



# THE HAWKER ASSOCIATION

NEWSLETTER 63 - SPRING 2022

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## EDITORIAL

Please read the AGM calling notice, the membership renewal form and the committee nomination form enclosed with this Newsletter. There is a committee vacancy as Wilf Firth has retired.

Since the last Newsletter, NL62, Members enjoyed an excellent in-person Christmas lunch and a Zoom talk. NL62 was successfully distributed digitally and we hope more Members will choose this method in the future (see below).

Thank you to all who have sent contributions or have given talks. Do not worry; all will be published or continued as space allows.

The committee wishes all members a happy and healthy 2022.

I am running low on articles for the Newsletter and am certain that many Members have interesting tales to tell so please write them up and send them to me. Don't be shy about the writing; it's the editor's job to polish the piece before printing. Send your contributions to the Editor, Chris Farara at [cifarara@gmail.com](mailto:cifarara@gmail.com) or by post to 24 Guildown Road, Guildford, Surrey, GU2 4EN. Phone 01483 825955. Note new e-mail address.

## IMPORTANT NOTE

If you did not respond to the request in NL61/63 and would prefer to receive the Newsletter by e-mail ONLY please let the secretary, Dick Poole, know at [secretaryhawkercommittee@gmail.com](mailto:secretaryhawkercommittee@gmail.com). Overseas Members are requested to seriously consider the e-mail option as postage is very expensive.

However, as the Association sends important information and reminders only by e-mail it is in everyone's interests to ensure that the secretary has your e-mail address.

## PROGRAMME FOR 2022

Wednesday February 9 <sup>th</sup>	Robin Trewinnard-Boyle - 'F-35B Flight Tests and Sea Trials'.
Wednesday March 9 <sup>th</sup>	Angela Bailey - 'Frank Murphy, Hawker Test Pilot'.
Wednesday April 13 <sup>th</sup>	Annual General Meeting followed by entertainment TBA.
Wednesday May 11 <sup>th</sup>	TBA
Wednesday June 8 <sup>th</sup>	Summer Barbecue at the Hawker Centre.
Wednesday July 13 <sup>th</sup>	TBA
Wednesday August 10 <sup>th</sup>	TBA
Wednesday Sept tba	Visit to Farnborough Air Sciences Trust

Angela Bailey is Frank Murphy's daughter and has researched Frank's life. Robin Trewinnard-Boyle had a long and varied career in the Royal Navy in engineering and flying, including the Sea Harrier and Harriers GR7 and T10. He also participated in the UK F-35B operational flight testing at NAS Pax River and at sea. Sir Donald Spiers is organising a visit to the Institute of Aviation Medicine centrifuge as part of the FAST outing.

General note. It is planned that meetings will be both live and by Zoom but may be affected by the Covid situation, as may the barbecue and FAST visit. Members will be kept informed by e-mail (as long as the Secretary has your address!)

## HAWKER P.1121

This was a very advanced Mach 2 fighter project of the 1950s, company funded until the 1957 Sandys defence white paper made it clear the prospects of its adoption for the RAF were gone. A prototype, to be powered by the mighty DH Gyron turbojet, was well under way at the time, most of the fuselage and one wing being built. Having been in storage for many years at the RAF Museum Duxford, these assemblies have been declared surplus to requirements. On behalf of the Association our Chairman has submitted an 'expression of interest' and is working closely with the Brooklands Museum management and trustees to bring the remains back to Surrey.

## FIRST UK F-35B LOST

A UK F-35B (ZM152) was lost when performing a Ski Jump launch from HMS Queen Elizabeth participating in NATO exercise 'Steadfast Defender' on May 27 2021 off the coast of Portugal. The aircraft failed to accelerate to flight speed and toppled off the bow end into the sea. The pilot ejected safely and was rescued and the aircraft was eventually recovered from the seabed. The cause of the crash has not been released but it has been suggested that an intake blank or weather cover may have been ingested. There goes £100 million of taxpayers' money! A video of the incident found its way onto the internet (Google UK F-35 crash). The photographer has been arrested.

## RAF HAWK T1s RETIRE EARLY ?

It has been reported that the 76 strong Hawk T1 fleet, at RAF Leeming and RNAS Culdrose, is to be retired on March 31<sup>st</sup> 2022, leaving just 28 T2s at RAF Valley. Apparently 'synthetic training' will augment the T2 capability. The Red Arrows T1s will continue until 2030 if enough financial sponsorship can be obtained.

## HUNTER XL623

Paul Rash reports...

Nothing useful has been done at Dunsfold since October 23<sup>rd</sup> when the Marvel Film Company moved us off our stand. Although they have left, we still have to move the fuselage and trailer back when weather permits. A new nose undercarriage door and a fuselage access door are being worked at Brooklands. The team is ready to restart.

## G-HAWK

G-HAWK's own wing in its final configuration has been received at Brooklands from BAE Systems. Its last job with BAES was on a non-flying publicity 'mock-up' of a proposed Indian Hawk variant with leading edge slats, and is painted in a colourful red, white and green livery. It has five pylons and wingtip missile launchers. In due course it will be painted dark blue to match the rest of the aircraft, with the slats removed. It will be fitted to G-HAWK carrying a pair of Sidewinders.

