



TASMANIAN AVIATION GIANTS – DAVID WARREN
THE INVENTOR OF THE BLACK BOX

Tasmanian Aviation Giants – David Warren – The Inventor of the “Black Box”

Author: C Byrne, June 2022

David Warren was one of the four children of Reverend Hubert and Elle Warren. Hubert Warren was a member of the Anglican Mission for Aborigines at Groote Eylandt in the Gulf of Carpentaria for nearly 20 years. It was here that David Ronald de Mey Warren was born on 20 March 1925. He was the first child of European descent to be born on the island.

The family moved to Tasmania in 1932 when his father became the Rector of Cullenswood, near St Marys in the Fingal Valley of Tasmania. The 9-year-old David was enrolled at Launceston Grammar school as a boarder in 1934.

David was given a crystal radio set by his father while he was at Grammar. It interested him greatly and he taught himself how it worked. It was an early indication of his interest in science and technology.

Hubert was then appointed to take charge of St. Thomas's Church at Enfield in Sydney. Hubert would fly to Sydney first and the family would travel later by boat. Thus, he was a passenger on the Holyman's Airways DH.86 *Miss Hobart* on the flight from Launceston to Melbourne on 19 October 1934. Tragically the plane was lost in the sea near Wilson's Promontory, the two pilots and 10 passengers were killed. David was 9 years old.

The Warren family later relocated to Sydney and David attended Trinity Grammar School. He continued with his interest in radio by studying to be a radio operator (or “Radio Ham”).



David graduated from the University of Sydney with an honours degree in Science in 1944, after which he taught Mathematics and Chemistry at Geelong Grammar School for two years. This was followed by two years as a Chemistry lecturer at the University of Sydney.



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Then he took a position with the Woomera Rocket Range and studied the chemistry of rocket fuels at Imperial College in London, where he gained a PhD in 1951. Upon return to Australia, he was transferred to Aeronautical Research Laboratories (ARL), the section of Australia's Defence Department to work on aviation fuels.

It was here that he undertook his official research and also started to work on what would become the Black Box. The idea initially arose in 1953 when he was part of a panel investigating why the de Havilland Comet, the world first commercial jet airline, was prone to crashing. (David was on the panel because of his expertise in aviation fuel). Without any flight information, the panel could only speculate on potential causes. (The problem would eventually be traced to the design of the square windows).

He had recently visited the first post-war Trade Fair in Sydney and had seen a new voice recorder, the Telefunken Minifon Portable Wire Recorder, which was marketed as a dictation machine for businessmen. He thought that this type of technology could be used as a cockpit voice recorder.

Back at ARL he wrote a report outlining the idea, titled "A Device for Assisting Investigation into Aircraft Accidents" which was published in April 1954. The report didn't generate any interest, so David only worked on the idea in his own time, although with support of his immediate Supervisor. He acquired a Minifon recorder and quietly worked developing a prototype over the next four years using it and parts from his crystal radio set.

From these components the first ARL Flight Memory Unit (FMU) prototype was developed which would record 4 hours of cockpit voice recording and also data from 8 instruments every two seconds.

In 1957, with a more supportive manager, ARL built a prototype FMU and the Australian civil and defence aviation authorities were invited to assess it. They were not supportive, either because they thought it was not necessary, or for privacy fears.

Support would come in 1958 when David was asked to explain his idea to a visiting English official who David did not know. After explaining how the FMU worked, the identity of the official was revealed to be Air Vice Marshall Sir Robert Hardingham, the Secretary of the UK Air Registration Board. He was very impressed.

Soon David was on a plane to England with Sir Robert and tested the recorder on the last leg of their flight. The reception the FMU received in the UK was the complete opposite to that in Australia.



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As well as demonstrating the FMU to Government and Industry representatives, he was also interviewed on BBC TV and radio.

A video of a 1958 interview is available here:
<https://www.bbc.com/news/av/world-australia-49031957>

It was at a London Press Conference that the term “Black Box” was coined by a journalist. Although the unit was stored in a red case, the unit itself was enclosed in a black Bakelite case, and “black box” was also a generic word from electronics engineering, and the name stuck.

On his return, the ARL now gave David its full support. He now had a research team of three others to turn the demonstration model into a pre-production prototype. On 23 March 1962, the team were ready to test their FMU in a Department of Civil Aviation Fokker Friendship, which was a success.

ARL worked with EMI in Australia to develop a commercial unit. Although EMI did undertake some pre-production work, the project stopped when EMI could not dedicate the resources needed for the project because of the pressure to support the Woomera rocket range activities.

When David had demonstrated the FMU in England in 1958, a British firm, S Davail & Son approached ARL about the production rights. They subsequently released a commercial Black Box flight recorder based upon David’s prototype in 1962. An American company, United Data Control, also developed a commercial Black Box at the same time.

On 22 September 1966 an Ansett-ANA Vickers Viscount crashed near Winton in QLD, killing all of the 29 crew and passengers. As an outcome, the following year, Australia became the first country in the world to make both flight data and cockpit voice recorders mandatory on all airliners.

Although David may have developed the Black Box, he never received any financial royalties. ARL did not apply for patents until many of the design elements were already in the public domain. This allowed companies elsewhere in the world, particularly in the United States, to



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develop the idea, thereby capturing a growing market as the installation of flight recorders became mandatory around the world.

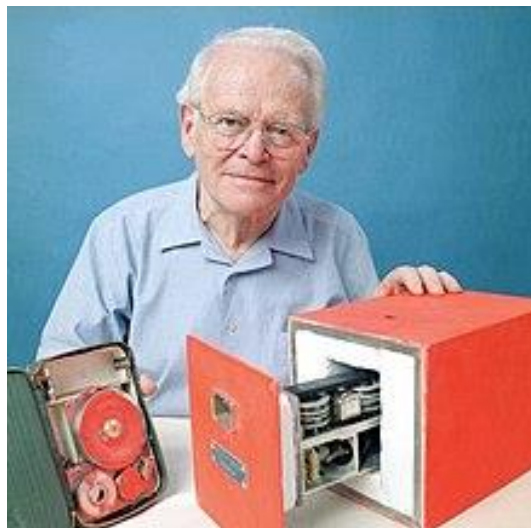
David retired as Scientist at ARL in 1983.

In the 2002 Australia Day Honours, he was awarded the Order of Australia for “service to aviation industry, particularly through the early conceptual work and prototype development of the Black Box flight recorder.”

Dr David Warren lived to see Qantas name an Airbus A380 after him in 2008. VH-UQI commenced commercial flights in January 2011.

David died on 19 July 2010, at the age of 85.

(ARL now part of the Defence Science and Technology Organisation)



David with the Minifon Recorder and a “Black Box”