THE HAWKER ASSOCIATION

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EDITORIAL

You will see from the AGM report that our Association is doing well and seems to be satisfying the needs of Members. Please let me know if you have any suggestions for improvements. Our visit to the **Fleet Air Arm Museum** is in September; see booking details below. This issue contains interesting reminiscences from Members. The last Newsletter should have been numbered 32 - sorry. The barbecue was rated excellent by attendees. Please continue to send your contributions to the Editor, Chris Farara, 24 Guildown Road, Guildford, Surrey, GU2 4EN. Tel 01483 825955, e-mail cjfarara@ntlworld.com

PROGRAMME FOR 2012

Wednesday 11th July	The Great Richmond Road Aircraft Factory - **David Hassard**
Wednesday 8th August	Social and video
Wednesday 5th September	Visit to **Fleet Air Arm Museum**, Yeovilton
Wednesday 12th September	Social and video
Wednesday 10th October	The Indonesian Hawk Contract - **Les Palmer**
Wednesday 14th November	A Personal View from St Giles Court - **Arthur Brocklehurst**
Wednesday 12th December	Christmas Lunch

David Hassard has made a study of the history of our factory and uncovered the true story, **Les Palmer** was our Contracts Manager and **Arthur Brocklehurst** represented our main customer, the Ministry of Defence.

To book for the FAA Museum visit please contact Ken Batstone on 01932 229938. The cost is £30 in advance to Ken at the August meeting or by post to 42 Kings Road, Walton on Thames, Surrey, KT12 2RA, for coach travel and **all entry charges**. You can book to visit the Historic Flight **or** the Museum reserve collection (90 aircraft) in the morning, you can buy lunch at the Swordfish Restaurant and visit the main museum in the afternoon. The coach (with toilet) will depart from the Hill's of Hersham depot, Chertsey, at 9.00 am, where there is free parking. There may be a pick-up at BAES Farnborough. You will be advised and sent directions when your cheque is received. Please book and pay by July 31st.

Unless stated otherwise, meetings are at the Hawker Centre, Kingston - the old Sports & Social Club - and start at 2.00 pm. Lunch and drinks are available beforehand, tea afterwards, and there is a large, free car park.

MEMBERS' E-MAIL ADDRESSES

Richard Cannon needs to compile an up-to-date list of your e-mail addresses as he will be handling **all e-mail correspondence** (except that for the Editor), not Barry Pegram. If you have NOT received an e-mail from Richard very recently please contact him on richard@cannonr.me.uk with your e-mail address. If you change your address in the future please let him know.

9th ANNUAL GENERAL MEETING - 11th APRIL 2012

Chairman's Report

After welcoming Members to the AGM the Chairman, Ambrose Barber, observed that the speakers at our meetings continued to entertain and inform, that the barbecue and Christmas lunch went down well as did the visit to the Hornby Centre. Ambrose thanked those who organised the events and noted that Members not able to participate had been able to read reports in the Newsletter. Reminiscences, too, had been enjoyed and Ambrose asked people to keep sending them in.

A significant aim of the association was raising public recognition of 'Hawkers' proud place in aeronautical history and the Kingston Aviation Centenary Project initiative had gathered impressive momentum. The consortium led by the Hawker Association had been awarded £49,500 by the Heritage Lottery Fund which would enable the project team to run an impressive list of events and activities including a Kingston Aviation Festival from 2nd - 5th June. The joint project leaders, David Hassard and Bill Downey, had divided the tasks involved into assignments manageable by small teams of volunteers and Ambrose urged Members to support these activities.

Looking back over the last 9 -10 years the Association had benefited from two assets in particular: the continued use of the 'Hawker Centre' and the dedicated Committee officers, and others, who have helped to make things happen. None of us, said Ambrose, could manage without them and we have good reason to thank them all very much.

Secretary's Report

Using 'PowerPoint' (!) Barry Pegram reported on programme and membership matters. Average attendance at talks had been 43, the top scorer being Andy Jones with 57 followed by Mat Potulski with 50. The barbecue, the outing to Airfix and the Christmas lunch were well supported with 37, 29 and 48 respectively. Membership stood at 374 with 67.6% local, 27.6% distant, 4.8% overseas, 14.2% ladies and 15% working. Membership had been generally flat since 2007 at about 375 ie losses equalled gains. Sadly, eight Members had died: Eric Goose, Eric Haywood, Dawn Howes, John L Parker, Don Pratt, John Partridge, Orde Scott and Selwyn Smith.

Treasurer's Report

Treasurer, Martin Pennell presented the accounts for the period January 1st to December 31st 2011 and noted that the balance at year end, £3,589.08, exceeded that at the beginning and that the Association finances were in a healthy state with no need for any increase in the annual subscription. Income had been £4,487.96 and expenditure £4,351. The three highest regular outgoings were: stationery/postage at £1,023.85, room hire at £550 (a special reduced rate) and liability insurance at £438.49. Principal regular incomings were: subscriptions at £1,940 and raffle takings at £557.50

THE KINGSTON AVIATION FESTIVAL

"Designed and built in Kingston - a 100 years of world class aircraft". This was the slogan of the event celebrating the 100th anniversary of the foundation of Sopwith Aviation, the Kingston Aviation Festival held from 2nd - 5th June. It was organised by the Hawker Association together with the Brooklands Museum and the Kingston Aviation Heritage Trust, supported by BAE Systems and the Royal Borough of Kingston upon Thames, with a Heritage Lottery Fund grant. The historic town centre market place accommodated Brooklands' Sopwith Camel and a new, yet to be completed, Sopwith Tabloid replica being built by Steve Green at Brooklands and funded by the Kingston Aviation Heritage Trust, as well as Harrier, Hunter and Hawk cockpits. In the Market House was a comprehensive exhibition of models of Sopwith, Hawker and British Aerospace Kingston aircraft from the Brooklands Museum, and banners summarising the history of the Sopwith-Hawker-BAe companies as well as other aviation related firms in the borough, covering the achievements, the sites and the people who worked there and, of course, the aircraft. On the first floor was an exhibition of aviation paintings by Mark Bromley, large scale models from BAE Systems and a specially prepared video presentation.

