THE HAWKER ASSOCIATION

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EDITORIAL

It is four years since the Association's inaugural meeting in February 2003 and the Chairman's address to third AGM is reported below. We have settled down into a smoothly functioning organisation that seems to be satisfying the needs of the Members, now totalling 367. Please let us know if you have any complaints or suggestions. The Committee needs to know that its hard work is in the right direction. Members still owing subs. for 2006-2007 are in **bold** in the Members list at the end on this Newsletter. Act now!

June 28th was the 50th anniversary of Ralph Hooper's first P.1127 drawing...tempus fugit.

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PROGRAMME FOR 2007

Wednesday 11th July	"Joint Force Harrier Operations from Cottesmore" - **Cdr Adrian Orchard**.
Wednesday 8th August	Social with video.
Wednesday 12th September	Social with video.
Wednesday 19th September	Visit to RAF Museum, Hendon.
Wednesday 10th October	"My Third Job in the Front Office - **Chris Roberts**
Wednesday 14th November	"Fifty-three Years of Flying" - **Clive Rustin**
Wednesday 12th December	Christmas lunch

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.

The annual visit this year is to the **RAF Museum** at Hendon. Having found our own way there (share cars?), we will meet at 11.30 am at the main entrance. There is no admission charge and plenty of free parking. We hope to have an introductory talk before setting off to view the many exhibits, including a Typhoon and a Tempest, the ex-Dunsfold Hart and a Hurricane.

Cdr Adrian Orchard is the CO of 800 NAS at Cottesmore and **Clive Rustin** is best known to Hawkers through his test flying work at RAE Bedford and the A&AEE

KINGSTON AVIATION HERITAGE PROJECT

The KAHP still needs a Trustee. This entails attending a meeting at the Hawker Centre about every six weeks and taking an active interest in the project - not too onerous. Help to keep the 'Hawker' heritage alive. Call Trevor Jordan on 020 89942018.

DUNSFOLD WINGS AND WHEELS

Once again the Brooklands Museum and Dunsfold Park are collaborating on an airshow with vintage cars. Special attractions for Association Members are: Guy Black's 'Aero Vintage' Hurricane and Nimrod II, the Red Arrows Hawks, the Battle of Britain Memorial Flight with their Hurricane and the Royal Navy Historic Flight with their Sea Fury and Sea Hawk. The static exhibition will include a Sea Harrier, a Sea Hawk and a Hunter. Altogether a plethora of Hawker types! Tickets for this charity event, on Sunday August 26, can be obtained from the Brooklands Museum shop, by telephone at 0871 230 1084, or on-line (Google 'Wings & Wheels Dunsfold') which will also give you ticket prices and further details of the event.

ANNUAL GENERAL MEETING - 11th APRIL 2007. President's Report

Ambrose Barber thanked Members for the good turn-out before moving on to a review of the year. There had been a full 'fixture list' of meetings although one team did fail to make an appearance! He noted that out of a membership of over three hundred, only a minority came to this familiar venue. As mentioned at last year's AGM the Association intended to support two projects concerning the memory of our most famous Chief Designer. The first was the refurbishment of his headstone and the second was to get the Royal Air Force Club to add Sir Sydney to their select group of bronze busts. A beautiful job was done on the headstone last summer and the bust was unveiled by his grand-daughter, Elizabeth Dickson, in February this year. The Association is pleased to have paid for the headstone and contributed to the bust. In addition the Association had presented to the RAF Club a framed collection of photographs and documents celebrating Hawker aircraft of the Camm design era, bearing an engraved plaque recording its presentation by the Association. The Association also supported a further printing of "The RAF Harrier Story", a most authoritative collection of first-hand accounts, including recollections by the late Air Cdre David Scrimgeour of the Tripartite Kestrel squadron. During the year our external visit was to the Fleet Air Arm Museum where we were given a hospitable reception and a guided tour. This year we plan to visit the RAF Museum.

The Chairman trusted that Members agreed that the year's activities were consistent with the aims of the Association. He thanked the Committee members for their support and trusted that Members would echo his thanks for their initiatives and effort.