## HAWKER HURRICANE - DISPELLING HISTORICAL MYTHS

On November 10<sup>th</sup> Stephen Philpott addressed thirty Members live and twenty by Zoom on the enduring fallacy that the Supermarine Spitfire 'won' The Battle of Britain' (BoB) and that it was pre-eminent throughout WW 2. He was introduced by our Chairman, Chris Roberts, who said that after working for the MoD Stephen joined BAe at Kingston in 1989 as an operational analyst and market researcher. There his belief that the Hurricane was undervalued relative to the Spitfire by 'historians' led him to research the RAF service history of the type seeking original data: National Records Office material, Squadron historical records, pilots' log books and so on. His book, 'Hawker Hurricane - Defender of the Skies', was the outcome of his studies comparing the combat records of the Hurricane and Spitfire.

Stephen started by stating some basic fact about the Hurricane. It was easy to build using the simple manufacturing techniques developed by Hawker for their very successful 'beautiful biplanes'. The Spitfire was more complex with a modern stressed skin airframe, less robust than that of the Hurricane, not able to sustain as much battle damage and not so easily repairable. The Spitfire also needed a more protracted test and development programme resulting in fewer aircraft being available in the Summer of 1940. 1,715 Hurricanes flew with fighter Command during the BoB, many more than all other fighters combined. This superiority in numbers led to the outcome of the BoB: actual enemy losses credited to Hurricanes 661; to Spitfires 518 (56%:44%).

The Hurricane fought in 33 campaigns in theatres from the 'phony' war in France to Yugoslavia via the North African desert, the defence of Malta, southern Europe, the Middle East, east Africa, Russia, Singapore, Java and Burma, to name but the main ones. In contrast the Spitfire didn't leave Britain until 1942. In the Far East Hurricanes were operational for 3 years 8 months, the Spitfire 1 year 11 months.

Over WW2 looking at air combat only, actual enemy losses to the Hurricane were 1427, to the Spitfire 1732; whilst Hurricanes lost were 1631, Spitfires lost were 1822, 'showing' superior results for the Spitfire. But does it? Stephen contended that this was not a fair comparison because the Hurricane was not used in the air combat role after 1942 whereas the Spitfire was until the end of the war. So if you exclude results post 1942 the Hurricane is still responsible for 1427 actual enemy losses but the Spitfire count reduces to 1258.

After his talk Stephen answered questions from the floor before being thanked by Speaker Secretary, Frank Rainsborough.

This talk is available to members on You-Tube. There were some problems with the sound recording but most is satisfactory. Copies of Stephen's book can be obtained from the author at 19 Andrews Close, Epsom, Surrey. KT17 4EX for £19.99. Phone 07986 764408, e-mail [stphplpott@aol.com](mailto:stphplpott@aol.com).

Editor's comments.

We must remember that the Hurricane was, as Stephen pointed out, essentially of an earlier generation so its success rate is even more remarkable. The conservative and practical Camm chose to retain his simple, rugged, tubular steel structure for his first production monoplane using the existing skills of the Hawker workforce, whereas Mitchell embraced the new, initially troublesome in manufacture, stressed skin construction technique concentrating on achieving high performance. The result, fortunately for the United Kingdom, was that the RAF had two fine complementary fighters in sufficient numbers when they were needed. Subsequently the Spitfire was considerably developed throughout WW2 while Camm's Hurricane successors, the Typhoon and Tempest, were modern stressed skin designs with, in the case of the Tempest, thinner (elliptical) wings.

## THE GREAT TRANS-ATLANTIC AIR RACE 1919- PART 2

David Hassard's account is continued from NL59.....

On 8<sup>th</sup> May three of the US Navy flying boats left Long Island for Halifax, Nova Scotia, on their way to Newfoundland but

NC 4 developed engine trouble and put down 80 miles out to sea, taxiing through the night to reach a naval base at Cape Cod. The other two reached Halifax and three days later, with replacement propellers and better weather, took some seven hours to reach the south side of Newfoundland and the narrow inlet of Trepassey Bay where they managed to survive difficult landings, avoiding the many floating ice blocks in the gusting 40 knot winds. Their Atlantic attempt was supported up by a hundred US Navy ships, including support vessels which had been waiting for them in Trepassey Bay. In contrast to the small British team sitting it out in the bad weather, the US Navy was banking on better weather, sooner, by taking a more southerly route, stopping in the Azores and then flying on to Lisbon.

After eight days at sea the Handley page V/1500 bomber was off-loaded at St John's on 10<sup>th</sup> May for an 80 mile rail journey to Harbour Grace where the only relatively flat land long enough had been leased. The Vickers team arrived at St John's three days later, Alcock and Brown finding rooms with Hawker and Raynham at the Cochrane House Hotel. They had two weeks to find a 500 yd field before their aircraft arrived. The following day NC 4 left Cape Cod for Halifax and the next morning for Newfoundland, hoping it would not be too late to join the other two on their Atlantic attempt.