The Festival was formally launched by the son of Sir Thomas Sopwith, Tommy, at a reception for the Mayor and other local dignitaries. Also present were important personalities, including Ralph Hooper, Ambrose Barber, Chairman of the Hawker Association, Les Palmer, Chairman of the Kingston Aviation Heritage Trust, Allan Winn, Director of the Brooklands Museum, Barry Guess of BAE Systems as well as the event project leaders David Hassard and Bill Downey of the Hawker Association, and Project Manager Fiona Sturley. The event proved to be very popular and certainly succeeded in reminding those who knew the old factories, and informing those who moved into the borough after BAe closed them in 1992, of the remarkable contributions to world aviation progress made in Kingston upon Thames by the people who worked at 'Hawkers'.

The Kingston Aviation Centenary Project continues with the recording of oral history from old employees, talks to local schools and organisations, and other outreach activities, with the aim of getting Kingston's world-class aviation achievements better known. All the information prepared and gathered will be kept in the Sopwith/Hawker Archive at the Brooklands Museum and in the Kingston Local History Centre and much of it will find its way onto the website www.kingstonaviation.org. In addition a "Kingston Aircraft" art exhibition is planned for November. If you would like a copy of the Festival "Designed and Built in Kingston" leaflet send a 4 x 8 ¼ ins s.a.e. to David Hassard, 20 Tangmere Grove, Kingston upon Thames, Surrey, KT2 5GT.

THE SYDNEY CAMM COMMEMORATIVE SOCIETY

The Society's full scale Hurricane model has been installed in the Alexandra Gardens, Windsor. The Hurricane represents that flown by Squadron Leader John Grandy, CO of 249 Squadron during the Battle of Britain, who went on to be Chief of the Air Staff. Also, following initial fund-raising by the Commemorative Society, a new scholarship, funded by the Worshipful Company of Coachmakers and Coach Harness Makers, in memory of Sir Sydney Camm will be awarded to one student a year in Kingston University's Faculty of Science, Engineering and Computing .

HARRIER NEWS

GR.9A ZG477 is at the RAF Museum Cosford and GR.9A ZD433 is at the Fleet air Arm Museum. Of the 74 ex-RAF Harriers sold to the US, 58 are in storage Davis-Monthan AFB Arizona and 16 are at Naval Air Depot Cherry Point being prepare for USMC service, reports "Air Forces" magazine. Without the Harriers and Ark Royal the RAF had to use Tornadoes in the Libyan campaign. The MoD reported that (as a result) **each fighter sortie** averaged **eight** hours and required **five** air-to-air refuellings. The majority of the tankers was provided by the USA.

JOINT STRIKE FIGHTER NEWS

The UK's first Lockheed Martin F-35B Lightning II, BK-1, made its first, 45 minute, flight on April 13th. The aircraft has to complete company and government test flights before it is accepted by the UK. It will then be used for training and operational tests at Eglin AFB, Florida. BK-1 is the first international F-35 to fly. The fact that this first UK F-35 was a B-model was very embarrassing as the Government had switched from the STOVL F-35B to the F-35C carrier variant. However, further embarrassment, except to the UK Government, was avoided when the Ministry of Defence reversed that decision because they at last realised that the cost of fitting the Royal Navy's future aircraft carrier with catapult launch and arresting gear was prohibitive and largely unknown, as many commentators had pointed out.

HAWK NEWS

BAES has signed a £1.9bn deal to supply 22 Hawks to Saudi Arabia as a lead-in trainer for the Typhoon. The deal includes 55 Pilatus PC-21s to be manufactured in Switzerland and 25 primary trainers (yet to be defined), upgraded training facilities and simulators, and initial spares support. Hawk deliveries will start in 2016. Jobs at Brough have been saved until mid 2015 when employees could be offered transfers to Warton and Samlesbury where Hawk work will move to.

The Hawk Advanced Jet Training System Road Show campaign to secure a Hawk order for the USAF can be seen at hawk.us-baesystems.com/Roadshow/index.html.

HUNTER NEWS

The Airborne Tactical Advantage Company (ATAC) was founded in 1994 by retired USAF officer Jeffrey JD Parker, as a result of the cutbacks in aggressor training organisations in the US armed forces. Initially operating two ex Royal Danish Air Force SAAB J-35 Drakens, six retired Kfir C2s were acquired from Israel Aerospace industries followed by four A-4N Skyhawks and 13 ex Swiss Air Force Mk58 Hunters. The latter are the mainstay of the ATAC fleet. Flying daily around the world the Hunter has proved to be a reliable, safe and effective platform with predictable flying qualities, long endurance and high reliability. The Hunter and A-4 were, in the opinion of ATAC, "drastically over-engineered. They are incredibly strong and capable jets with minimal systems, and the ones that are in there are built very reliably. This allows ATAC to maintain very high availability rates." The Kfirs are the most maintenance intensive in the fleet followed by the Skyhawks, then the Hunters.

