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BAHG Newsletter

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Vulcan XA899 demonstrating an autoland at Thurleigh, Feb 1962 (neg B128)

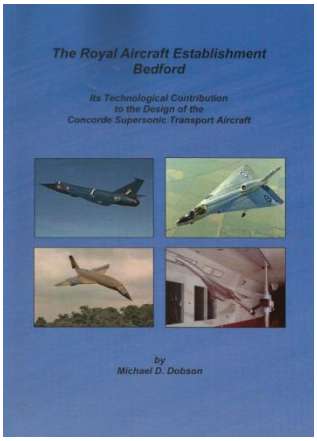
Prototype Concorde G-BSST "touch and go" at Thurleigh, Jan 1972 (neg B3090)

Vulcan XA899 Anniversary The autoland programme run by the Blind Landing Experimental Unit (BLEU) was established at Martlesham Heath in Suffolk in 1945, with BLEU "to be responsible for the development of blind approach and landing of RAF, Naval and Civil aircraft". With the feasibility of automatic landings having been demonstrated, Operational Requirement 947 was issued 65 years ago, in 1954, for the development of an automatic landing capability for the RAF's V-bomber fleet, to provide the V-Bomber force with the ability to land back at base in all weathers. This became BLEU's focus. BLEU moved to RAE Bedford in 1957, for its better facilities. While most of the early research work used Varsity aircraft as flying laboratories, the ultimate demonstration was required in a Vulcan. Avro Vulcan B1 XA899 was seconded to BLEU from 1959-1961 and in December 1959 performed the first automatic landing in the world by a four-jet aircraft. A plaque (pictured, *neg M378*) was put in the aircraft. Autoland for the Vulcan was accepted into RAF service in 1961. BLEU then applied the concepts to airline operations and 55 years ago, in 1964, received from the Guild of Air Pilots and Air Navigators the Cumberbatch Trophy (pictured on wing of Varsity, *neg B1007*), awarded for BLEU's outstanding contribution to air safety.

Concorde at The Higgins Museum The display telling the story of RAE Bedford's research contributions to the Concorde programme is still open in The Higgins Museum Bedford, and will remain so into 2020. This display was reported in detail in the last newsletter.

Concorde Talk at The Higgins In support of this Concorde exhibition, Barry Tomlinson will be giving a talk at The Higgins on Wednesday 6 November 2019, 2pm-3pm, on the theme of "RAE Bedford and Concorde". Entry is free but booking via The Higgins is essential (01234 718618).

Concorde at Thurleigh We have just one record of Concorde coming to Thurleigh, in January 1972 (photo above), as a "thank you" to the Establishment for its major research contribution to the project. Some people, however, have suggested there were other visits. Does anyone have any recollection or evidence of Concorde visiting Thurleigh again, perhaps to do ILS trials? Some tests flying our HS125 to assess the air wake behind Concorde were also conducted over the Irish Sea. Can anyone tell us more?



New Book – RAE Bedford's Contribution to Concorde A new book about RAE Bedford's contribution to the Concorde programme is now available. This is: '*The Royal Aircraft Establishment Bedford, Its Technological Contribution to the Design of the Concorde Supersonic Transport Aircraft'* by M D Dobson. This book seeks to provide an historical record of RAE Bedford's involvement in research for Concorde by drawing together and reviewing all of the research and development programmes which RAE Bedford so successfully undertook using advanced wind tunnels and flight test aircraft. With 72 pages and 45 illustrations, copies (priced at £10 plus p&p) can be obtained by contacting Mike Dobson on 01234 771685 or via bahg.books@gmail.com.

Timescales in Civil Aviation Research (by Reg Harlow) In June 1998, Civil Avionics Section at Bedford carried out six demonstration flights of an advanced Air Traffic Management (ATM) system designed to increase airspace capacity in order to reduce delays and cope with the ever-increasing traffic demand, while maintaining or improving safety levels. The system also enabled aircraft to operate close to their optimum performance, with a resulting reduction in costs and pilot/controller workload. RAE Bedford's BAC 1-11 (XX105) aircraft (pictured, *neg A3439*) was based at Bretigny, France for the demonstrations, which were the culmination of the PHARE (Programme for Harmonised ATM Research in Eurocontrol) programme.

The flights proved that a contract could be negotiated between the aircraft and the ground ATM system ensuring a conflict-free flight path in 4 dimensions (2D position, plus height and time), and that the aircraft could then stay within the contract boundaries. The display interfaces developed for the pilots and Air Traffic Controllers were also shown to be fully satisfactory. These can be seen in the photo of the XX105's cockpit (n*eg A9066*).

The negotiation started with the aircraft sending its ideal trajectory, generated by the on-board Flight Management System (FMS), to the ground over a Data Link. The ground system checked that trajectory against all other aircraft trajectories and sent back any necessary constraints (in position, height or time) required to avoid conflict with all other aircraft. A revised trajectory was then calculated by the FMS, meeting these constraints, and downlinked to the ground. A contract was then approved which defined a 3D "bubble of airspace" moving with time, within which the aircraft must remain.

Eurocontrol have recently issued a Press Release stating that aircraft trajectories are now being downlinked from cooperating aircraft to the Maastricht Upper Area Control Centre to enable controllers to assess the quality and usability of the data. Therefore the first step has been taken towards implementing a system demonstrated by RAE to be effective 21 years ago. Clearly research in the Civil Aviation field takes a long time to come to fruition and it will doubtless be many more years before the full system becomes operational. Meanwhile we will continue to be frustrated by delays to our flights, even when pilots are not on strike!

Harrier XW175 RAE Bedford's research Harrier has had a distinguished history from its arrival at Bedford in February 1975 to its final research flight on 18 November 2008 at Boscombe Down, but its future is now in doubt. The aircraft was recently acquired from the MoD by the Jet Art Aviation company (www.jetartaviation.co.uk), who wish to sell it on to a museum or other collection but so far has had no takers. Jet Art Aviation are well aware of XW175's achievements, which included development of head-up displays and operational procedures for the Sea Harrier, proving the ski-jump concept, supporting night vision research and the VAAC flight control programme, which culminated in the "unified" control system devised at Bedford being adopted for the F-35B Lightning II.

Harrier XW175 9 deg Ski Jump, 1977 (neg B4551H)

VAAC Harrier XW175, 1994 (neg A10453)

F-35B Lightning II on HMS Queen Elizabeth in 2019

It would be very sad if, fifty years since the Harrier's first flight, Harrier XW175 were to be broken up and its heritage lost. We hope that a major air museum can be found to provide accommodation for this iconic aircraft.