

## Aviation Science & Development at Farnborough History and Learning Briefings



### A BRIEF HISTORY OF FARNBOROUGH AVIATION SITE Part 1 : The Early Days 1901-1914

*This is Part 1 of a much abbreviated history of the Farnborough Site and contains just a small range of the experimental research and development carried it out in its lifetime. In these brief notes, it has, unfortunately, not been possible to mention all of the many Departments' contributions or individual staff contributions. The tremendous width and depth of the research & development can be obtained from wider reading – just a few recommendations of which are made at the end of each section – most of which are available from FAST.*

#### The Royal Engineers Balloon Section

In 1905 the Balloon Factory and the Balloon Section of the Royal Engineers were moved to the Farnborough site (in South Farnborough as it was then known) and a Balloon Equipment Store established.

Previously the first official Army experiments with balloons were carried out at Woolwich Arsenal in 1878 and in that year the War Office allocated £150 (the first Air Estimate) for the construction of a Balloon. The 10,000 cu ft balloon was designed by Col Templer and the 'Pioneer', was sent to The Arsenal in August.

In the autumn of 1882 the Balloon Equipment Store was moved to the School of Military Engineering at St Mary's Barracks in Chatham. The successful development of military balloons continued until a balloon detachment was sent to Aldershot to take

part in summer manoeuvres. This was so successful that there followed a recommendation that the Balloon Establishment be moved from Chatham to Aldershot – The Home of the British Army. Consequently the Balloon Section of the Royal Engineers was formed in 1890 and the depot moved to South Camp, Aldershot, near the canal. By 1892 the Balloon Factory and the School were moved to the Royal Engineer (Stanhope) Lines – called Balloon Square.

The move in 1905 of the Balloon Factory and the Balloon Section to the present Farnborough site was accompanied by the move of the No 3 Building from the old site and was the first building to be erected on the new site.

The eastern side of the No.29 building (Beta Shed) was built in 1907 and the western half of increased width was added in 1909.

#### From Kites to Flights

In 1904 Samuel Franklin Cody succeeded in interesting the War Office in his man-lifting kites and two years later was appointed Chief Instructor in 'Kiting' at the Balloon School. Significantly, in 1906 Lt J W Dunne was attached to the Factory for the purpose of full-scale experiments with inherently stable aeroplanes and by 1907 Dunne's first aeroplane, the D1 fitted with two 12 hp Buchet engines, was completed. The aircraft was moved to Blair Atholl in Scotland to maintain the secrecy of the work and flight experiments undertaken. In this same year, Cody produced his first powered aeroplane – a modified kite fitted with a 12hp three cylinder Buchet engine – and first tested it on a wire suspended between two 100 ft poles.

FAST is developing a series of briefing on key aspects of Farnborough's Aviation Heritage.

These briefing notes are not intended to be a complete and comprehensive history of the subject of the title, but are intended to stimulate the imagination and encourage further reading. To that end, a 'further reading' list is included at the end of each briefing. By reading a number of different histories, written by varying authors over a range of timescales, a balance of the differences can be achieved – and the reader's own opinions formed. But we hope that these briefings will be an interesting summary.

It is a continuing process and a number of further briefings are planned.

#### **BRIEFING SERIES**

1-6 A Brief History of the Farnborough Aviation Site (1901 to 1991)

1. 1901-14 The Early Days
2. 1914-18 World War I
3. 1918-39 The Inter War Years
4. 1939-45 World War II
5. 1945-90 The Cold War Period
6. 1991 The Demise of RAE
7. Royal Engineers Balloon School
8. Royal Flying Corps
9. Royal Aircraft Factory
10. Edward Teshmaker Busk (Scientist)
11. Frank W Gooden (Test Pilot)
12. Samuel Franklin Cody
13. The Farnborough Wind Tunnels
14. Hermann Glauert (Aerodynamicist)

Please check [www.airsciences.org.uk](http://www.airsciences.org.uk) for the latest list of available titles.