The ATAC fleet operates around the world with permanent bases in Virginia, California, Nevada, Hawaii and Atsugi, Japan, providing many services to the US Department of Defense. These include adversarial support to fighter pilots of the USAF, USN and USMC, air-surface missile simulation, offensive and defensive counter-air, strike practice, airborne electronic threat simulation, R&D support, air-to-ground combat controller training and strike fighter tactics instructor training. ATAC aircraft also participate in service exercises, carrier air wing work-ups and contractor defence programmes.

In 15 years ATAC grew from a two-aircraft niche DoD contractor to a leader in fast jet support services, much like Mat Potulski's Hawker Hunter Aviation in the UK (see the August "Air Forces" magazine). How satisfying to us that the 1951 Hunter is still so very active militarily after more than half a century.

RESTORATION NEWS

Restoration of Indian Air Force Tempest II MW376 is to be completed in New Zealand by Pioneer Aero at Ardmore.

The last remaining genuine Sopwith Dolphin, C3988, is now on show at the RAF Museum, Hendon. The aircraft has been recreated by the RAF Museum from parts obtained from a number of sources including Doug Bianchi and the Shuttleworth Trust. The original Hispano-Suiza engine came from New York.

SIR JAMES DYSON'S HARRIER

The following is taken, abridged, from Sir James Dyson's website…

I am fascinated by ideas that seem impossible. A vacuum without a bag. A bridge without supports. A jet that jumps into the air. We've actually got one of those sitting in the car park of Dyson's HQ: The Harrier Jump Jet (a repaired crashed GR9). It sits there as an inspiration to Dyson engineers, but also as a reminder of what happens when you lose your resolve. Harrier is one of Britain's greatest technological achievements and yet, through what can only be described as a lack of vision, we are out of the Harrier business and have even divested ourselves of our fleet, at rock-bottom prices. It was recently revealed that the Ministry of Defence had sold 74 Harriers to the U.S. at a drastically low price. Having recently undergone a £600M overhaul the like-new aircraft were sold for £112M.

AVIATION IN THE 21st CENTURY

Professor Ian Poll came to Kingston on February 8th to talk to members about aviation in the 21st century. Ian remembered with pleasure the start of his career at HSA Kingston in John Allen's Future Projects department. He now is Professor of Aerospace Engineering at Cranfield University and the Technical and Business Development Director of Cranfield Aerospace (a wholly owned subsidiary of Cranfield University) which he founded in 1997 as the commercial arm of the College of Aeronautics. He has worked in the field of aircraft drag reduction for 30 years and on developing a better understanding of the thermodynamic efficiency of the whole aircraft system.

Citing Sir George Cayley (1772 - 1857) as the father of the aeroplane, inventing the concept in 1799 in response to his perception of a commercial transport need, Ian observed that historically a good idea takes 100 years to mature and that only in the last 50 years has Cayley's vision been realised. Civil aviation is now a major business essential to world commerce. Civil aircraft are now commodities with customer satisfaction as top priority. The drivers of civil aviation used to be "further, faster, bigger" but now they are "cheaper, safer, cleaner" - not so exciting!

Cost reduction techniques, outside the realms of the aircraft and its engines, include health and usage monitoring, innovative air traffic control solutions, de-skilling pilots, better use of information technology to reduce the cost of sales, and more efficient training. Safety can be improved by reducing pilot interventions (80% of accidents involve human error), by utilising virtual reality technology to give all round and poor weather vision, and by having air traffic management systems which separate aircraft rather than bunching them, and more efficient training. Security improvements can come from screening for weapons and explosives, creating an international database for the rapid identification of undesirable individuals, and by denying access to designated sensitive areas through the flight control system. Environmental impact will be reduced by using fuel cells for ground power supplies, treating airport run-off water, and employing multi-mode transport linking to reduce congestion.

However, civil aviation is the victim of 50 years' success. In 1995 some 3,500 billion seat-miles were flown which growth forecasts (5% pa) take to 12,000 billion s-ms by 2020. Freight, growing at 7% pa, will increase from 100 bn tonne-km to 500 bn tonne km. There is a four-fold increase in fuel burn in a 30 year cycle and a real danger that aviation is damaging the planet. Ian could not believe that politically this will be allowed to happen so the projected growth in air transport will be capped unless fuel burn can be reduced.

Is global warming really happening? This is not contentious. Lots of temperature measurements are made world-wide to give a global mean and this **is** rising. Warming **may** indicate climate change but this is too difficult to predict. Gas turbine emissions: soot, water vapour, carbon dioxide and nitric and nitrous oxides, contribute to atmospheric warming. If the global average temperature rises the atmosphere holds more water which leads to "more weather". Notably, aircraft are the only source of pollution in the stratosphere and effects here, where altitudes are important, are different from effects in the troposphere. A 50% reduction in fuel burn per passenger km by 2020 is the industry target but this is not feasible as it would take 20 - 30 years to get the necessary changes into the complete civil fleet. Con-trails are triggered by engine water vapour emissions but are made up from atmospheric ice particles and can lead to persistent cirrus clouds which have a direct and large impact on global warming by reducing the earth's heat rejection and increasing heat retention at night. Contrail formation can be avoided by changing the aircraft altitude but there are no rules at present.