The third contender to be eliminated before even getting to the start was the Bolton Paul Atlantic which crashed taking off on a test flight when one of the two 480hp Napier Lion engines cut out. The only other Napier Lion powered contender was the single-engine Alliance Seabird which was test flying from Napier's Acton airfield in London. The Seabird pilot and navigator were housed in a roomy enclosed cabin in the rear fuselage but the pilot was only able to see directly forward by putting his head out of the triangular side windows.

A surprise on the 15<sup>th</sup> of May was the arrival at St John's cricket field of the US Navy airship C5 after a record 25 hour 50 minutes 1,177 mile non-stop flight from New York. It was tied down with earth anchors satisfactory for 20 mile an hour winds and the crew went off for a rest whilst the ground party organised refuelling the 192 ft long, twin-engine machine with a 55 miles per hour cruising speed. Unfortunately, the wind picked up and 100 sailors struggled to control the swaying airship. When gusts reached 60 miles per hour the rip panel cord was pulled to deflate the ship. The cord broke as did the mooring cables so C5 was wildly blown away. Two ground crew jumped out before the airship slammed back down and the control car broke away. Now much lighter the envelope disappeared out to sea in the gusting winds. Harry Hawker quipped that they had "flown it all the way from New York and it is now dipping doodling on its way to Ireland without a soul on board".

That same day, further south in Trepassey Bay, NC1 and NC3 made unsuccessful take-off attempts in high winds and heavy seas which threatened to damage the aircraft. When NC4 appeared overhead the planned departure was abandoned in the hope of better weather the next day. On 16<sup>th</sup> of May the three NC flying boats were provisioned but NC1 and NC3 refused to leave the choppy water. NC4 landed back whilst equipment, spare fuel, water and floor planks were unloaded from the other aircraft, together with an engine mechanic. By 5.36pm all three were on their way to the Azores but in the dark they broke formation letting the faster NC4 go ahead.

The US Navy support ships were already strung out across the Atlantic at 50 mile intervals, in radio contact to aid navigation, for local weather reports and to provide an emergency response if needed. After 15 hours NC3 was completely lost. The crew, believing they were near the Azores and not wanting to hit a mountain in the thickening fog, alighted to use their radio compass direction finder, not realising until the last moment that the apparently flat sea had 12-ft waves. NC3 plunged into a wave, soared up and crashed down suffering considerable damage and severely injuring three of the crew. From the surface their SOS messages did not reach the rescue ships. The crew's extreme ordeal went on throughout the night and the next day as they struggled to taxi towards the Azores on one engine. NC1 did a similar thing; badly battered, with one wing dragging in the water and just one engine running, the aircraft taxied along with soaking-wet crewmen out on the other wing for balance. Luckily after 5 hours all six of the crew were rescued in the heavy seas by a small Greek tramp ship. In contrast, NC4 averaging 90 knots, contacted each destroyer in turn before the crew became disoriented in fog and the aircraft entered a spiral dive. Recovering, shallow water was seen through a gap in the fog and a descent made to 50ft below the fog when the islands of Flores and then Faial were spotted. NC4 alighted in Horta harbour, 180 miles short of their Ponta Delgado target, but safely in the Azores after 15 hours in the air.

Having patiently waited so long, Hawker's and Raynham's teams were determined not to let the Americans be first across. On 18<sup>th</sup> May, two days since the NCs left, they studied the weather forecasts and prepared their aircraft even more carefully than usual. By noon the weather in Newfoundland was good and both teams decided to make their attempt despite the Atlantic weather forecast of "not yet favourable but possible". In everyday suits and ties but with extra jerseys and then their immersion suits Hawker and McKenzie Grieve climbed into their open cockpit with mail bags, maps and navigation equipment, flares and smoke bombs, and sufficient sandwiches, hot drink flasks, chocolates and brandy for 3 days. At 3:15 Hawker lined up diagonally across the field, to compensate for the wind direction, and waved away the chocks. The undercarriage spread to its extreme with the weight of fuel. The Atlantic lifted off just clear of the fence at the far lower end of the field and after a 3 minute steady climb crossed over St John's. Hawker and McKenzie Grieve could see Raynham's aircraft at the water's edge surrounded by a large crowd and were delighted to have got away before him - although Raynham believed he could give Harry a three hour start and still win. At 1,500 feet Harry jettisoned the undercarriage, reducing wind resistance and the weight by 450 pounds. In another 5 minutes they were at 4,000ft and still climbing to get above a fog bank.

Back at Quidi Vidi the crowd were pushed back as the Raynor's engine was warmed up. Fred Raynham and Fax Morgan climbed aboard and started a take-off run down the narrow strip, despite a partial tailwind. After 300 yards the

Raymor, still on the ground, hit a bump, rose steeply and plummeted 100 ft to earth, buckling the undercarriage, then skidded on, to nose abruptly into soft ground at the end of the field. Raynham climbed out but Morgan, with his artificial leg, had to be extricated and had face injuries. Before any second attempt the aircraft would need significant repairs, a replacement engine and a new undercarriage.

