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**RAE 100** The Royal Air Force was formed 100 years ago, on 1 April 1918, by amalgamating the Royal Flying Corps and the Royal Naval Air Service. The RFC was initially established in 1912, with four parts: the Military Wing (to serve the Army), the Naval Wing (to serve the Navy), the Central Flying School and the Royal Aircraft Factory (to design aircraft). The Factory, established at Farnborough, was the source of many important aircraft of World War I, including the BE2 and the SE5. On the formation of the Air Force, however, with its abbreviation 'RAF', the Factory, also then known as the RAF, had to change. It became the Royal Aircraft Establishment, our 'RAE'. So as well as celebrating the centenary of the Royal Air Force we can also celebrate the centenary of the founding of RAE.



Royal Aircraft Factory BE2c Reconnaissance Scout

**Aircraft Retirement - BAC221/HP115 and Concorde Flight Research at Bedford** Concorde first flew in 1969 – prototype 001 at Toulouse in France on 2 March and prototype 002 at Filton on 9 April. Bedford's flight research programme supporting the Concorde project employed two research aircraft, the Handley Page HP115 (XP841) at low speeds and the BAC221 (WG774) at supersonic speeds. These aircraft retired 45 years ago: the BAC221 made its last research flight on 4 June 1973 and the HP115 its last research flight on 31 Aug 1973. Both aircraft are now at the Fleet Air Arm Museum, Yeovilton. The first photograph (*neg B2565A*) shows the HP115 conducting smoke tests to reveal the vortex flow over the wing. The second photograph (*neg M313*) is a rare picture of the BAC221 (foreground), in formation with the second Fairey FD2 (WG777), showing clearly how the wing differs from the FD2.



**Bedford Airfield Main Runway** (by Reg Harlow) When the main runway at Bedford first became operational in 1954, many of us considered it to be the longest and widest in the country (10,500 feet long, 300 feet wide). This was true in terms of operational runways at that time, but it is perhaps surprising to know that there were even larger runways in use earlier.

During the second World War three UK airfields were designated as emergency recovery sites, Woodbridge in Suffolk, Manston in Kent and Carnaby in Yorkshire. Each of these airfields was provided with a concrete runway 9000 feet long and a remarkable 750 feet wide. This was achieved at Woodbridge by clearing more than one million trees from Rendlesham Forest (taking 2 years) to provide an obstruction-free site in an area considered to be nearly fog-free.



Unfortunately this proved not to be the case. On one occasion a number of Halifax aircraft returning from a bombing raid over Germany found their own base closed by fog and therefore attempted to land at Woodbridge. The fog there was also bad and only one landed successfully, the rest crashing in the area around Woodbridge. As a result Woodbridge was then fitted with a FIDO (Fog Investigation and Dispersal Operation) installation which could pump up to 99,000 gallons of petrol per hour through pipes along each side of the runway, with burners creating a wall of flame generating sufficient heat to clear the fog along the runway.

The photo shows Woodbridge with its modern runway - the original 750 feet wide strip clearly visible.

*Bedford Aeronautical Heritage Group*

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The 750 feet wide runways were operated in a unique way. They were divided into three lanes, each 250 feet wide. The most northerly had yellow edge lights, the central strip white lights and the southern strip green lights. The northerly and central strips were allocated by Flying Control, but the southerly strip could be used at any time by aircraft in distress without having to make any radio contact. No less than 4,200 aircraft made an emergency landing at Woodbridge.

It was at Woodbridge that the Blind Landing Experimental Unit (BLEU) was formed in 1945 before moving to Martlesham Heath in 1946, and then to Thurleigh in 1957. While at Martlesham Heath, BLEU continued to use the Woodbridge runway for approach and landing trials.

*With acknowledgements to the Bentwaters Aviation Society and the Milton Keynes Aviation Society*

**RAE Bedford flight controls return to the UK** (By G T Shanks) Four Joint Strike Fighter F-35B aircraft (Lightning II) were recently delivered to the UK as the first contingent of aircraft for the new Royal Navy aircraft carrier HMS Queen Elizabeth.



These aircraft, replacements for the Harrier Force, have the highly successful computer-based control law algorithms researched and developed at RAE Bedford using the VAAC Harrier aircraft (pictured left, *neg M354*) back in the 1990's. With these control laws, the F-35B aircraft is flown down to the hover without the need for a nozzle control lever, unlike the Harrier. This innovation allows the pilot to control the aircraft in the same unified way independent of airspeed. The control law algorithms provide the new STOVL aircraft with a highly stable platform, excellent handling qualities and a low pilot workload in the transition region from wing-borne flight to the hover. These flight characteristics are of particular merit when recovering to a ship in bad

weather and poor visibility. All examples of the F-35B (the STOVL variant) will employ these Bedford-originated control laws, not just those for the UK. The UK's F-35B aircraft will conduct their first of class flight trials on HMS Queen Elizabeth at sea in late 2018.



*HMS Queen Elizabeth on sea trials in 2018*



*F-35B hovering over US ship*

**New Book by RAE Bedford Author** Bruce Lumsden, who worked in the Blind Landing Experimental Unit and later in Flight Systems Department, has published this book, *Touchdown, Safely! A Boffin's Tale of All-weather Approach and Landing Research and Flight Trials at RAE Bedford 1966-1986*. His work focussed on the challenges of landing aircraft safely in all weather conditions. The book is part historical, part technical and part autobiographical, describing a number of major experimental programmes on which the author worked, and also including some personal recollections of life at RAE Bedford. The book is illustrated with many well-produced photographs and numerous diagrams and charts, taken from the author's technical papers, showing the results of the various trials and experiments undertaken. The book will appeal to readers who would like to know more in depth about aspects of autoland and other technology associated with achieving safe landings in all weathers, and about how scientific research programmes are conducted.

The book can be purchased (price £25 plus P&P) via BAHG, by sending an email to [bahg-bt@hotmail.co.uk](mailto:bahg-bt@hotmail.co.uk).