## The First Wind Tunnel at Farnborough

December 1906 saw the completion of the Factory's first wind-tunnel (in those days called wind-channels) – based upon an existing tunnel at NPL Teddington, with whom the Factory had a close and fruitful working relationship. Built in the corner of the Beta Airship Hangar, it measured some 25 sq ft with a 48 inch diameter electrically driven fan providing the flow of air.

## Nulli Secundus - The First British Army Airship

On the 10<sup>th</sup> September 1907, *Nulli Secundus* (meaning 'second to none' in Latin), a factory built dirigible, emerged from its shed at Farnborough and having completed its first flight, heralded the beginning of the Airship development period which lasted to the beginning of the Great War in 1914.

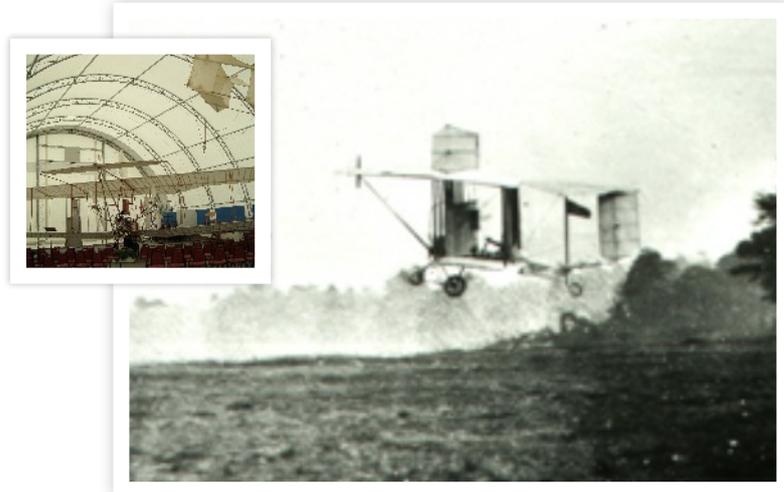
A significant journey for the airship was undertaken on October 5<sup>th</sup> 1907. Piloted by Colonel Capper and Samuel Cody, she made the journey from Farnborough to London crossing Buckingham Palace and rounding St Pauls Cathedral, via Whitehall and the Strand, before attempting to return to Farnborough. Unfortunately, the south-westerly breeze had freshened and, unable to make headway, the airship had to be landed at Crystal Palace.

Right : The Nulli Secundus over Farnborough Common



## The First Powered Flight

On the 16<sup>th</sup> October 1908 SF Cody made the first official sustained and controlled powered aeroplane flight in Great Britain, from Farnborough, covering some 496 yards in 27 secs at an altitude of 30 to 40 ft.



Above : The first powered, sustained and controlled flight in Great Britain and its completion!  
Inset : See the full-scale Cody replica at the FAST Museum

## Aeroplane Development

At the end of 1909 the Balloon Factory and the Balloon School were separated, Mervyn O'Gorman being appointed Superintendent of the Factory. The factory then consisted of one small Machine Shop, one shed (No.3 Building) for making Balloons and one Airship Shed (No.29 Building). Fifty men and fifty women were employed.

The appointment of O'Gorman signalled the start of the scientific method for aeronautical Research & Development at Farnborough and the beginning of the aeroplane development period 1910 to 1918.

Airship development continued at Farnborough with the Gamma, the Baby/Beta, the Lebaudy and Delta, alongside Cody's aeroplane developments and on the 31<sup>st</sup> December 1910, Cody won the 'British Empire Michelin Cup' with a flight around Farnborough of 185.5 miles in 4hrs 47 mins in his 60 hp Green-engined biplane at an AUW of 1400 lb.