For the first 4 ½ hours in the Sopwith Atlantic Kenneth McKenzie Grieve took sextant readings to check his dead-reckoning navigation before heavy cloud banks and rain squalls reduced visibility. It was bitterly cold in the dark at 10,000 feet, Mackenzie Grieve getting frostbite in his fingers with his gloves off to use the sextant and to free the collar of Hawker's immersion suit which was rising up and strangling him. After 5 hours the temperature of the radiator water was rising rapidly, remaining constantly high for another 2 hours. Hawker concluded that some foreign matter must have been clogging the filter in the engine water cooling system so he switched off the engine and dived steeply to clear it - that seemed to work. When Mackenzie Grieve finally got a gap in the cloud to measure their drift against the waves he realised that unexpectedly strong northerly winds must have taken them 150 miles south of their planned course, which Hawker corrected. To be continued.

## FROM GRADUATE TO EARLY RETIREMENT - Part 1 FLIGHT DEVELOPMENT

Your editor, Chris Farara recalls his life with Hawker....

I had always been interested in aircraft; one of my earliest memories is sitting in a push-chair in 1941, aged about three, and telling my mother that the aeroplane flying over was a Wellington. I felt quite affronted when she said "Don't be silly, you can't possibly know that". But I did because I had been given a large picture book of British aircraft for Christmas and the Wellington was in it. This interest was nurtured by my father, an automobile engineer, at that time teaching servicemen about engines at the Chelsea College of Aeronautical and Automobile Engineering, who made me cardboard cut-out aircraft models and, later, a pseudo Meccano set, the original being unobtainable in wartime England. So, when I came to choose a career path in the 1950s, it had to be aeronautical engineering.

There were few places to do a degree course then, just three in London: Imperial College, Queen Mary College and Northampton College London. My 'A' levels weren't good enough for the first, the second wouldn't take me so NCL it was. I enjoyed my time at what would soon become the City University. In those days graduates were sought by the companies who visited the colleges to assess the students and present their employment case. I was invited by de Havilland and Hawker Aircraft to see their facilities and be interviewed by senior engineering staff. Paul Boone was a contemporary and together, in some trepidation, we went to Kingston to be seen by Roy Chaplin who was very welcoming and kind. He took us on a tour of the factory which, as my holiday job had been at the extensive Vickers factory at Weybridge, left me wondering where the rest of it was! However, what grabbed our attention was the sight of a strange little secret aeroplane with bent down wings, which, Roy told us, would take-off and land vertically. That did it for me. We were told that they wanted us so I went home to await the letter of offer.

Next week I had my DH visit and was offered a place in the flight test instrumentation department, receiving a letter soon afterwards - but nothing from Kingston. Frustrated I phoned Personnel and asked if Hawker wanted me. "Oh, didn't we tell you? (Blunder number 1) yes of course we do" they replied. So, in July 1960 I joined the Apprentice Training School where I had to fill in a form in which one question was where I thought I would eventually like to work; I answered Flight Development. After a few weeks in the School I was given my programme of departments to sample - there was no Flight Development. (Blunder number 2). The Supervisor told me it was too late to change the programme but when I was at Dunsfold I was to go and see Fred Sutton, the Chief Flight Development Engineer, and ask if he would take me in for a couple of weeks. This I did and Fred agreed. The office was on the ground floor of the control tower, and in an adjacent pre-fabricated hut, with the test pilots upstairs. I really enjoyed my time there so I asked Fred if he would like to take me on full time in due course and to my delight he said "yes".

In the Summer of 1961, aged 23, I drove down to Dunsfold from Esher to start my first proper job, at £18 per week. I went into the Personnel office in the old parachute building and said I was Chris Farara reporting for duty. This caused the clerk to start frantically thumbing through files in a cabinet finally saying that they didn't know I was coming and that "Kingston never tells us anything". (Blunder number 3). As I knew the layout of Dunsfold I was sent on my way to find Flight Development in its new offices at the west end of the Production Hangar.

The familiar faces were still there: Ambrose Barber, Alan Gettings, Brian Beaumont, and Charlie Phillips. Ambrose and Alan covered aerodynamics (stability and control and performance) while Brian and Charlie did systems (electrics/avionics and hydraulics and fuel/powerplant) but there were no hard divisions. New to me were Eric Ellis in a wheel chair (caused by a motorcycle racing crash on the Isle of Man) who did analysis and Peter Wreford-Bush (Flight Technician Dunsfold), a Hawker man returned from Canadair where he had worked on flight testing the Sabre. Soon we were joined by another graduate, Russ Fairchild. Ambrose was given the job of mentoring me in the ways of the department and teaching me practical flight testing, very different from the theory taught at university. Ambrose and I got on very well together and I count myself very lucky to have had him as my mentor and friend. The department was completed by two young woman trace readers, a records clerk, Bill Dix, and Fred's secretary, Janet. It was a very youthful and happy office with lots of repartee and good natured fun; and what a wonderful place to work, deep in the Surrey countryside in the most beautiful surroundings - with aeroplanes! Bill Bedford was now Chief Test Pilot, Hugh Merewether his deputy, with Duncan Simpson and David Lockspeiser as production test pilots. Altogether a really good, small and enthusiastic team led by the

reserved and undervalued (except by the pilots) Fred Sutton. A retired naval officer he was technically astute but not comfortable managing people, leaving that to Peter.