HAWK NEWS

BAES has been awarded an initial £ 74 million contract by the Ministry of Defence to support the Hawk TMk1/1A aircraft of the RAF and RN. The Hawk Integrated Operational Support (IOS) contract will ensure that agreed numbers of sorties can be carried out through to 2011, guaranteeing aircraft availability for training. RAF Valley , RAF Leeming and RNAS Culdrose will be supported directly by BAES and Babcock Defence Services who currently carry out all Hawk maintenance. The support service will provide fleet and supply chain management, forward and depth maintenance, and technical support. Also a spares availability service will be provided to RAF Scampton for the Red Arrows, and to MoD Boscombe Down.

F-35 LIGHTNING II NEWS

The BAES Electronic & Integrated Solutions' (E&IS) Co-operative Avionics Test Bed (CATB), known as Catbird, made its maiden flight at Mojave, California, in January. Catbird is a Boeing 737-300 converted into a flying test-bed that replicates the avionics suite of the F-35. Modifications include an extended F-35 shaped nose and radome, and twin 12 ft sensor 'wings' behind the cockpit representing F-35 wing leading edges. Inside the fuselage there is an F-35 cockpit displaying sensor inputs. There are twenty work stations for test engineers. Catbird will be used to develop and evaluate the F-35's extensive sensor systems.

HUNTERS STILL ACTIVE

Norman De Viell reports that a civilian contractor, Airborne Tactical Advantage Co (ATAC) of Newport News, Virginia, operates two former Swiss Air Force Hunter Mk 58s. Currently they are in Japan on a twelve month US Navy contract providing airborne threat simulations for training shipboard and aircraft squadron weapon systems operators. He also reported that a firm in Delaware has leased six Hunters to the USAF for similar duties.

HAWKER NIMROD QUERY

Ralph Hooper noticed in the Spring 2007 Newsletter that it was claimed that the Nimrod II has a steam cooling system. He understood that it was the High Speed Fury that was fitted at one time with the steam cooled R-R Goshawk.

The July 'Aeroplane' explained that the more powerful Kestrel V, replacing the II of the Nimrod I, produced too much heat for the cooling system to cope with and the coolant was, at high power settings, turning into steam which was discharged through a vent pipe. To cope with this a brass steam condensing tank which formed the leading edge of the upper wing centre section, was introduced. A pipe took the steam up one of the struts to the condenser tank whilst coolant was returned down another pipe under the control of a shuttle valve. So, not really a steam cooling system, more a steam condensing system.

ERIC RUBYTHON

John Glasscock remembers an eminent 'Hawker' person...

Members of the Hawker Association and many others have cause to remember Eric Rubython who died earlier this year in San Diego, California, where he had lived for many years. In association with (Sir) John Lidbury he helped to establish the commercial strength of Hawker Aircraft and his determination to keep us 'in the black' stood us in good stead in the transition through Hawker Siddeley Aviation and later into British Aerospace.

Born in 1921, married in 1943, preceded by Army service, he became Company Secretary of Hawker Aircraft Ltd in 1953. Ten years later he joined the Board of Hawker Siddeley Aviation as General Manager, Hawker-Blackburn Division and moved steadily into more senior positions - Commercial Director, General Manager, Managing Director and Chairman. He was appointed to the Organising Committee of British Aerospace prior to nationalisation, became a Board member and Deputy Chief Executive of the Aircraft Group in 1977, the position he held until his retirement in 1982 - when he 'emigrated'!

AN UNUSUAL OCCURRENCE AT UPPER HEYFORD

Here is Duncan Simpson's personal recollection of a flight with Eric Rubython...

To us at Dunsfold Eric Rubython appeared a rather distant senior director at Kingston. He rarely visited the aerodrome and aeroplanes were somewhat of a mystery to him; flying was to be avoided if at all possible. But came the day that Eric was completing a difficult week closing down Hawker factories in the Midlands when he wished for transport back home to Wonersh as 'rapidly' as possible. It so happened that I was available on 25th March 1965 and was persuaded to fly our de Havilland Rapide to Bitteswell to pick up the Commercial Director and take him to Dunsfold.