What can be done in the fields of the gas turbine engine, the mode of propulsion and the airframe configuration? In gas turbines the maximum turbine entry temperature is 1900 deg K, close to the maximum obtainable from kerosene so can't be increased; the pressure ratio is about 40:1, again close to maximum; compressor and turbine efficiencies are already higher than 90%; the ideal thermal efficiency is 65% and now is 56% and the law of diminishing returns is in force. So overall only about 15% improvement seems feasible. However, propulsive efficiency is about 70% now and a substantial improvement here is thinkable.

There is more opportunity for improvements in the airframe. Today's A380 layout is just like the B-47 of 1945. The way ahead is to get rid of the non-lifting volume - put everything in the wing. There is a new interest in such blended wing-body (BWB) configurations which may yield a 30% improvement in lift to drag ratio (L/D) when carrying the same number of passengers as a 'conventional' airliner, which is the same L/D as a conventional airliner with laminar flow control (LFC). Fuel burn per passenger would be 25% lower. A BWB airliner with LFC would have an L/D four times that of a conventional airliner. Such an aircraft would be expensive to develop but the gains make the concept difficult to ignore. Cranfield Aerospace have designed and built two sub-scale unmanned X-48B BWB aircraft, for Boeing, which have been flying at NASA Dryden for four years.

Ian then moved on to the military field but there is no room here to cover this part of his talk in detail. However, in closing he listed possible 'spin-offs' into civil aircraft including reduced costs, lower accident rates, improved security, greater automation, easier training of cockpit crew and crewless cargo aircraft.

The vote of thanks for this brilliantly delivered, interesting and provocative talk was given by Ralph Hooper.

LIFE AFTER AVIATION

On the 14th March Tim Gedge spoke to the association about what he did after leaving the Royal Navy in which he had served for 33 years. Tim's retirement was really his being made redundant because nowadays, at the age of 50, one is not ready to retire.

Tim outlined his background in flying - University Air Squadron Chipmunk to RN Tiger Moth, Jet Provost and Hunter progressing to operationally flying Sea Vixens, Phantoms and Sea Harriers. He also flew many other types ranging from the Gnat to the Tomcat, the Hueycobra to the Chinook and the Islander to the 125, not to mention the Beaver floatplane and the Viking! From this Tim had learned that training was all important and that breadth of experience was vital. His lifelong interest in sailing and boats led to him to thinking about combining his passion for training with boats.

Finding a vacant RAF barracks building on the beach at Lyme Regis Tim decided to set up a residential boat-building academy, primarily for people wanting a career change. Soon the 3 bedrooms grew to 13 and he was running courses ashore and afloat, offered a diving course and opening a chandlers for sales to the public. The courses available now are one for boat building taking 38 weeks, an 8 week woodworking skills course and a number of short one to five day courses. Each boat building course takes 18 students and there are two courses per year. During the overlap the new course takes place upstairs where basic skills are taught. The students then move downstairs and start boat building, initially building a 20 inch clinker section from plans so that the result can be checked dimensionally. Here 'best practice' or correct methods is taught.

Several typical boat types are built by the students: riveted or glued 'clinker built' where everything except the sails are made; 'strip planking' covered in glass fibre and epoxy resin; 'cold moulded' double curvature with double-diagonal veneer strips glued with epoxy resin; 'resin infusion' as used in the aerospace industry; 'foam core and glass fibre' with a honeycomb and ply deck; 'stitch and tape' where plywood panels are sewed together with wire then joined with

epoxy and tape and the wire removed; and 'all wood' where the clinker boards are held by wooden pegs and wedges. Wide experience is gained in building this variety of types. Besides the building skills demonstrated by the students the ability to work in a team is also assessed. Some two dozen boats are built per year and all are launched at a set date to put pressure on the builders and to develop project management skills. About 200 people come to witness this twice-yearly launching. Students may buy their boats for the cost of the materials.

Students are awarded City & Guilds Certificates (they always get credits or distinctions) and the academy certificate which is recognised in the marine industry as the best possible recommendation; graduates always get jobs. Short courses include wooden boat restoration and conservation, building a dinghy in a week, sail making (unique in the UK), chair making, and wood working skills for beginners - an 8 week course leading to a City & Guilds certificate.

The Academy ethos is high self-imposed standards - and these standards are rising. Students can use the facilities in the evenings and at weekends so they can achieve high goals. The long course costs £12,000 for everything except accommodation, a substantial sum, ensuring that students are really motivated. Tim has a very strong belief in high standards of training. He believes that the nation is not training people properly or setting high standards. Sending everyone to university is, said Tim, "crackers". Many graduates don't find employment and are saddled with debt. A number of university graduates have come to the Academy, taking on more debt to pay for it, but have all got jobs. Students come from all walks of life including high flying professionals. All succeed.

The vote of thanks for this enthralling and inspiring talk was given by Arthur Brocklehurst who was involved in the Sea Harrier project at the MoD.

THE MITHRAEUM TEST FRAME

Colin Flint, retired Head of Ground Test, recalls his time with the Mithraeum test frame…

With the closure of Langley in the late '50s there was a requirement either to move the Abbey test frame to Kingston or build a new one so that structural testing could continue. Given that aircraft were getting larger it was thought sensible to build a new one. About the largest aircraft that Kingston could envisage building was something the size of a B-58 Hustler and so that was the chosen size. People employed in the Research and Development Department where tasked with the design of such a test frame which was to be called Mithraeum after the Roman temple recently discovered during building work in London (all previous test frames were called after religious buildings). Derek Thomas was the lead engineer on the task.

