

RAE Bedford Officially Opened 27 June 1957

(The material below was first prepared for the FASTA Newsletter and is repeated here, with a few extra pictures, in this longer-than-usual newsletter, for the benefit of the BAHG community.)



RAE Bedford, Thurleigh airfield (neg B3696F, 1974)



RAE Bedford, wind tunnel site (neg A6557, 1991)

Editor's Grovel

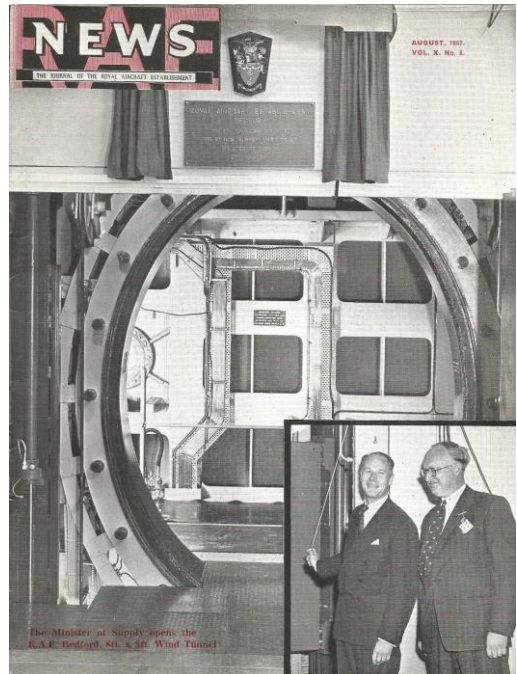
Thank you to all our readers who quickly pointed out that the cover of the October 1962 issue of RAE News shown in the last newsletter was a splendid shot of a Gloster Gladiator (from the Shuttleworth Collection), not a Fairey Swordfish. The editor has duly swallowed humble pie. A corrected version of Newsletter 26 has been placed on our web site.

RAE Bedford Official Opening

Sixty years ago, on 27 June 1957, Aubrey Jones, the then Minister of Supply, opened the newly completed 8x8 supersonic wind tunnel at RAE Bedford as the culmination of the post-war construction of the new establishment. RAE News in August 1957 recorded this event, on its front cover, and included the Minister's speech inside. The inset shows the Minister unveiling the plaque, accompanied by L H G Sterne, Chief Superintendent at Bedford. The main picture is the entry to the 8x8 tunnel working section. Note that wind tunnels like the 8x8 are typically identified by numbers which show the dimensions of the working section, in feet.



After inaugurating the 8x8 tunnel (see picture of plaque, neg B4467-Bk1A), the Minister later that day opened the new control tower (neg B4151-Bk1A) on the Bedford airfield and formally declared the whole establishment open.



Conceived before the end of World War II, as a new national facility to conduct aeronautical research, RAE Bedford was originally labelled the National Aeronautical Establishment (NAE), reporting independently of RAE Farnborough. W G A Perring, then Director RAE, was destined to be the first Director of the NAE, until his untimely death in 1951. By December 1955 NAE had become a full part of the RAE.

The need for new national research facilities was first identified in the Aeronautical Research Council's report ARC 7500, dated March 1944. There being insufficient space for a long runway at Farnborough, a new site was sought and a location to the north of Bedford was identified in 1945 as suitable, with three former war-time airfields in close proximity (Twinwood Farm, Thurleigh & Little Staughton).



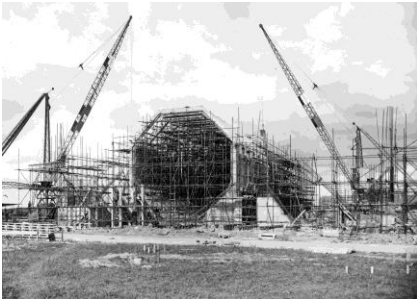
Early plans were very grand (artist's impression right, neg B11354-Bk1A),

Bedford Aeronautical Heritage Group

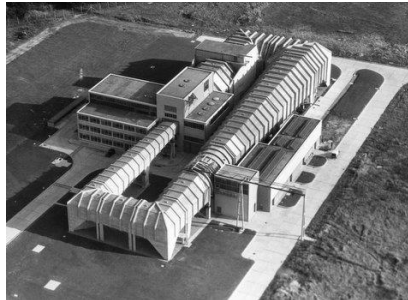
Don't forget, to contact us with any news or comments, please email (bahg-bt@hotmail.co.uk).

with more than 14 wind tunnels, extensive engine and structural test facilities, and a large well-equipped airfield for flight testing. Shortage of money scaled back these plans, and just five main tunnels were built. However, despite the need for concrete and steel (and manpower) to re-build the country after the war, construction of the new establishment was given high priority and began in 1947, with new roads and the first wind tunnel, the 3x3 supersonic tunnel, followed soon after by the 13x9 low speed wind tunnel. The estimated cost of the new establishment was £20M at the time, revised to £30M (about £2-3 Billion in today's money) by the opening.