So, I set off knowing that an active cold front lay up the west coast of England, but provided we returned on time there was no cause for concern. However, at Bitteswell my concern began to increase as time passed waiting for my busy passenger, and by the end of two hours the front, a very active line squall, was itself progressing 'rapidly'. I explained the situation to Eric when he arrived and we climbed aboard. After about ten minutes airborne heavy rain and turbulence hit us. I confess that I had not expected such extreme conditions and decided that I must land and wait for the front to go through.

I caught sight of Upper Heyford runway - just one end of it - and called the USAF for landing clearance. An aggressive American controller replied "What's your praablem?". I said I was now declaring an emergency landing and would explain matters when on the ground. The final approach in blinding rain, considerable crosswind and turbulence was not easy and we were lucky to keep straight and not burst a tyre. We came to a halt in the middle of the airfield and were immediately surrounded by Jeeps carrying armed US military police, 'whitecaps'. I called back to Eric (a rather pale Eric) to let me do the talking. I shall never forget him descending from the Rapide to be greeted by a 'whitecap' holding a gun to his left ear.

Now, Upper Heyford was a USAF Strategic Air Command base and the boss, General Curtis Le May, was in the habit of sending in test cases to catch them out on security. And here was a gaily painted, antique, twin engined biplane, a man in flying overalls, and an immaculate gentleman in a natty pin-stripe suit complete with brief case claiming, to be a Director of a major aviation company. Within minutes we were in the guardroom, a bare cell with three chairs. Could we identify ourselves, asked the MPs? "Ah, yes" says

our Commercial Director, opening his bulging brief case; but it contained not one piece of paper bearing his name or position. We suggested that they 'phoned Kingston and after two hours under guard we were eventually released. Then, a hire car to Wonersh.

The following day I received a charming letter from Eric thanking me for saving him, saving the aeroplane, and saving me.

That was the end of our favourite DH 89A Rapide, G-AHGC, and we took delivery of a new, modern, de Havilland dove airliner, G-ASMG.

Footnotes. I collected the Rapide from Upper Heyford the following day. Sure enough the starboard engine harness was saturated and the Gipsy Six ran rough until we were over Oxford. Shamefully, the Rapide was dismantled and unceremoniously dumped on the Dunsfold's November 5th bonfire! Following many protests it was removed, rebuilt and flown to the Channel Islands.

Eric Rubython was a 'people person' relating to all levels of the Company and many of us remember various acts of kindness, although from time to time he had his other moments - don't we all! He was, in his spare time, a keen gardener, golfer and fisherman and maintained an interest in all sports.

He leaves a widow, Joan, in the USA to whom we offer our condolences. Typically he left his body to medical science depriving us of the opportunity of paying our last respects to a much respected colleague and leading figure in the aircraft industry. There was a sad lack of written appreciation in this country which these few inadequate words seek to put right.

FROM EDO TO PROJECT OFFICE - Part 1

Ken Causer recalls his early career with Hawkers...

I began work in 1945 as an Engineering Apprentice at Hawkers in Canbury Park Road. Workshop experience was had in the Detail Fitters Shop and the Machine Shop over a period of two and a half years during which I was given a day off a week to attend Kingston Technical College but it was necessary also to spend several evenings there as well. Now, this was the usual experience, but something then happened which changed my course of events.

At the Tech. I had embarked on the ONC mechanical engineering course. I qualified in two years but the next year while studying for the HNC illness stopped work of any kind except for a few months early on when I was given some less physical work in the Process Department. At least I had obtained one minor qualification but TB, which had begun to attack my spine, was found to be the cause of my illness and was to keep me in and out of hospital for close on four years.

Eventually my health returned and in early 1952 Hawkers very kindly allowed me to return as a late apprentice. I was enrolled in the newly reconstituted Drawing Office School, situated in one of the Richmond Road outbuildings still occupied by Leyland Motors, and presided over by Mr (Dick) Barton. After training I joined the Experimental Drawing Office (EDO) in Canbury Park Road, working for Mr Ransford on mods. and amendments until I was told to report to Joe Melvin in a little drawing office within the Experimental Workshop in which the first production P.1067 (later named Hunter Mk 1) was being assembled. Joe was an absolute master at directing the installation of the hydraulic system and we covered the work in a set of detailed drawings. I learnt a great deal from him, to the extent that I was sent with Joe to do the same for the Hunter Mk 2 at the Armstrong Whitworth works near Coventry and later went on my own to finish the job. Thus I now found myself a member of the electrical and hydraulic section of the EDO under Ben Capper, and here I stayed until virtually all the Hunter work had been finished.