In 1959 the frame was constructed in Scotland and brought down by road in parts over a three week period. Because of its height the frame was erected in a 10 foot deep pit dug towards the northern end of the new Research building at the Hawker Aircraft site in Kingston. This was cheaper than raising the roof of the 500 foot long building by 10 feet. The basis of the frame consisted of a pair of keel members some 95 feet long and overhead warren girders 105 feet long; these were mounted on four massive columns. Eight loading bridges were mounted on rails attached to the warren girders and associated structure, each having facilities for manual loading by turnbuckles via linkages to the structure under test. The pit was finished in waterproof cement so that it could be used for underwater pressure tests if required. A 23,000 gallon water tank and pumping facilities were included.

The first major job was the P1127 static strength test done in 1960, the load being applied manually via turnbuckles. Some twenty tests were carried out in various configurations, each taking about six weeks including rigging for the case, testing and data analysis. Each test required four people to apply the load, two to apply fuel tank pressures (including myself), six to read the 800 strain gauges and four to read the deflection gauges. The maximum load required was divided into eight or ten increments, each of which was applied before the instrument readings were recorded. Each test took one day. As an aside, the last strength test carried out in the Mithraeum was the Hawk Mk1 test series where the six weeks per case was reduced to half a day using automatic load measurement and mechanical servo-controlled hydraulic valves. Just four people ran the test and graphs of strain gauge and deflection measurements where available one hour after the test was completed.

The next major test was a research programme on twenty Hunter Mk5 airframes for the RAE (Farnborough). The RAE was to test using constant load cycles from start to finish at various levels; Kingston was to use programmed loading (a programme consisted of 311 cycles which included one cycle of 7g to -2.5g and 5 other levels of cycles down to 2.5g to 0.5g). Two airframes could be installed in the test frame at the same time. On completion of each simulated 500 flying hours inspections were carried out overnight. The Kingston tests used four ultra low friction hydraulic tension jacks (two per wing) pulling up via linkages attached to soft rubber pads glued to the wings. The RAE tests used compression jacks pushing up under the wings. Kingston completed five airframes at three different levels. One additional airframe was added to the programme, a T Mk 7 XL574, to clear the trainer for use in the Royal Navy. This test used the same wing linkages with a modified fuselage linkage, and a different programme was used. An aircraft life of 3,400 hours was required with a factor of 5, meaning 17,000 flying hours and 34 inspections. This was accomplished in 49 working days! The test then continued to 63,000 flying hours when the fuselage failed. Three wing failures occurred, the wing being replaced each time.

At the same time as the Hunter tests, a Kestrel fatigue test was carried out in the same test frame. This test used 49 hydraulic tension jacks, again using linkages to distribute the load to rubber pads attached to the wing. It was not uncommon to go home with three fatigue tests running, unattended, overnight. Finding enough Inspectors the following day to inspect the airframes was the most serious management problem.

The next test carried out in the Mithraeum was the Harrier GRMk1 Strength test. Mechanical hydraulic servo valves developed by Kingston were used for this test series which utilised multiple tension jacks to ensure rapid case changes. Strain gauges were read using PDP11 computers with suitable data collection software thus shortening the overall timescale. The wing failed marginally below the required load and as a result the wing skin thickness was increased on all service wings. These tests were followed by the Harrier GRMk1 fatigue test and then the TMk 2 fatigue test. Both used the by now well tested system used on the GRMk1 strength test but the mechanical hydraulic servo valves were motorised so that case changes could be accomplished without human intervention during testing. Both these tests reached 200 % of the require life.

The final full scale tests carried out in the Mithraeum were the Hawk strength test, mentioned earlier, followed by the first Hawk fatigue test which was stopped at 60% of the required number of cycles when the wing failed, there being too much damage to make repair an option. This test was the first to apply simulated manoeuvre loads, for example rolling pull-outs and Cuban eights. Specific sortie patterns were also run. Many smaller tests were carried out using the Mithraeum but my memory is not good enough to list these here. Upon the Kingston site closure the Mithraeum test frame, which had been used for so much vital work, was scrapped and later structural tests were carried out at BAe Brough .

My thanks go to Richard Cannon and Brian Indge who did so much original thinking in constantly improving test techniques, and to the late Derek Thomas who created the environment in which people could advance.

YOU DON'T ALWAYS KNOW WHAT IS AROUND THE CORNER

Keith Hobbs remembers his career in the aeronautical industry….

In 1958 I graduated from Bristol University with a degree in Aeronautical Engineering. It was in that year that the then Defence Minister, Duncan Sands, stated that there would be no more manned military aircraft. That was the first quandary for me at the start of an aeronautical career and I decided to opt for the manufacturing side of aviation thinking that if you could build aircraft you could turn your hand to washing machines!

So I started a graduate apprenticeship with Folland Aircraft at Hamble. A rude awakening after a student life style was that work started at 7.30am and I had an eleven mile cycle ride to get there. I started in the training workshop and then progressed to the shop floor departments: sheet metal shop, machine shop, aircraft assembly, tool room, jig boring room and then on to the test house and pre-production departments. It was thought that we manufacturing students should then go on to sample the design departments. After I had had a short spell in the drawing office it was decided that my next stop would be the flight test department – little did I know they were short staffed and needed more people.