We worked closely with the Experimental Hangar under the Manager, Len Harsey and Foremen, Alan Wigginton and Bert Hayward, the Instrumentation Department run locally by John Weekes under 'Jumbo' Betteridge and the Bristol engine reps, John Vowles and Mike Chittenden who married one of our trace readers, Brenda. The Senior Air Traffic Control Officer was Bertie Coopman who always got the pilots home exactly on time by continually updating their ETAs.

Each of the flight test engineers was allocated one of the test aircraft so that he became familiar with it. Ambrose's was XP836, the second P.1127, so I assisted him on that one. I soon had my own P.1127, XP976. We had to fill in the CAT (condition of aircraft for test) form and take it over to Experimental so they could prepare the aircraft in the required engineering and external stores configuration, fuel state which we calculated based on hovering performance using current atmospheric data, instrumentation recorder fit (A13 and CID paper trace and AOP automatic observer panel of photographed dial instruments) and so on. We also had to inform Instrumentation which parameters had to be recorded. The pilot's briefing note was compiled from the flight test requirements from Kingston specialists, the load sheet and the clearance documents (RDA13 and RDA94). We sat down with the test pilot (TP) as he transferred the test details to his paper roll kneepad.

When the aircraft was ready we collected the FAF (flight adjustment form), which declared the state of the aircraft, from Experimental and took it to the pilot and had a final talk about any last minute changes, including updated VTO and hover fuel states. We had to weigh the aircraft on the scales in the Production hangar before and after flight to cross check with the instrumentation fuel counter. In the early days of VTOL we filmed every take-off, hover and landing with a 16 mm Bolex camera and had our departmental brown Austin van down by the grid for radio contact with the pilot throughout the test. It was also necessary, for correcting performance data, to measure the outside air temperature with a whirling arm thermometer, obtain the atmospheric pressure with an altimeter and measure the wind speed with a hand-held anemometer, near the grid. We recorded this data on a pro-forma on which we noted details of the flight as it happened, including stopwatch times of cardinal events such as: engine start, full travel control checks, wheels off ground, manoeuvres and touch down. After the flight and a chat with the TP we would do a formal debrief with him, and he would then write up a narrative report from his knee-pad notes. Post flight John Weeks would remove the recorders and take them to his laboratory to unload the paper and film spools and process them. He would call us when they were dry and we would collect them and take them to our office for analysis. We had a film reading box for the AOP and cardboard scales we had made from the trace calibrations provided by Instrumentation. The paper rolls were stretched out on our desks and we compared the record with our stopwatch times and the debriefs and noted any unserviceable parameters for Instrumentation to fix. The pilots, especially Hugh Merewether, would often look through the traces with us as would the local Bristol engine people and visiting engineer Michael Miles.

Full analysis followed, sometimes with Kingston specialists present; Robin Balmer, Dave Rees and Trevor Jordan might be there to review and collect urgent data, after which we would analyse the records from the series of flights and prepare a formal report, a Flight Development Note (FDN). In those days the more comprehensive Flight Development Reports (FDRs) were often prepared by the TPs with our assistance. This was pre-photocopier so all reports were typed on translucent paper with yellow 'carbon' paper face-up behind to give a printable sheet on blue-print machines - very difficult to correct. Thanks to Paul Rash we have all these old reports at Brooklands, together with the 16 mm movie films... and the camera. During the P.1127 testing Ralph Hooper would come down to see how his project was getting on and to observe any development problems with us, down by the grid.

For spinning trials we had simple telemetry in a hut on the airfield equipped with an instrument panel for a safety TP to monitor altitude and to help the airborne TP identify spin direction if this was unclear. Telemetered aircraft data (control positions, rotation rates, altitude etc) were displayed continuously on pen and paper readouts for simultaneous monitoring by the FT engineers. It was recorded for later analysis.

Peter Wreford-Bush's equivalent at Kingston was Nigel Money (Flight Technician Kingston), another returnee from Canada, Avro Canada in this case, where he had worked on the design of the CF105 Arrow. He eventually joined Flight Development and prepared the flight test programmes, instrumentation lists and monthly summary reports which I helped him with. I learned much from him and when he later returned to Kingston I took over as Head of Flight Programmes.

One winter when I was at home with 'flu' Ambrose phoned to say that Fred had asked the office if anyone wanted to go to Germany for three months to work with the Dornier flight test team on their Do.31 VTOL transport programme being done in partnership with de Havilland. Nobody had volunteered so Ambrose advised me to call Fred asap if I wanted to go. My wife was happy so I called and got the job. The Dornier story will have to wait for another time.

When Folland was taken over by HSA, Gnat Trainer final assembly was moved to Dunsfold together with their flight development (and production) people, who were housed in Nissen huts to the west of the Experimental hangar, to run their test Gnats and ejection seat trials Meteor flown by their test pilots led by Mike Oliver. In due course Fred's department, which now included Colin Wilson, was merged with the Folland people in the Nissen huts with Fred in charge, Folland's John Lewendon as Head of Flight Test Operations (FTO) and Peter Wreford-Bush as Head of flight Test Instrumentation (FTI). Most of the Hawker engineers were in FTO with Folland's Ron Cooper, Peter Amos, Eric Crabbe and others whose names escape me. Also Reg Smyth from Kingston joined me in Flight Programmes. To be continued.