The reason I mentioned my brush with TB was to show how that led to a dramatic change in my fortune. The first thing that happened began while I was still in hospital where I became very much attracted to one of the nurses, whom I later married. The next thing was due entirely to her persuading me to go back to the Kingston Technical College where I met John Fozard for the first time. He lectured on the mechanics of fluids which of course included many aspects of aerodynamics, a subject I had been interested in since my school days, making flying model aircraft.

By now work in the EDO had become focused on a new private venture aircraft, but work was slow and my part in it, in the words of our Deputy Chief Experimental Draughtsman was to "Do the electrics of the P.1121". This was quite a challenge as virtually nothing was known of the electrical requirements. However, those designing the structural members, such as fuselage frames and wing ribs, needed to know what allowances to make for the passage of cable bundles with their plugs and sockets. Of course, they came to me for the answers which I gave by arbitrarily increasing the sizes used on the Hunter. Fortunately for me this was never put to the test as the P.1121 was later cancelled.

In the meantime work continued in a desultory fashion which very often meant looking busy while doing next to nothing. This was not the happiest situation but fortunately another stroke of luck came my way in the person of John Fozard. He arrived at my drawing board one morning in 1956 and said that the Project Office, where he was a senior member, needed someone who could draw and he asked me to apply promptly for a transfer before the position was advertised. I immediately went to Mr Cross, Head of the EDO, but he showed a marked reluctance to agree to the move and the interview was akin to being in the presence of a minor earthquake, from which I staggered back to my board. About a week later John returned and pressed me to apply for the transfer once more or I would lose my chance. I did this straight away and the result was again rather earth quaking, but fifteen minutes later I was summoned into Mr Cross's presence to be told "You're transferred. You can go". So I packed my things and arrived in the Project Office. (to be continued.)

FROM RIBS TO RETIREMENT

Dave Edwards recalls his long and unique career with 'Hawkers'...

In 1940, when I was fourteen, my Scout Master arranged an interview for me with Mr Judd of the Personnel Department at Hawker Aircraft. Afterwards Mr Judd took me to see Mr Rayner of the rib shop and he agreed that I could start the following Monday. He explained the work to me, including making tea for Mr Davis, Mr Walker and himself.

Mr Ron Day was the fitter I was to assist and we had a very pleasant period together. The work was holding up the ribs of the Hurricane wings while Ron Day completed the riveting. After three months Ron went on night work and left me instructions as to what work I should do. Mr Rayner knew that now both my mother and my father had died and I was in lodgings so he had a look at the work I had completed and decided to put me on the bench which meant that my wages rose from thirteen shillings a week to one pound.

My first details were items for the Australian Demon. The rib shop moved to Slough but I transferred to 'top fitters' (top floor fitters) under Mr Percy Cheeseman. Here my first job was detail manufacture and assembly of Hurricane radio trays. Now past sixteen I joined the Hawker Home Guard and 328 Squadron Air Training Corps. Home Guard duties were mainly fire watching which I did in the tool room behind the old Regal Cinema.

My next move was to 'mid fitters' (middle floor fitters) where I signed up for an Apprenticeship which was normally five years but mine was for six. While on 'mid fitters' many female fitters joined us. The Duke of Kent visited us and was amused that I was standing on a box to reach the vice to cut and file the parts. When the air raids came a buzzer used to sound and we would retreat to the shelters. This lost many working hours because the buzzer sounded as the German aircraft were crossing the coast. The system was changed so that the buzzer sounded as the bombers approached London which meant a quick retreat to the shelters. The factory did get one bomb on the edge of the Experimental Department where the Typhoon prototype was being built. However, the aircraft was only covered in dust but unfortunately a soldier on guard in a metal shelter was killed. We had a Lewis gun positioned on the canteen roof on the opposite side of the road for low flying aircraft.