Here I was allocated to Engineering under John Lewendon who reported to the Chief Flight Development Engineer, Maurice Carlile. My job included briefing and debriefing the pilots and the reading and analysis of paper trace and auto-observer records as well as reporting on engineering systems such as air conditioning, liquid oxygen and electrical, and specialist trials on rate gyros. These trials were undertaken on both the Gnat fighter and trainer aircraft. On the trainer I also became involved with flutter and vibration tests. The airfield was at Chilbolton, twenty miles from my home, so investment was needed in a Vespa scooter, fine transport in summer but a different matter in winter. During this period I was despatched to Boscombe Down to liaise with the Ministry staff who undertook confirmatory trials on the aircraft. Then came my second quandary with the announcement that Chilbolton was to close and that the Department would move to Hawker's airfield at Dunsfold, forty miles away.

The Vespa took me there where the Gnat trainer trials continued. Shortly afterwards Folland was amalgamated with the Hawker Siddeley Aviation whose Chief Flight Development Engineer, Fred Sutton, was put in charge of both the Hawker and Folland flight test teams. There I was lucky enough to witness the first transitions of the P1127. In 1964 development of the Gnat finished and Maurice Carlile advised that I should apply for a job in the new Programme Control Department at Kingston, set up for the P1154 project. The head was John Cotes who had come from Fairey Aviation. Fortunately I was successful in my application and I started to commute to Kingston in my recently acquired Mini Van.

The P1154 progressed to the metal-cutting stage but was cancelled by the Labour Government in 1965. After a short hiatus the Ministry of Defence (MoD) placed a contract for the P1127(RAF); we were back in business and I became Deputy Programme Control Manager. Apart from programme monitoring and reporting, using a recently introduced technique called PERT (Programme Evaluation and Review Technique), a contractual requirement, the job included setting up a close interface with the customer, the MoD, and covered the supply of Government Furnished Equipment. This activity continued throughout the various phases of what had become the Harrier programme.

During this period I had a phone call from Stan Rymel, the Production Director at Hamble, enquiring where I had been for the last few years and inviting me to Hamble on the following Saturday. From this arose a good job offer in the manufacturing organisation at Hamble. Shortly afterwards I was summoned to the office of the Divisional Production Director, Peter Jefferson, where I was advised that they wanted to keep me at Kingston and the job offer from Hamble was withdrawn.

During the late '70s the US Marine Corps showed a great interest in the Harrier and this led, in 1979, to my first visit to the USA to agree the flight test programme with the customer. Also on the visit was Chris Farara, then of the Flight Development Department. The meetings took place in the Pentagon and at the Marine Corps base at Patuxent River.

The next aircraft was the P1182, later to become the Hawk. The Programme Control Department was reorganised to take on board this latest project. For my part I was the Deputy Programme Manager (P1182) reporting to Peter Wildhaber. Peter saw the Hawk through its early days with much toing and froing between the Procurement Executive of the MoD and the Company. Sadly Peter died and shortly afterwards I was promoted to his position.

Overseas interest in the Hawk then took off. My first trip in the export field took me to Beirut and Cairo for meetings with the Egyptian Ministry of War Production. Hawk proposals were submitted and meetings also took place at the Helwan aircraft plant to see if we could support the Egyptian Air Force MiG aircraft. After many visits we had limited success in the MiG programme but the Hawk was not purchased. However, interest was soon shown by Finland and Kenya and shortly afterwards by Indonesia. Our General Manager, Colin Chandler, headed a team, of which I was an active member, to negotiate the Finnish deal.

In September 1979 I got married but then spent the next three months more away from home than with my new wife. Meetings in Finland with the Finnish Air force, our agents in Finland and with the Finnish manufacturing company, Valmet Oy, took up much of the time and in between I ran the pre-contract conference at Kingston with the Kenyan authorities, followed by logistics discussions in Kenya. I then headed to Longbeach, California, to the Douglas plant to obtain a RFP (Request for Proposal) for a jet trainer for the US Navy. During all of this Indonesia could not be forgotten but with all the other discussions taking place my deputy, Eddie Hunt, ably took on my responsibilities for this .

The New Year came and I returned to Longbeach in a team from Kingston with the task of writing a proposal for a Navy jet trainer based on the Hawk. Proposals were submitted by the main US aircraft manufacturers including our host Douglas Aircraft. The team was headed by Roger Dabbs and our proposal was submitted after three months hard work. Our bid was short listed and we were invited to submit in the next round of proposals. McDonnell-Douglas then decided to join forces with us in a joint Hawk submission. As our new partner had much experience of supplying US Navy aircraft this was good for us and we now found ourselves resident in St Louis with another team from Kingston, directed by Gordon Hodson. The HSA/McDonnell-Douglas proposal won the competition and the T-45 Hawk was launched.

I was in for a surprise when I returned to Kingston. I was told that the programme management organisation was to be changed; Programme Control was to be disbanded and a Project Management group set up. Subsequently Chris Farara became Hawk Project manager and I was advised that there was a job for me in Purchasing.

Surprise was probably a bit of an understatement as my previous purchasing experience was personal shopping in Bentalls and the like. However I had two superb trainers, Maurice Lomas and Ken Alexander, who soon taught me the ways of the commercial world. I became the Purchasing Manager (Hawk) with significant budget responsibility for each mark. This brought me into the field of negotiation, into dealing with suppliers and the trials and tribulations of getting the parts to specification at the right price and available to the shops at the right time. Moving to purchasing did not bring my travelling to a halt. A multi-disciplined team set off for the USA to source a radar for the Single Seat Hawk. This saw us oscillating between Baltimore and St Louis to obtain the best deal.