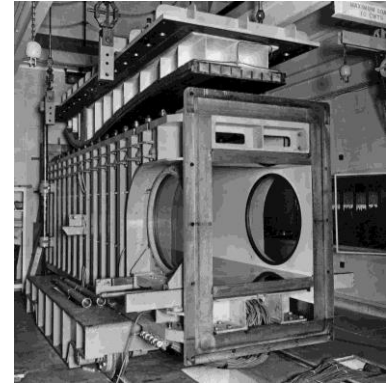
The 3x3 tunnel made its first calibration runs in April 1952 while the 13x9 was in active use by 1954, as well as the 3x3. Construction of the largest of the Bedford wind tunnels, the 8x8 supersonic tunnel, was approved in August 1949 and work was well under way in 1951. This tunnel was a focal point of the grand opening day on 27 June 1957. The last of the Bedford wind tunnels, the High Supersonic Speed Tunnel (HSST), with a 3x4 working section and capable of operation to Mach 5, was completed and opened in 1961. The fifth tunnel, the Vertical Spinning Tunnel (VST), also completed by 1952, was hardly used. It is still running today, however, having been adapted for sky-diving activities. The 13x9 is also still operating, being owned by Red Bull and used to test Formula 1 car aerodynamics.



1950 view of 13x9 tunnel under construction (neg RAE89664)



Aerial view, 1955, 13x9 tunnel finished (neg B3433-Bk1A)



3x3 working section, 1953 (neg RAE108008)



Early stages in the construction of the 8x8 tunnel in 1951, (neg RAE96212) before the water tower was moved.

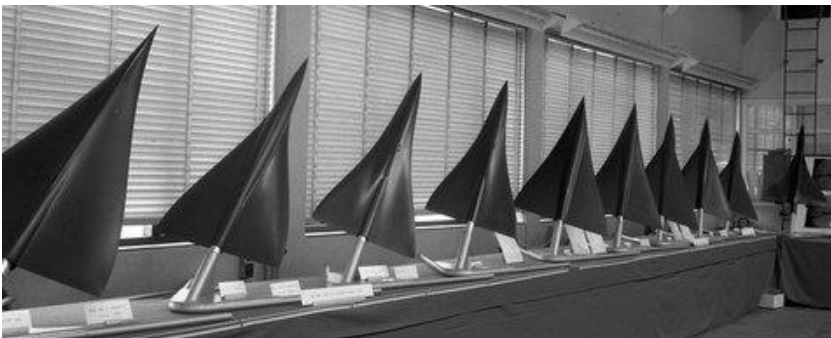


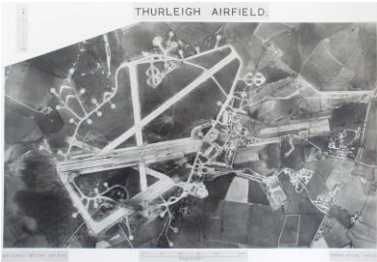
The 8x8 tunnel complex, a view taken in 1982 (neg B6087R)



Exterior view of 3x4 (HSST) tunnel building, 1961 (neg C6568)

The 3x3 and 8x8 supersonic tunnels were used extensively as part of the Concorde programme, to research practical wing shapes for Mach 2 cruise, and also engine intake design. The picture below shows a few of the slender wing models evaluated (neg B5557-Bk1A), together with a picture of ground effect tests with a sting-mounted Concorde model in the 13x9 tunnel (neg C10687).





To provide the desired facilities for flight research, Thurleigh airfield, formerly a base for the US 8th Army Air Force during the war, was substantially re-built, with a brand new main runway 10500 ft long by 300 ft wide, two experimental catapult facilities for naval aviation research, other experimental facilities for arrester gear studies, a VTOL pit and a new control tower. It began operation as Bedford airfield in 1954, when the first officer commanding (see below) was appointed. With the new runway aligned through the centre of the war-time

hangar complex (see image above taken in 1952, *neg M119*), all the hangars were removed, with two being re-positioned (for use by NAD) and three new ones constructed for Aero Flight, BLEU and general maintenance (see right, *neg C6602*).



Although not yet officially opened, there were early VIP visits to the nascent establishment, with the Minister of Supply, Mr Duncan Sandys, on 13 June 1952 (as reported in RAE News July 1952, in the first occurrence of a new feature, "News from the National Aeronautical Establishment") and Lord Mountbatten, First Lord of the Admiralty, on 12 August 1955.