During this period I moved to various departments where most of the work was making rough tooling for new parts. These tools were for quantities between ten and fifty and if the parts were successful proper tools were made for production. I then moved to the assembly of Meteor rear fuselages, Sea Fury tails and Hunter wings where my apprenticeship finished. I transferred to become a Rate Fixer in the Spar Shop. From there I went to the Contracts Department becoming a Senior Divisional Estimator. After a few years I moved to the Future Projects department to estimate the costs of new projects. Eventually I returned to Contracts. While there I made visits to McDonnell Douglas to assist the Ministry of Defence and to compile joint estimates. After forty-seven years with the Company I retired at the age of sixty-one.

RACING GLIDERS AND OPTIMISING PERFORMANCE

The last talk of 2006 was given on the 8th November by aerodynamicist Afandi Darlington, a graduate of Imperial College, onetime employee of BAe, member of the British Gliding Team and president of the Imperial College Gliding Club. He also led Richard Noble's Farnborough F1 design team and went with the project to the USA when it was taken on and built by the Gulf Aircraft Partnership as the Kestrel. His colleague, Peter Masson, was due to cover the competition aspects but, as he was indisposed, Afandi covered that as well as performance.

The objective of glider design is to improve performance so that the aircraft flies faster and further, and climbs more quickly in thermals or waves. The key is low drag achieved by developing a clean airframe with laminar flow regions. A successful modern glider will demonstrate a lift:drag ratio (L/D) of up to 70; i.e. the glider will travel 70 miles for a mile of height. At low speed induced drag is dominant and this is reduced by winglets. At high speed profile drag dominates, mainly from the wing, and this is reduced by achieving laminar flow and by careful design of profiles and the junctions between the wings and tail and the fuselage. Water ballast is used to increase the wing loading which results in increased speed for the same L/D and yields an increased L/D because the operating Reynolds number is increased. The boundary layer can be laminar - thin and well ordered - or turbulent - thicker giving more drag. Glider wing sections are designed to achieve large regions of laminar flow with low drag and reasonable stalling behaviour.

Afandi illustrated glider performance improvements by historical examples. The 'modern era' started in the 1930s with the German 'Wiehe', an 18 m span wooden design, which achieved a L/D of 29 at 41 kts and a minimum sink rate of 1.2 kts. The 'fs 24' Phoenix of 1957, a 16 m glass fibre design incorporating laminar flow technology, had a L/D of 40 at 43 kts with a sink rate of 1.1 kts. The equivalent numbers for the 'Nimbus' of 1971, a 20.3 m glass fibre design, were 49, 49 and 1.0. By 2000 the carbon fibre/glass fibre/Kevlar 31 m 'ETA' demonstrated 70, 59 and 0.9, the current 'state of the art.' By 2020 an L/D of 80 should be achievable by laminar flow control. It was laminar flow which gave the big jump in L/D post WW II. This is all put into perspective by Sir George Cayley's 1853 9 m span glider which had a L/D of 5 at 25 kts and flew 200 yds. In 1985 Werner Pfenniger designed a 32.4 m glider with a predicted L/D of 100 using a windmill to suck away the boundary layer. The honeycomb carbon fibre skin was laser drilled with holes of sizes which matched suction to local pressure and was successfully tested in a wind tunnel. The UK built 21 m 'Sygma' had a variable chord wing to be extended in thermals. Seal difficulties caused failure but the concept was later tried successfully in Germany. Also investigated have been the 15 m 'SB 13' flying wing and a variable span 19 to 30 m design with extension by hand crank.

Current wing design tools include computational fluid dynamics and infra-red boundary layer visualisation in the wind tunnel; laminar flow is cool, turbulent is warm. Materials include Kevlar and carbon fibres aligned to tailor strength, using traditional wet lay-up methods or pre-impregnated cloth; 'pre-preg'. The latter reduces weight by 5% with increased strength but costs rise by 300%. Computer aided design and manufacture (CAD/CAM) techniques give accurate, smooth moulds allowing airframes to be hand finished to a mirror-like surface, aiding laminar flow. Modern gliders have safety cockpits, carefully shaped with high sills and made with a mixture of composites (70% Kevlar, 30% carbon or glass fibre) for peak energy absorbtion. They are equipped with electronic instruments including total energy displays and GPS. Some gliders have high powered, compact electric motors, the latest of which can take a glider from launch to 10,000 ft. The future holds the promise of stronger fibres, active boundary layer control, adaptive geometry, better instruments, fuel cell powered electric motors and weather information via datalink. Advances will probably spill across from military UAV (unmanned aerial vehicle) research.