## Time of Change

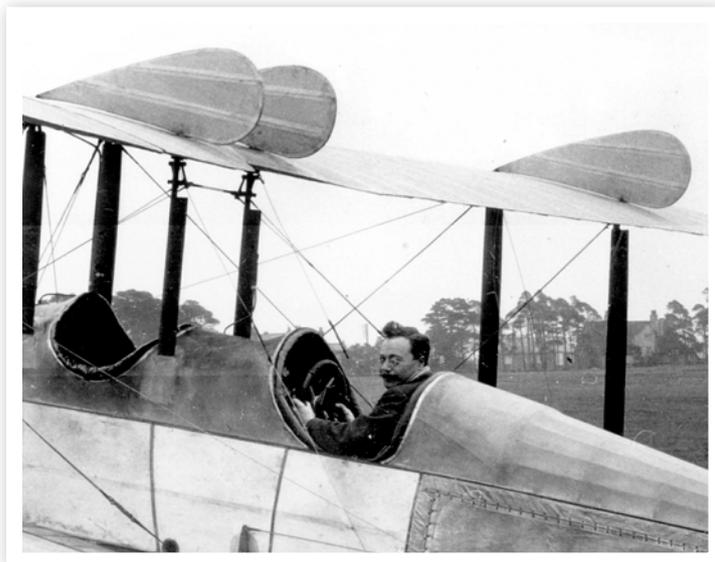
In April 1911 the Royal Engineers Balloon Section ceased to exist and became the Air Battalion No1 Company (Airships) based at Farnborough. The Balloon Factory became the Army Aircraft Factory with O'Gorman as Superintendent.

The design and build of the Factory's first aeroplanes, the SE1 and BE1, continued in these years, 1910/11, and in November 1911 a report prepared by O'Gorman (R&M No59) laid out the classification of the aeroplane design adopted by the Factory (SE,FE,BE etc).

Limitations of early flight were highlighted by poor engine performance and reliability and poor power-to-weight ratios. This led to a request being made in December 1911 that the Factory should design and build a more satisfactory engine, and resulted in a long line of RAF (Royal Aircraft Factory) engines beginning with the RAF 1a of 1913 to those of 1917. One month later, the first BE1 hosted a series of airborne Wireless experiments using a radio designed by R. Widdington, who had recently joined the Factory from Cambridge, and successful spotting for army artillery was carried out on Salisbury Plain for the first time.

In April 1912 a White Paper entitled 'Memorandum on Naval and Military Aviation' changed the name of the Army Aircraft Factory to the Royal Aircraft Factory and laid down the functions of this establishment by the War Office.

## Busk, De Havilland and Sykes



Above : Edward Busk testing his own ideas in the search for the stable aeroplane

In June of that year, Edward Teshmaker Busk arrived at the Factory from Cambridge and commenced research in aerodynamics, particularly in respect of stability and control.

In that same month, a BE2 aeroplane was flown to an altitude of 10,000 ft – a world record – by test pilot Geoffrey de Havilland and Captain Sykes. At the same Military Trials at Lark Hill where this record was set, Cody won the trials in his 120 hp Austro Daimler engined biplane, beating some 30 other French and English aircraft. The Factory provided the special recording instruments to record the many flight and engine performance parameters, thus starting the long history of instrumentation research and development at Farnborough.

By mid 1913, Farnborough was setting up and carrying out structural overload tests on aeroplanes and this was supported by the basis principles of stressing of aeroplane structures (see *Flight 19 October 1913*).

## End of an Era

On the 7<sup>th</sup> August 1913, Cody lost his life when his latest aircraft, which he intended to use as a private entry for the Daily Mail Race around Britain, broke up in the air and Cody fell to the ground from some 300 ft. One hundred thousand people attended his funeral and he was laid to rest in the Aldershot Military Cemetery – where his headstone can still be seen.

As 1913 drew to a close, the factory originated the Inspection Methods for Aircraft & Accessories and on 1 January 1914, the Navy and Military Airship Section were amalgamated, the Admiralty taking over the military airships and equipment from the Army, signalling the end of the Airship phase at Farnborough.

### FURTHER READING

*There is much more on this fascinating period of Farnborough's development in other FAST briefings and in :*

The Royal Aircraft Factory, Paul R Hare, 1990 ISBN 0-85177-843-7

Early Aviation at Farnborough Vols 1&2, Percy B Walker

The Flying Cowboy, Peter Reece

Flight & Aeroplane of the period (*available in the FAST Library*)

1866 to 1966 Royal Aeronautical Society Centenary Report



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