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Australian Aviation Pioneering Spirit Alive in the F-35

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On Wednesday, 8 March 2017, Australia's first two Lockheed Martin F-35 Lightning II multi-role fighters departed from Brisbane bound for the USA to continue their involvement in training the next generation of pilots from the Royal Australian Air Force (RAAF) and international partner nations. The RAAF F-35s were in Australia for the Avalon Airshow to give the Australian public its first look at the 5th Generation air combat aircraft that will soon be at the front line of the country's defence capability.

The trans-Pacific flight of the two RAAF F-35 aircraft to Australia marked several firsts, including the first time the Lightning II has operated in the southern hemisphere. Under the command of Squadron Leaders Andrew Jackson and David Bell – Australia's first qualified F-35 pilots – the two RAAF F-35s transited a distance of more than 16,000 kilometers (8,000 nautical miles) from their current home at Luke Air Force Base outside of Phoenix, Arizona, to RAAF Base Amberley in Brisbane.

The return flight of the F-35s to the USA also has great historical significance, replicating the 1934 flight of Australian aviation pioneer Sir Charles Kingsford Smith, who flew his single engine Lockheed Model 8D Altair aircraft, named *Lady Southern Cross*, on the first ever west-to-east aerial crossing of the Pacific Ocean.

The F-35, with its array of on-board sensors, supersonic performance, and designed-in stealth technology represents a formidable advance in aviation capability beyond the wildest dreams of Kingsford Smith. One notable coincidence, though, is that both the Lockheed Altair and F-35 are powered by Pratt and Whitney engines. However, the F135 engine on the F-35A generates more than 100 times the power of the Altair's Wasp nine cylinder radial piston engine. The F-35 transit from Australia to the USA was completed in less than three days and a total flying time of approximately 20 hours.

The F-35s were refueled in-flight by RAAF KC-30 tanker crews and

made overnight stops at Andersen Air Force Base on Guam and Hickam Air Force Base, Honolulu, Hawaii, before completing the transit to Luke AFB, Arizona, on March 10.

In comparison with the smooth transit for the F-35s, the trans-Pacific crossing by the Lockheed Altair *Lady Southern Cross* was significantly more arduous. The Altair was a wooden monoplane less than 9 meters (28 feet) in length weighing 1500kg (3,300lbs) with a top speed of 360 kph (180 knots) – about half the length, one-tenth of the weight and one-sixth of the top speed of an F-35. It featured a variable pitch propeller and hand-retractable undercarriage that were considered 'state-of-the-art' in the early 1930s.



The journey of the *Lady Southern Cross*, illustrated by the red dotted line, is compared in this graphic to the journey of the F-35, illustrated by the purple line. The F-35's total flight time was ~20 hours, at a maximum altitude of greater than 30,000 feet, and an average speed of 450 knots. By comparison, the *Lady Southern Cross*'s flight time was 52 hours, with an altitude of no more than 15,000 feet and an average speed of 150 knots.

Departing Archerfield Aerodrome in Brisbane on 21 October 1934, Kingsford Smith and his navigator, P.G. (later Sir Gordon) Taylor flew the *Lady Southern Cross* to Fiji, where they landed on Suva's Albert Park rugby field.

The aircraft was then flown 20 km (14 miles) to Nasilai Beach on 24 October to give it sufficient 'runway' for a fully fueled takeoff. As Kingsford Smith was attempting to take off from the narrow curved beach, a crosswind and rising tide forced the *Lady Southern Cross* into the surf, requiring all of Kingsford Smith's skill to avoid catastrophe.

After a further five days in Fiji awaiting favorable weather conditions, the *Lady Southern Cross* made the flight of more than 20 hours to Wheeler Field in Hawaii on 29 October. Once again, Kingsford Smith was able to avert disaster when the aircraft entered a spin and dropped more than 9,000 feet (2800 meters) while flying through a heavy tropical storm.

Following repairs and recuperation in Hawaii, Kingsford Smith, Taylor and the *Lady Southern Cross* completed an incident-free flight from Wheeler field to Oakland, California, on 4 November 1934 – a total of 52 hours flying time over 15 days from Australia to the USA.

Upon arrival they were welcomed by an estimated crowd of 20,000 people. In his post-arrival speech, Kingsford Smith predicted that his achievement would pave the way for inter-continental flight to one day become a routine experience for the general public.



Australia's first F-35A, designated AU-1, performs a flying display during the 2017 Avalon Airshow.

Getting back to the present day, the two RAAF F-35s involved in the trans-Pacific flight were delivered to Luke Air Force Base in 2014 and will remain in the US until 2020 as part of the RAAF commitment to international pilot training arrangements at Luke. The first permanent arrival of RAAF F-35s in Australia will occur in late 2018, with all 72 aircraft being delivered by 2023.

Inter-continental flights by RAAF F-35s will be a regular occurrence in the decades to come, with a regular tempo of joint exercises in North America and the Asia-Pacific. Australia will also routinely host deployments and exercises involving the F-35s of close allies including the United States.

The F-35 is a worthy inheritor of Kingsford Smith's legacy and continues the more than 80 year ties between Lockheed Martin aircraft, Pratt & Whitney engines, and aviation in Australia.

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