Turning to the sport of gliding, Afandi noted that the current distance record, which must be set in daylight, is 3009 km, the speed record is 247 km/hr over 500 km, and the altitude record is 49,009 ft, although Steve Fosset, in a flight yet to be homologated, has exceeded this wearing a pressure suit. Thermal, hill or ridge and wave lift are utilised but new records depend on the latter; wave lift is known to extend up to 100,000 ft in New Zealand. Competitions consist of nine races over nine days. Competitors launch when they choose, fly through the start line, then fly a triangular course back to the finish line. The United Kingdom is the top gliding nation!

Afandi closed with a video of the Gulf Kestrel first flight and then answered questions from the floor. He encouraged the audience to go gliding, perhaps by a course at Lasham. (The Editor can thoroughly recommend this having done such a course in September.) The vote of thanks was given by Ralph Hooper, a once keen glider restorer and pilot who also worked with Afandi on the Farnborough F1.

WHY PAY MORE?

This was the title of Sir Colin Chandler's talk, delivered to the Association with characteristic verve and wit on 14 February. His subject was, of course 'easyJet'. Our Chairman, Ambrose Barber, introduced Sir Colin saying that after starting as a De Havilland commercial apprentice in 1956 he moved to Hawker Siddeley at Kingston rising to be MD of BAe's Kingston-Brough Division and then Group Marketing Director. From 1985-89 he was Head of Defence Sales (receiving a Knighthood for services to export), then Chairman of the Vickers Group and now Chairman of 'easyJet'.

Sir Colin, in his relaxed, informative and entertaining style, outlined the history of the airline and explained its low cost philosophy. Stellios Haji-loannou started the business in 1996 using a £5 million loan from his father to buy two used Boeing 727s. His objective was to take advantage of the opportunity to innovate made possible by Margaret Thatcher's deregulation and market liberalisation policies. Prior to this the market had been dominated by large, overstaffed, airline partnerships with fares set by the IATA (International Air Transport Association), resulting in high costs and fares.

'EasyJet' emphasised safety, timekeeping, high utilisation, rapid turn-round and pleasing the customer. They introduced low cost, 'no frills' operating techniques (e.g. food not included, no free newspapers), dispensed with tickets and agents substituting on-line and call-centre booking. The lean business model minimised management staff who were housed in non-prestige offices without 'personal assistants', company cars, medical schemes or other benefits. Everyone eats in the same canteen. Heathrow was not used because of its high costs and delays, Luton, Stanstead and Gatwick being preferred, especially Gatwick. The classic hub and spoke network was replaced by a point-to-point route system flying to major airports, unlike its main competitor. 'EasyJet' has seventeen bases of which ten are in the UK. The company culture is lively and customer oriented. The operation is constantly under review and steps are taken quickly to correct adverse trends. Ineffectual directors are soon replaced. Growth is rapid - from zero to 35 million passengers in eleven years - so staff are recruited for what the job will be in two year's time.

After 'nine-eleven' the major carriers experienced large falls in passenger numbers and reacted by putting fares up resulting in many airline failures; in contrast the low cost operators reduced their fares resulting in record revenues and profits. Today the business is a PLC with a solid investor base. The opportunity for growth in Europe, particularly France, is such that even greater future annual growth is forecast for the next five to ten years. For this reason 'easyJet' bought BA's unsuccessful 'low cost' offshoot 'Go' and has purchased a hundred and twenty Airbus A319s with an agreed price option on another one hundred and twenty 319s, 320s or 321s. Tenders were invited from Boeing and Airbus; Boeing was complacent but Airbus, fielding their top people to pitch their product, was keen and made the best offer. A modern fleet of efficient new aircraft gives reduced operating costs.