Another memorable trip was to Algeria with representatives from most of the major UK aircraft equipment suppliers to see if UK industry could support their fleet of Russian military aircraft - and of course determine the Hawk potential in Algeria. One morning we found ourselves clambering on board a paratrooper-equipped Hercules aircraft at Boufarik. We climbed out over the Atlas mountains and headed south into the Sahara and on to an isolated air force base to view a squadron of Su 7 aircraft and some rather ancient MiGs. The visit ended with a meal, the contents of which I would rather forget. Also on this trip we reviewed the manufacturing capabilities of the base at Maison Blanche

Life changed yet again when Maurice Lomas moved on and I was promoted to Purchasing Manager. Not only did this give me the responsibility for Harrier/AV-8B purchasing but also for all commercial purchasing to keep the Kingston and Dunsfold sites running. I also now was responsible for the Stores and for purchasing for the Bitteswell and Hamble sites. As time progressed purchasing on behalf of Brough was added to my remit. At this point I was invited to join the Management Committee for the Kingston site. The peak purchasing year saw us with a purchase order book approaching one hundred million pounds. But things were to change again; Purchasing was to move to Warton and it was announced that Kingston would close.

This was the saddest part of my career. I had a staff approaching 250 strong and most were to be made redundant. Each Friday the list came out naming those who were to go over the following period. On top of this all the plant and machinery was up for disposal. An auction was arranged and many contracts were raised for the dispersal of equipment and cleaning up of the site. Aircraft manufacture was in progress when the closure was announced; this necessitated the orderly transfer of parts and stock to the sites to which the work was now allocated, a complex task for my Material Control and Stores organisations. At this time I thought that it would be an opportune moment to take early retirement myself but this was not to be and I was requested to set up a local purchasing department at Dunsfold, a return for me to the site which I had left some thirty years earlier.

The organisation established at Dunsfold provided off-load manufacturing support for the manufacturing departments using sub-contractors and enabled the Works Engineering Department to use outside contractors for essential work around the site. More integration between the Purchasing staff and the Stores took place. Warton kept a close eye on these changes and most Mondays I flew up to Warton to report progress on this and other logistic targets they had set. This situation continued until 1998 when out of the blue I received a phone call from Roger Roberts, the Purchasing Director at Warton, to say that he would now back my early retirement. Included in this conversation was a thank-you for the way I handled the Kingston closure for my part of the organisation with next to no, if any, involvement by Warton purchasing. Praise indeed!

So ended my forty year career in the Aviation Industry. A Journey with many twists and turns on a path which had no preplanning by me which took me in many different directions and disciplines. I never had time to get bored and thoroughly enjoyed myself in the process.

MEMBERSHIP NEWS

We welcome new Members: Pamela Barnes, Clive Bushrod, Martin Churms, Nigel Cook, Jonathan Cooper, Richard Curling, Ian Ferguson, Chris Goymer, Patricia Holt, David McCarter, Keith McMahon, Chris Rostant, Siva Sivalingam, Thomas Sopwith (Jnr.), Chris Stephens, Edward Syradd, and Laura Syradd.

Sadly we record the deaths of : John L Parker, John Partridge, Maurice Lomas, Gloria Murphy and Patrick Webb. Our sympathy and condolences go to their families and friends.