## FIRST TWO-SEATER HARRIER EXERCISE ON A SHIP by John Farley

Originally published in 'Harrier Communique' No.8, Winter 1974.

I was particularly frightened. Robbie Roberts (HSA Kingston Sales Executive) knew it too - he was with me at the time

I was trying to get on board the Indian Navy Carrier Vikrant. The weather was not too bad; there was low cloud and at low level the visibility was decidedly murky, only about a mile in a humid sub-tropical haze over the sea. In a Harrier of course, as we always say, you can slow down and visibility on the approach to land is nothing like the problem to a Harrier pilot as it is to the pilot of a normal high performance jet. Alas, at the time, Robbie and I were not in a Harrier but in an Indian taxi, streaking through the narrow crowded streets of Bombay's dockland. The cause of my fear was that on several occasions the young lad driving us used only the horn when I was absolutely certain that operation of the steering wheel and brakes was needed.

Once on the ship, though, we were quickly engrossed in details of planning the Harrier operations which were to take place eight weeks later. A meeting was held with the ship's officers and the engineering, administrative and flying control aspects were quickly dealt with. All that remained was a period on the flight deck where it was decided what markings would be painted on the deck. In the end we settled for a centre line two feet wide down the axial length of the deck, a white line across the bows of the ship for the 'nozzles down' cue and a dotted line down the starboard side of the deck, parallel with the centre line, for use as a 'wing tip safety line' behind which all parked aircraft, men and equipment would be positioned while a short take-off (STO) was in progress. More of these lines later as ideas about them turned out to be a most important new aspect resulting from the subsequent flying.

The Harrier to be used was the Hawker Siddeley owned two seat demonstrator registered G-VTOL. It was fitted with the Rolls-Royce Pegasus 11, the 21500 lb thrust engine currently in service with the RAF and USMC Harriers. It was to be the first time that the longer and heavier two-seater had been flown from a ship. Therefore, in our meetings with the Indian Navy, Robbie and I had been at some pains to point out that we only had estimates of our performance from Vikrant and that it would require cautious test flying, rather than a simple sales demonstration, allowing us to establish what weights we could lift from what deck runs in the hot monsoon conditions off the Indian coast in July.

The ferry flight to India was uneventful, the route being Dunsfold, Naples, Akrotiri, Tehran, Kuwait, Masirah, Bombay. The ground crew followed along each leg in a Hawker Siddeley 748. In Bombay the team met the monsoons, an intensity of rainfall that someone used to shopping in Woking cannot be expected to comprehend. Sufficient to say that although the Harrier arrived at Bombay only 20 minutes late on the plans laid two months earlier, we were a day late arriving at Cochin, the Indian Navy base on the south west tip of India. The delay meant that the two days allowed for work-up flying from the airfield prior to going on board Vikrant had to be shrunk to a single day. I didn't mind this but it was hard on Captain Tahiliani, the Director of Air Staff Division, Indian Navy, who was to fly in the rear seat. Since the Captain had not previously flown the Harrier it meant that he had to train very intensively to reach the standard necessary for him to control the aircraft himself in the confined environment of the deck.

The morning of the first day allocated to the ship dawned hot and humid but fine and the short flight out to the ship with a vertical landing (VL) on the stern was completely straightforward. Due to the test flying aspects of the initial take-offs it had been agreed that I would fly the aircraft solo the first day and Captain Tahiliani and two other officers would join in on the second day.

Examination of the deck markings showed that they had been painted just where I had asked for them but unfortunately the two foot wide centre line, down which the Harrier would roll, was in high gloss paint which was very slippery indeed when it was wet. Since the Harrier is controlled directionally by nose wheel steering it was clear I would have to run slightly to one side of this line. This caused some concern at first since the obstacle clearance on the left hand side with the Harrier on the line was only 8 ft 6 ins. Running to the right of the line would have taken the wing tip uncomfortably close to parked aircraft. However, there was an additional line already painted on the deck 7 ft to the left of the Harrier line and parallel with it so it appeared that providing the Harrier operated between these two lines all would be well. This was how the matter was left and after a short period of taxiing round the deck to familiarise the deck handlers with the Harrier I was all set for the first take-off. This was done at a light weight down the full length of the 660 ft axial deck.

The technique used for the first short take-off (STO) worked well and was retained in principle throughout the two days flying. It consisted of taxiing the Harrier into position at the start of the run, running the Pegasus up to 55% RPM with the brakes on and the nozzles almost aft at 8 deg down. Then, on being given clearance to take-off, the brakes were released, full throttle applied and the left hand moved from the throttle to the nozzle lever as the run commenced. The aircraft was kept straight with the nose wheel steering controlled by the rudder bar and then finally, when the white line at the end of the deck reached the bottom of the windscreen, the nozzles were lowered to the required angle marked by the preset STO stop. There followed a short period off the end of the deck when I reflected how lucky naval aviators are not having to bother to climb over anything from hedges, trees and houses up to hills and mountains, as pilots flying from airfields usually do.

