

Sir James Hamilton

Sir James Hamilton, who has died aged 89, was one of the leading figures in post-war British aircraft design, and was largely responsible for the swept-back delta wing on Concorde, a project he led for five years.

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Hamilton also headed the project team for the Jaguar ground attack aircraft (another Anglo-French project), then, as Britain's appetite for developing new aircraft abated, moved into Whitehall, ultimately becoming Permanent Secretary at the Department of Education.

His particular aptitude was in understanding the characteristics of steep descent and high-speed flight, and his speciality was wing design; many aeronautical engineers regard the wing for the supersonic airliner as the peak of his achievement. His input on the wing, developed at the Royal Aircraft Establishment, Farnborough, drew on ideas that had been sketched out by Roy Chadwick in 1947. (Chadwick died in an air crash soon afterwards, but his work came to fruition in the Vulcan bomber.)

The ultra-slim delta wing had the appearance of total simplicity, but the reality was complex: looked at head-on, it did not just sweep back by 55 degrees, it also twisted and drooped. No other part of the aircraft had so much time and attention given to its design. Concorde's wing was subjected to 5,000 hours of wind-tunnel testing to modify its outline, and ensure that the wing surface vortex would be a stable and dependable source of lift.

On a traditional wing, there can be more than 50 movable parts to control and trim the aircraft, and flaps and leading edge slats to generate extra lift at slower speeds. The Concorde wing had just six trailing edge "elevons" to control pitch and roll.

As flying speeds increased, wing designs involved more "sweepback". Concorde took this further, giving lift at low speeds by increasing the angle of attack of the wing, and offering efficiency in the supersonic cruise, during which the wing's long chord, narrow profile and short span generated very little drag.

James Arnot Hamilton was born in Midlothian on May 2 1923. From Penicuik Academy, where he was dux (the outstanding student), he read Civil Engineering at Edinburgh University; his degree was fast-tracked because of the war. In 1943 he joined the Marine Aircraft Experimental Establishment at Helensburgh, developing anti-submarine weapons for the RAF. When MAEE, which mainly tested flying boats, returned to its pre-war base at Felixstowe in 1945, he became Head of Flight Research.

Hamilton's involvement with the aerodynamics of high-speed flight increased when he moved to Farnborough in 1952. As finances tightened and the arms and space races with the Soviet Union promoted missile technology, several projects he worked on failed to gain acceptance — among them a supersonic jet trainer and a light tactical strike aircraft. But design work on what would become Concorde went ahead. In 1964 he became head of New Project Assessment at Farnborough. Soon afterwards Britain and France agreed on a collaborative programme for better training and tactical strike capability, and in 1965 Hamilton was appointed project director for the first joint Anglo-French combat aircraft. Said also to be the first RAF aircraft designed in metric, it would enter service in 1972 as the Jaguar.

Having moved to the Ministry of Aviation (later the Ministry of Technology), Hamilton became director-general in 1966 of the British end of the Concorde project (then still spelt without an "e"). In the summer of 1967 he oversaw trials with Lightning fighters to test how the public would react to supersonic flights over land by Concorde; they ended with a sonic boom over central London.

The response (hostile, after a promising start) was serious for Concorde's commercial prospects; Hamilton reckoned a total ban on supersonic flights over land, as was eventually imposed, would reduce sales by 40 per cent.

The first supersonic tests involving Concorde itself took place in 1970, along a corridor between Oban and Cornwall. Hamilton monitored them from St David's Cathedral, where scientists found sealing wax they had poured over cracks in the walls remained undisturbed.

Hamilton moved in 1971 — five years before Concorde first flew in airline service — to be deputy secretary for aerospace in the Department of Trade and Industry. With his minister, Frederick Corfield, he oversaw the cancellation of the Black Arrow rocketry programme and nationalised the aero engine division of Rolls-Royce (whose Filton factory was in Corfield's constituency) when the cost of its RB211 engine spiralled out of control. Concorde was still one of Hamilton's responsibilities. He oversaw from Whitehall the first full-scale roll-out of Concorde, as Corfield's successor, Michael Heseltine, tried in vain to persuade other countries to place orders.

In 1973 Hamilton became deputy Cabinet secretary to John Hunt, serving under Edward Heath and Harold Wilson. In May 1976, weeks after Wilson's replacement by James Callaghan, he took charge of the Department of Education and Science, with Fred Mulley — soon to be replaced by Shirley Williams — as Secretary of State.

Even before Callaghan and Mrs Williams launched a "great debate" about educational standards, Hamilton shared their concern, and visited schools incognito as a junior inspector .

After Margaret Thatcher came to power, Hamilton wrestled with strikes in schools and the impact of spending cuts. He intervened personally to reprove scholarships for painting and sculpture given through the British School in Rome.

He retired from government service in 1983 with a warning that, while scientific research in the best universities was first-class, it was "extremely mediocre" at some others. The battle for industrial supremacy would, he said, be won and lost in technical colleges and colleges of further education.

Hamilton now joined the boards of Hawker-Siddeley, Smiths Industries and Devonport Royal Dockyard. From 1997 to 2000, after 14 years on the company's advisory board, he chaired Brown and Root UK, a Halliburton subsidiary constructing and running military bases and conducting logistical operations.

In 1992 he served on a steering group studying the organisation of the engineering profession (the Fairclough Study); its findings were published as *Engineering into the Millennium*. He was later commissioned to prepare a further critical overview of the profession, and his report was published in 2001.

Hamilton was president of the National Foundation for Science Research and the Association for Science Education, vice-president of the council of Reading University and vice-chairman of council at University College, London.

He was appointed MBE in 1952, CB in 1972 and KCB in 1978.

James Hamilton married, in 1947, Christine McKeen; the marriage was dissolved, and he is survived by their three sons and by his partner, Marcia Cunningham.

Sir James Hamilton, born May 2 1923, died May 24 2012