The official date of the commencement of flying operations at Bedford was 14 November 1955. This is recorded in the first Operations Record Book for Flying Wing, RAE Bedford compiled by OC Wg. Cdr. H.G.F. Larsen (in January 1957) and now held in The National Archive. He wrote "Up to October, 1955, the airfield at Bedford had been used only on a few occasions for specific experimental tasks originating at Farnborough. There was no air traffic organisation and no resident officer complement, apart from the Naval officers concerned with the scientific work of NAD." (April 1954 saw the first dead-load launch from the raised catapult.) The aircraft of Aero Flight and Naval Air Department arrived from Farnborough on 14 Nov 1955. The picture left (*neg NAD1-3145*) shows the launch of Scimitar '618' from the raised catapult in 1964 – unfortunately, there are no pictures of the first ever catapult launch of an aircraft at Bedford, reported by Percy to have occurred on 25 Nov 1955.



Airfield facilities were not complete in 1955, although all runways were serviceable and fit for their task. The control tower was still under construction (completed Sept 1956). Hangar 1, the maintenance hangar, was completed towards the end of November 1955, while the Aero Flight hangar was still being constructed, together with the Aero Flight pilots' block. The 1961 picture, right, shows some of the early Aero Flight research aircraft (*neg B2550*) including FD2, Avro 707A, and Short SB5.



The Blind Landing Experimental Unit (BLEU) moved in from Martlesham Heath in Suffolk in early 1957. The picture shows BLEU Canberra WJ992 used for autoland research (*neg B4654*). Thus, by the official opening day, the three main flying research groups were well established and actively pursuing their research programmes.



Much of the work undertaken at RAE Bedford is described in two books (available for sale from BAHG), *Wings Over Thurleigh*, dealing with flight research, and *Wind Beneath the Wings*, describing the wind tunnels and the research work undertaken,

and a few other topics.

On the official opening day in 1957, the Minister arrived by Westland Dragonfly helicopter WG725 (*neg B4452-Bk1A*) and was met by the Director RAE (Sir George Gardner) and the Chief Superintendent Bedford (L H G Sterne), accompanied by Morien Morgan, the then Head of Supersonic Aerodynamics.



On the airfield, the research fleet was lined up (see below, *neg C1490*), and individual aircraft could be inspected.



The Rolls-Royce “Flying Bedstead” XJ314 (below) was the first Vertical Take-off research aircraft to be tested at Bedford and marked the beginning of a long-lasting theme of Bedford research on Vertical Take-Off and Landing (VTOL), being followed by the Short SC1, Hawker P1127 and finally culminating in the VAAC Harrier XW175 and its research on the advanced flight control laws now

embodied in the next generation Lockheed Martin F-35B Lightning II.



Boulton Paul BP111A Delta VT935
(image courtesy John Selby, 262-1957)



Fairey FD2 WG777
(image courtesy John Selby, 263-1957)



Rolls-Royce “Flying Bedstead”
(image courtesy John Selby, 266-1957)



Short SB5 WG768
(image courtesy John Selby, 264-1957)



English Electric P1A WG763
(image courtesy John Selby, 265-1957)



Aircraft outside hangar 1, May 1956, including Supermarine 508 VX133 (V-tail), Hunters, Meteor, Javelin, BP111A (*neg B3858-Bk1A*)

The pictures above (provided to BAHG by former RAE employee John Selby) show some of the research aircraft on display, over a three-day period, for staff and families as well as VIPs. The 1956 scene shows a varied group of aircraft.

The creation of RAE Bedford immediately after WWII was a big step in providing vital new aeronautical research facilities to complement Farnborough’s capability and standing in the world. The commitment of money and resources showed how high a national priority it was to create such research facilities. This commitment was repaid by the world-class research achievements of RAE Bedford, in Vertical Take-Off and Landing, Concorde aerodynamics, automatic landing in fog, naval air operations, civil avionics, and many more.

First Ski-Jump 40th Anniversary

The first ever ski-jump launch of a Harrier aircraft took place at RAE Bedford on 5 August 1977, when John Farley, a former test pilot in Aero Flight at Bedford, and then Chief Test Pilot BAE Dunsfold, took Harrier XV281 into the air with an initial ramp angle of 6 degrees. Progress was rapid, with a recommendation needed on whether to fit a ski-jump to the Invincible-class ships for the Royal Navy, as the first of its class, HMS Invincible, had been launched on 3 May 1977. By the end of August 1977, Harrier XV281 had completed 73 launches successfully, accumulating sufficient data to verify the predicted performance advantages. RAE’s two-seat Harrier XW175 joined the trial on 23 August 1977 and accumulated a further 43 launches by 7 September 1977 (picture right, *neg B4517A*). The decision to fit the ski-jump to the new Invincible Class ships was made on 22 September 1977.



To determine the best ramp angle for service use, the trials continued to explore the launch performance with increasing exit angles up to 20 degrees. The optimum was established at about 12 degrees but, initially, a 7 degree angle was selected and retrofitted to HMS Invincible and HMS Illustrious. Later the angle was increased to 12 degrees, during a refit.

Bedford Aeronautical Heritage Group

Don’t forget, to contact us with any news or comments, please email (bahg-bt@hotmail.co.uk).