Vertical landings (VL) with a Harrier are very straightforward because any approach path errors (slightly high, low, left, right, too slow, too fast etc) can be corrected after the aircraft has come to the hover, whereas in a conventional aircraft the pilot carries these errors with him right to touchdown. In fact the Harrier is so much easier in this regard that one has to remind oneself continually to stay alert and not relax because it is so straightforward.

I digress; back to the Vikrant. After this sortie a second was done at the same light weight to allow me to feel certain I had got used to the deck technique and then the weight was increased by putting more fuel into the Harrier. The third take-off was with full internal fuel, the fourth through to the eighth were all at full internal fuel but the distance of the start point from the end of the deck was reduced down to as little as 370 ft. The remaining take-offs on the first day were with the Harrier as heavy as we could make it using fuel alone and for these the two 100 gall combat drop tanks were full (approximately 1600 lb extra weight). The run was eventually reduced at this maximum weight to 585 ft. On the eleventh flight the aircraft was landed back at Cochin for the night with the whole Hawker-Rolls team as well as our Indian hosts well pleased with the day's activities.

The second day's flying saw Captain Tahiliani flying in the rear cockpit for the first six flights. He had no difficulty in taking control of the Harrier outside the hangar at Cochin and flying entirely unaided into a hover astern of Vikrant 20 minutes later. This, of course, illustrated why Hawker chose a two seater for the demonstrator. We say the Harrier can be flown by any pilot trained on modern military jets but people still tend to doubt it until they try it for themselves.

By the end of his six flights on the second day Captain Tahiliani had flown a take-off himself on the full length of the axial deck and had accompanied me on the first angled deck take-off using the short 377 ft deck length. In addition I demonstrated a cross-deck VL just aft of the island to show the technique used when landing a Harrier if the ship is not steaming into wind. Captain Tahiliani then gave up his seat to Cdr Grewal, the Commander (Air) of the Vikrant. Cdr Grewal being a current Sea Hawk and helicopter pilot found himself delighted with the Harrier, carrying out a decelerating transition alongside the ship followed by an accelerating transition back to wingborne flight, with no assistance from me other than the odd word of encouragement over the intercom. The three remaining flights that day were with Cdr Raju, a Sea Hawk Squadron Commander, in the rear seat. On these flights we covered a VTO from the bow of the ship and a heavy weight STO from the 310 ft point. This particular take-off allowed those on the bridge and in flying control the novel experience of looking down into the cockpit of a modern aeroplane about to do a free take-off from a point over half way down the deck. It resulted in many "I just don't believe it" comments.

I mentioned earlier about the deck markings and the ideas that resulted from the Vikrant operations. The conclusion of the Indian Navy officers at the end of the Harrier flying was that the Harrier needed a total operating strip no wider than 38 ft 6 ins (I talked them into this; they wanted to reduce it by 6 ft!). If this strip was positioned down the port side of the ship it left another strip over 30 ft wide down the starboard side for parked and taxiing aircraft as well as equipment.

Thus, because of the Harrier's good control on take-off and the small space needed to do a simple vertical landing, the concept of an angled deck is no longer important for the Harrier. This has two effects: it simplifies the design of new ships to straight decks and it enables a much wider range of hitherto obsolescent aircraft carriers around the world to become ideal homes for Harriers, offering a wide range of fixed wing roles at sea with unapproachably low levels of capital investment.

The exercise finished as planned at the end of the second day. The two days with Vikrant had given us 21 sorties at an ambient temperature of 30 deg C. The surface wind was almost calm at a maximum of 3 kts and the wind over deck much less than one would normally expect. Despite these ambient penalties the Harrier had once again shown to a potential customer that not only can our brochure performance figures be met, with some margin in hand, but also that the aeroplane can be handled by existing military jet pilots with little special training.

Editor's note. Eric Crabb was the flight test engineer on the trial. The parallel line deck markings that had happened serendipitously were found to be much easier to track during take-off than a single centre line, which prompted the pilot to make unnecessary small corrections, so were adopted as standard for Harrier carriers. This 1973 demonstration eventually resulted in the FRSMk51 Sea Harrier being ordered by the Indian government in 1979, the first of 30 being delivered in December 1983. The last FRSMk51s were retired in 2016 after 33 years of service.

## RTA AT WETWOOD BENDS

Roy Evans recalls a road traffic accident (RTA) on the Chiddingfold Road...

In addition to my full-time employment in the Dunsfold Aerodrome Fire Service I also worked part-time for the Surrey Fire Brigade as Officer in Charge of the Dunsfold village fire appliance which involved attending fires, road traffic accidents and even flooding, personnel being called out by pager or bleeper.

One morning I had got home at about 8.20 after a 24 hour shift and was eating my breakfast when my bleeper wet off. Arriving at the station I learned there was a RTA at Wetwood Bends about a mile and a half away on the Chiddingfold Road and within six minutes six men and the appliance had arrived at the scene. The Bends were two notorious 'S' bends and a car heading west had turned right on a blind bend and collided with the off-side front of a car travelling towards Dunsfold and the driver was trapped and injured. I notified the Brigade and requested an ambulance and police as the road was impassable.

