into short term storage.

The short term storage plan resulted in the equivalent of one aircraft being in storage on the Paine Field flight Line at Everett, from March to October 1992. The agreed schedule resulted in the following.

1. VH-OJO / Line No 894 / Variable RT565 / MSN 25544

- a. Technical Acceptance on 25-Mar-92
- b. Short term storage from 25-Mar-92 to 20-May-92
- c. Delivery on 21-May-92

2. VH-OJP / Line No 916 / Variable RT566 / MSN 25545

- a. Technical Acceptance on 19-May-92
- b. Short term storage from 20-May-92 to 23-Jun-92

c. Delivery on 26-Jun-92

3. VH-OJQ / Line No 924 / Variable RT567 / MSN 25546

- a. Technical Acceptance on 20-Jul-92
- b. Storage from 21-Jul-92 to 17-Sep-92
- c. Delivery on 18-Sep-92

4. VH-OJR / Line No 936 / Variable RT568 / MSN 25547

- a. Technical Acceptance on 1-Oct-92
- b. Short term storage from 2-Oct-92 to 14-Oct-92
- c. Delivery on 15-Oct-92

Boeing Flight Testing

During the acceptance and storage phases a number of flight tests were carried out on the four 747-438 aircraft delivered in 1992.

1. VH-OJO

VH-OJO had already been configured during its factory build with additional flight test equipment to support the Package 3 engine certification, so a flight test was scheduled during the acceptance phase to measure the fuel mileage (NAMS) of the 747-438 aircraft with production RB211-524G2 engines.

The aircraft was positioned from Paine Field to SEATAC airport on March 4th (10 mins flight time) to allow a take off with a maximum fuel load.

The NAMS flight on March 5th from SEATAC lasted 13 hrs 1 min flight time, with most of the flight spent off the coast of Baja California flying at various altitudes, speed and weights to gather the aircraft fuel burn data.

It returned to SEATAC and was positioned back to Paine Field, Everett on March 6th (flight time 19 mins).

On March 13th VH-OJO was flown to Spokane to be on display during a Boeing Staff Open Day at the Spokane Composite Manufacturing facility.

2. VH-OJP

During the acceptance of VH-OJP two Engineering flights were flown to support the FAA certification of a new version of the TCAS software on May 4th and 6th.

3. VH-OJQ

During the acceptance of VH-OJQ seven Engineering flights were carried out to support various FAA certification activities between June 24th and 29th.

During the storage period Qantas allowed Boeing to use VH-OJQ for training of new flight test pilots required for new aircraft deliveries. Between July 27th and August 6th the aircraft was based at Boeing Field but conducted the majority of the training at

Moses Lake in Eastern Washington. A total of thirteen flights were conducted and 252 touch and go landings were carried out at Moses Lake making a total of 265 landings.

4. VH-OJR

During the acceptance of VH-OJR three Engineering flights were conducted out of Glasgow Montana in support of FAA cross wind certification on September 14th and 15th.