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Small-Scale Lindbergh 2003

Maynard Hill's transatlantic flight

In 2002, after a gruelling 4-year marathon of hard work, retired Johns Hopkins University metallurgist Maynard Luther Hill* began the attempts at crossing the Atlantic with his model aeroplane. On 9th August 2003 "TAM 5" took off in Newfoundland and, 38 hours, 52 minutes and 19 seconds later, reached Ireland near Mannin Beach.
*born 1926 in Philadelphia, died 2011

Still an issue

Crossing the world's oceans with model aircraft has remained an interesting challenge for ambitious and qualified model designers and builders. Even

universities seem to find it worthy of funding and research, although these days aircraft are more likely to be solar-powered and the goal has long since been achieved by Piccard and Boschberg, when they circumnavigated the world with their manned solar-powered aeroplane IMPULSE II. However, the technological conditions of today cannot be compared to those of 20 years ago.

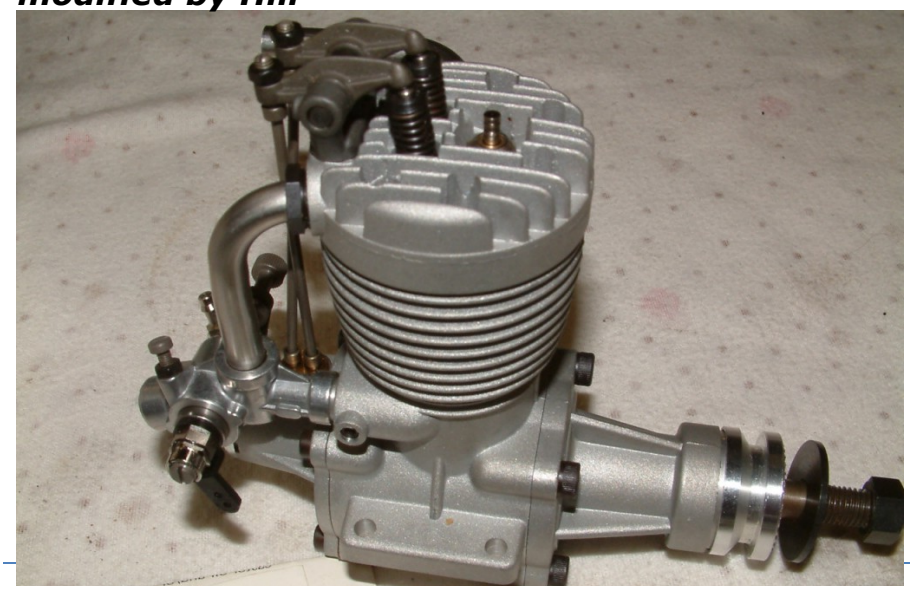
Numerous world records

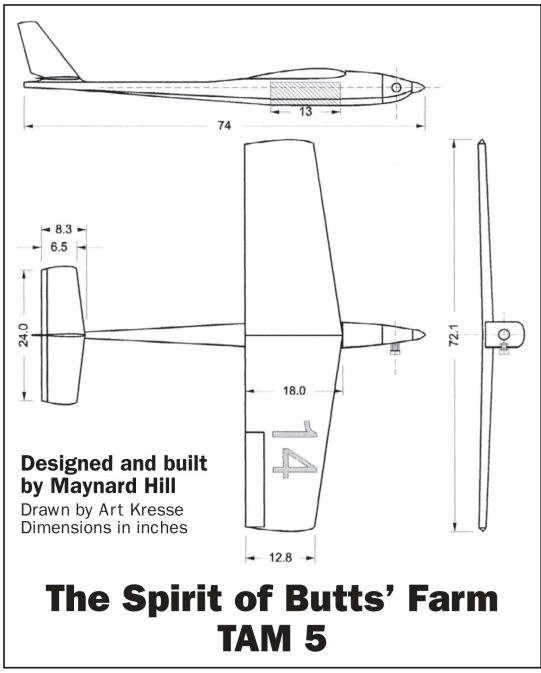
Maynard Hill's work at the Johns Hopkins University Department of Physics allowed him to gain comprehensive knowledge of unmanned and autonomously flying aircraft such as military drones. He was also a highly talented designer and builder of model aircraft. It has been claimed that he achieved 23 world records in speed, duration flight and altitude. All his models were built using only balsawood and MonoKote covering.