MEMBERSHIP LIST JULY 2012

A: Allan Abbott, Mike Adams, Beryl Alexander, Ken Alexander, Peter Alexander, John Allen, Peter Amos, Terry Anstey, Alma Apted, Steve Apted, John Arthur, Alan Auld, Bryan Austin, **B:** Brenda Bainbridge, Dick Baker**,** Colin Balchin, Ambrose Barber, Derek Barden, Peter Barker, Pamela Barnes, Frank Barrett, Geoff Barratt, Graham Bass, Ken Batstone, Dennis Baxter, Colin Bedford, Peter Bedford, Anne Beer, David Betteridge, Brian Bickers, Guy Black**,** John Blackmore, Keith Bollands, Paul Boon, Betty Bore, Pat Bott, Steve Bott, Bob Bounden, Mike Bowery, Alan Boyd, Sally Bracher, Roy Braybrook, Clive Brewer, Laurie Bridges, Doug Britton, Arthur Brocklehurst, Eric Brown, Peter Brown, Ron Bryan, Christopher Budgen, Maurice Budgen, Roy Budgen, Reg Burrell**,** Clive Bushrod, Robin Burton, Dave Byford. **C:** Richard Cannon, Chris Carter, Tom Casey, Bob Catterson, Colin Chandler, Keith Chapman, Keith Chard, Martin Churms, Gerry Clapp, JF Clarke, John Cockerill, Hank Cole, Percy Collino, Nigel Cook, Brian Coombes, Jonathan Cooper, Paul Cope, Patricia Cosgrove, Ron Cosgrove, Nick Cox, Mike Craddock, Shirley Craig, Richard Cripps, Tony Cripps, Russ Culley**,** Richard Curling, Richard Curtis. **D:** Clive Dalley**,** Andy Dalton, John Danse, Afandi Darlington, John Davie, Jo Davies, Ken Davies, Trevor Davies, Michael Davis, Diana Dean, Ralph Denning, Norman Deviell, Mike Diprose, Mike Dodd**,** Colin Dodds, Peter Dodworth, Lambert Dopping-Heppenstal, George Dow, Bill Downey, Brian Drew, Peter Drye, Dick Duffell, Jean Duffell**,** Gwen Duke, Chris Dunhill, Mike Dyke. **E:** John Eacott, John Eckstein, Andy Edwards, Dave Edwards, Barry Elliot, Tony Elliott, Eric Ellis, Celia Evans, Norman Evans, Roy Evans. **F**: Russ Fairchild**,** Ian Falconer, Mike Fantham, Chris Farara, John Farley, John Farrow, Max Fendt, Donna Ferguson, Ian Ferguson, Stan Field, Geoff Fieldus, Mike Finlay, Wilf Firth, Anne Fletcher, Richard Fletcher, Colin Flint, Ted Forster, Dave Fowler, Mike Frain, Steve Franklin, Harry Fraser-Mitchell, Geoff French, Mike French, Heinz Frick. **G:** Roy Gaff, Mike Gane, John Gardner, Patricia Gardonio, Peter Gates**,** Sandie Gear, Tim Gedge, Mark Gerrard, Tony Gibbs, John Gilbert, John Glasscock, Pat Goodheart, John Gough, Chris Goymer, Andy Green, Barry Grimsey, Ray Grout. **H:** Violet Hall, Douglas Halloway, Liz Hargreaves, Simon Hargreaves, Bryan Harman, Guy Harris, Thelma Harris, Brian Harvie, David Hassard**,** David Hastie, Sandy Hay, Norman Hayler, Bob Head, Sheila Hemsley, Ted Henbery, Brian Hennegan, Jock Heron, Keith Hertzenberg, Frederick Hewitt, Merlin Hibbs, Richard Hickey, Peter Hickman, Vince Higbee, Reg Hippolite, Keith Hobbs, Chris Hodson, Gordon Hodson, Derek Holden, Patricia Holt, Ralph Hooper**,** Linda Hopkins, Paul Hopkins**,** Mike Hoskins, Gerry Howard, Diane Howells**,** Terry Howes, Simon Howison, Gavin Hukin. **I:** Pete I'Anson, Len Illston, Maive Impey, David Ince, Brian Indge. **J:** Keith Jackman, Simon Jackson, John Janes, Gordon Jefferson, Harry Johnson, John Johnson, Andy Jones, Brian Jones, Ian Jordan, Robin Jowit, Alf Justin. **K:** Andrew Keech**,** Barry Kensett, Dennis Ketcher, Bill King, Dave King, Charles Kirk. **L:** Barry Laight, Mike Laker, Charles Lamb, Richard Lane, George Latham, Paul Latham, Pam Lawrence, Andrew Lawson, Stanley Lawson, David Lee, Geoff Lee, Mark Lewis, Vernon Lidstone, Gary Lillistone, Andrew Lloyd, Dawn Lloyd, David Lockspeiser, Basil Lockwood-Goose, Norman Long, Terry Long, David Lovell, Lynda Lucas. **M:** David McCarter, Keith McMahon, Albert Magee, Al Mahoon, Mick Mansell, John Marsh**,** Ann Martin/Disspain/Turk, Brian Maton, Don McGovern, June McKeon, Mike Mendoza, Alan Merriman, Jim Middleton, Buffy Milford, Robert Millar, Alan Millican, Jack Mills**,** George Mitchell**,** John Mitton**,** Brian Monk, Pat Moon, Pauline Moore, Nicholas Morland, Geoff Mudle**,** Pete Munday, Carole Murphy, Martin Murray. **N:** Mike Newell, Anthea Newman, Jennifer Nicholas, Chris Nicholson, **O:** Roger O'Brien-Hill, John O'Sullivan, Chris Oliver, Adrian Orchard, Robin Owen. **P:** Les Palmer, Glynne Parker, John I Parker, Bernard Patrick, John Pearce, Barry Pegram, Martin Pennell, Bill Phillips, Ted Pincombe**,** Dick Poole, Mat Potulski, Dave Priddy, Mike Pryce. **Q:** John Quinn. **R:** Clive Radley, Frank Rainsborough, Colin Raisey, Paul Rash, Diane Raymond, Vanessa Rayner, David Rees, Peggy Remmington, Francis Rhodes, Geoff Richards, Bill Richardson, Kelvin Richardson, Chris Roberts, Graham Roe, Chris Rostant, Peter Ryans. **S**: Ian Sandell, Tim Sargant, Bernie Scott, Alex Seaman, Ray Searle, Maurice Shakespeare, Mike Sharland, Arthur Sharpe, Douglas Shorey, Duncan Simpson, Derek Sims, Gerry Sims, Siva Sivalingham, Charles Smith, Harold Smith, John Smith, Karl Smith, Pete Smith, Thomas Sopwith, Roy Sparrow, Don Spiers**,** Peter Spragg, Chris Stephens, June Stephens, John Strange, Carroll Stroud, Christine Strudwick, Tony Strudwick, Douglas Stubbs, Bill Swinchatt, Edward Syradd, Laura Syradd. **T:** David Taylor, Stuart Taylor, Brian Tei, Joanna Terrell, Reginald Thompson, Geoff Tomlinson, Graham Tomlinson, John Tratt**,** Rod Tribick, Peter Trow, Ron Trowell**,** Bert Turner, Michael Turvey. **U:** John Underhill. **V:** Roland Van Haeften. **W:** Terry Walker, John Wallace, David Ward, Harry Webb, Rob Welsh, Bryan West, Judith Westrop**,** Jan White, Mick White**,** Roy Whitehead, Peter Whitney, David Whittam, Annette Williams, Don Williams, John S Williams, Ron Williams, Sally Williams, Colin Wilson, George Wilson, Hilda Wilson, Paul Wilson, Dick Wise, Helen Woan**,** Alan Woolley, Kuo Wong, George Woods.