We had to cut off the driver's door before assessing his injuries and with the door off I could see his feet were trapped by the engine bulkhead which had been forced to the rear. Whilst updating the Brigade on the radio I recognised the driver's car and registration, although I couldn't recognise him due to his facial injuries. The direction of travel and time of day confirmed that he was an engineer from the Bristol Engine Company who travelled to the airfield several days a week to install and ground test the Pegasus engine fitted in the Harrier. He was given first aid whilst the bulkhead and pedals were carefully cut allowing his feet and legs to be freed so he could be transferred to the ambulance.

Knowing that the Bristol engineer would be expected at the airfield I telephoned the Chief Test Pilot, Duncan Simpson, and told him about the accident and where I thought the injured man had been taken. Strangely, I thought, the CTP asked where the car had been taken and I guessed the Dunsfold Village garage.

In the evening one of the Dunsfold firemen, whose full-time job was as a mechanic at the Dunsfold garage, said he had been sent out to recover the two vehicles involved in the crash. Later in the day a group of suited men arrived at the garage, one showing a Special Branch ID who asked to see the Bristol engineer's car and then for the group to be left alone with the vehicle. However, they had to ask for the assistance of a mechanic to access a compartment in the mangled floor pan and so retrieve several engine performance computer tapes.

## BOOK REVIEWS

### Hawker's Early Jets - Dawn of the Hunter

Chris Budgen's second 'Hawker' book, published by Pen & Sword Air World (ISBN 978 1 52679 217 4), is a well presented 295 page study of Hawker projects from the 1940s and 1950s leading to the Hunter and covering successor designs which remained on paper. Useful contemporary background lends valuable perspective to the fascinating story.

Chapter titles are self explanatory starting with 'The origins of jet power', a concise and illuminating history of jet engine development in the UK with some notes on German efforts. 'Hawker early jet designs' leads the reader from the famous fighting aircraft of World War II through Kingston Project Office studies to the 'P.1040 - Hawker's first jet'. Then comes a detailed and most interesting diversion, with newly published photographs and drawings, to the 'P.1072 - rocket propulsion', before moving on to 'N7/46 - the Naval project', 'P.1052 - swept wings', and 'P.1081 - a clean sweep', the first Hawker all swept aircraft. 'Sea Hawk into service' comes next, then 'P.1067 - dawn of the Hunter' covering precursor projects leading to 'Early Hunter' with all the problems and solutions neatly described. For historical context the author summarises 'Other companies' projects', including the main competitor, Supermarine, who persevered with developing the Swift from an airframe based on their straight winged Attacker. At times it was a close run race for Hawker due to development problems although the basic Hunter design was always superior being unencumbered by the use of a previous aircraft as the starting point. The final chapter, 'Future Hawker projects', covers post-Hunter designs prior to the P.1127, in particular the promising Mach 2 P.1121, the company supported prototype of which was in an advanced state of construction when Hawker Siddeley Aviation, realising that the 1957 defence White Paper meant there was little prospect of a government order, withdrew the PV funding. This 'cancellation' did, though, open the door for the launch of the P.1127 and V/STOL because of the design manpower that was released.

The author has found much new to say, provided good photographs, many of which are unfamiliar, and, admirably, has reproduced actual cleaned-up Hawker general arrangement drawings rather than redrawing them.

Detailed chapter notes give sources, appendices cover biographies of Hawker test pilots of the period, and tables of test flights of the P.1040, the P.1072, the N7/46s, the P.1052s, the P.1081, early production Sea Hawks, the P.1067s and early Hunter FMk1s, painstakingly compiled from pilots' log books. Finally there is a comprehensive index. Apart from a few 'typos' there is nothing of significance to criticise - remarkable.

Anyone interested in post-war aviation will find this book of great interest and for Hawker enthusiasts it will be a source of information and enjoyment. A 'reduced price' flyer is enclosed with this Newsletter.

### The Aviation Historian Issue 38.

HA Member Nick Stroud's high quality quarterly continues to inform and entertain. An article on outboard tailplanes, currently flying on the Virgin SpaceShip(sic) Two, covers their history including Kingston's P.1219 project study, a P.1216 predecessor. Prof Keith Hayward explains the early UK involvement in the Airbus and BAe chairman Frank Beswick's staunch support leading to long term wing design and manufacture in the UK. Writing about the Scimitar, Paul Stoddart shows that Supermarine lost their way and produced a powerful Naval interceptor fighter with much lower performance than contemporary US products. The F-8E Crusader, for example, had a 23% greater initial climb rate and a 93% higher speed at high altitude! Joel Mesnard examines French jet powered naval fighter prototypes of the late 1940s and early 1950s. Designed and built at a frantic pace many proved fatal to their brave test pilots. There is much more fascinating history including wartime plans to build Centaurus powered Boeing B-29s in the UK.

## MEMBERSHIP NEWS & LIST

It is with great sadness we record the deaths of Brian Monk and, after a long illness, Juliet Hassard. Also, we have just heard that Kingston project designer and author, Roy Braybrook, died last June. We send our deepest condolences.

The only other list changes since NL.62 are that the Hargreaves and Siva Sivalingham are no longer in bold; and new Members Joshua and Callum Watkins, Barry Pegram's grandsons, are added.