Optimised for energy consumption

The energy management system developed by Maynard Hill at the time would be a credit to those crossing the Atlantic today. The highly complex fuelling system he designed is probably one of his most significant achievements. Following countless trials with modified four-stroke engines and different fuels, he was finally able to lower the fuel consumption of his 10 cc O.S. 61 FS to only 2.02 ounces (59.74 ml) per hour. After all, the fuel had to last for nearly 39 hours and take-off weight including 2 kg of fuel was limited to 5 kg. In its unmodified condition, the four-stroke engine he used would burn 18 to 20 times the amount of fuel (The O.S. FS-62 V Owner's Instruction Manual of 2011 specifies a fuel consumption of around 1 l/h. Older engines used considerably more).

Type of motor – not on the market today – was modified by Hill





Limited Resources

While these days almost all equipment – from aircraft to stabilising and navigation systems, pressure sensors and telemetry – can be bought ready for use, Maynard Hill had to enter new territory for aeromodelling in many areas. A group of retired engineers and computer scientists were on hand to provide technical support for his endeavour. His team was also able to find several tens of thousands of dollars for an improved autopilot. Another group helped by flying his prototypes, of which he built no less than 29 versions.

Hundreds of astonishing details

In 2004 Maynard Hill wrote that the ignition system he used fired successfully no less than 8.5 million times. The electrical energy needed for this, and for the entire electrical system, was supplied by an AVIOX brushless motor, used as an alternator. The total weight of autopilot, pressure sensor and GPS receiver was around 250 g.

Theory and practice

According to textbook calculations, the model should have been able to cover a distance of about 3700 miles (approx. 6000 km). However, textbook theory is based on perfect profiles and highly efficient propellers and does not apply to a small model with a lower Reynolds number, being buffeted

about in the air. Maynard Hill therefore halved the intended distance to 1875 miles (3017 km), which corresponds to the distance from Newfoundland to Ireland. The winter term of 1999/2000 saw the first trial flights on Beecher Butts' farm (the reason for naming the transatlantic models "Spirit of Butts' Farm"). During the winter of 2001/2, Maynard Hill built more models, ending up with a total of 21 airframes and 12 wings in addition to hundreds of hours of engine running time. First flights with transatlantic model TAM 1, piloted by Joe Foster, took place in July 2002. Sadly, this model crashed into the ocean shortly after take-off. A few days later, TAM 2 did not fare much better. TAM 3 managed to fly for 479 miles before being lost in a rainstorm with strong turbulence. After these first attempts, the final one of which was considered to be a success, the crew decided to go home and try again in a year's time.

2003 – the year of reckoning

During the winter, Maynard Hill made a number of minor modifications and performwith O.S. 61 SF. He wrote: "You would think, that after 12 years of work and five records, I would know everything there is to know about an O.S. 61 FS engine. Not so." On 8th August, TAM 4 was launched. Everything went according to plan and the weather was good. However, after 430 miles, the team lost all contact with the model. Weather for

One of the four transmitters used by Hill 2003

the following day, Saturday 9th August, was forecast to be favourable again. Early in the day, Maynard Hill checked fuel and filters and, in the late afternoon, the tank was filled and TAM 5 weighed under supervision of the observers. Take-off was at 7.45 p.m. with a light esterly wind and was achieved without any problems. Data received at 11 p.m. at night indicated that the flight was progressing as planned. Throughout Sunday, TAM 5 flew unhurriedly eastwards at an altitude of between 280 and 320 metres.

Relief in Ireland

On Monday morning, the officials in Ireland, Joe Dible and John Molloy, were notified. They had a six-hour drive to complete to get to the landing site. Landing pilot Dave Brown was also called out. As it was nearing 2 p.m., Irish time, the Spirit of Butts' Farm appeared over Mannin Beach. Dave Brown switched over to manual control and let the model glide to the landing site in a steep turn. It was 2.08 p.m. in Ireland when Sally Brown called Newfoundland and reported: "It's on the ground!" – incidentally only 35 ft (10.5 metres) from the intended landing site. A little less than two ounces (approx. 50 ml) of fuel remained in the tank. In Newfoundland, Maynard Hill burst into tears.

Starting Crew in Newfoundland

After landing in Ireland. Landing pilot Dave Brown and officials Joe Dible and John Molly

I would like to thank Jennifer Aldermann, Maria K. Van Vreede and Bob Brown of Academy of Model Aeronautics AMA.
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