Ancillary revenue is raised from hotel bookings, car rentals, parking, transfers and 'ski partners'. Early bookers get the lowest fares; business passengers tend to book late so pay more! Speedy boarding is achieved by releasing passengers in blocks - first to check-in are first aboard. However, research showed that boarding first was highly valued so, for a premium, passengers can book into the first block no matter what time they check-in. 'EasyJet' fares are under attack from competitors but ancillaries are doing well.

Safety is paramount. The Board is the safety committee, meeting as such every three months. The Safety and Security Director, a retired training captain and ex CAA official, is responsible and has a direct line to the Chairman. Green issues are seen as very important. The young fleet has low emissions, carbon trading and offsets are to be introduced together with another typically innovative initiative. Today 'easyJet' is the number one low fare airline, is growing steadily to satisfy a continuing demand, leads the industry with its business model and is keeping up the pressure to reduce costs and increase efficiency. However, it is necessary to be active in opposing Government's misguided 'green' taxation policy which taxes all airlines the same whether they have modern low emission aircraft or geriatric gas guzzling turbojets. The tax puts up the costs to passengers, reduces load factors and increases emissions per passenger mile! The airlines must be vigilant that they do not become the Chancellor's 'cash cow'.

After a long question period, during which important issues were raised, Les Palmer thanked Sir Colin for his splendid talk.

UNLOCKING POTENTIAL

The 5th May turned out to be rather a special day for the Association - we had a speaker who was not going to talk about aircraft. Vernon Lidstone, or rather, the Reverend Vernon Lidstone, was our Commercial Director until he left to join Westinghouse in 1983. He was ordained in the Church of England in 1992 and in 1997 he became a full time Chaplain in the Prison Service, retiring in 2003. He came to tell us about his experiences working with prisoners as a Chaplain in our prison system.

There are, said Vernon, four categories of prison; from Cat.A, the most secure to Cat.D. Cat.A, typically has two sets of walls and dog handlers. In Cat.B and C prisons there are training opportunities, and Cat.D are the often criticised 'open' prisons. Prisoners with long sentences work their way to Cat.D where they are allowed out into the local community to help them get back in touch with life outside. Long term prisoners have been cut off from normal life for so long that they can find even the normal noises of a city terrifying.

The prison population has and is growing. While Vernon was at Ley Hill open prison numbers rose from 220 to 503. Overall there are now 80,000 prisoners of which some 4300 are women causing severe problems for Social Services in caring for their children. So, asked Vernon, does prison work? Michael Howard thought so because it protects the general public, but 74% of prisoners re-offend and end up back inside very quickly. So Vernon's answer was "I don't think so!"

Prisons are horrible places to be in, mainly, say prisoners, because of separation from the people they care about. The advantage that prison gives is that there is time to think and reflect on guilt and forgiveness. However, prisoners are continually reminded by the staff of their offences and that they are 'low life'. The aim of the prison Chaplaincy is to provide forgiveness, to engender attitude change and to forget the past. This does not fit with the existing system. Chaplaincy teams now include all faiths: resident Christian, Moslem and Budhist chaplains with visiting Rabbis, Jehova's Witnesses and even Pagan ministers. Chaplains have Statutory Duties: induction of prisoners, daily hospital visits, segregation unit visits (made with 3 police officers), and release interviews. The law requires that an Anglican priest must co-ordinate all religious activities which gives problems now that Britain has embraced the multi-faith doctrine. Really what is needed is a non-sectarian religion manager rather than a Co-ordinating Chaplain.

In closed prisons chapel services are popular with prisoners because it is an opportunity to meet mates, distribute drugs and mobiles etc in spite of there being five officers with radios to stop fighting. In open prisons inmates attend services because they want to. There are three services on Sundays, the evening being open to visiting family members. Attendance is about 10% equating to 40 - 50 prisoners. Semons are, refreshingly, often interrupted with questions. Baptisms are carried out but weddings are not encouraged!

Prison is a place of great stress where problems are made worse. For example, prisoners can't pay rent so families become homeless. The lowest in the pecking order amongst prisoners are sex offenders, the highest life sentenced murderers. Of the latter most offended at home and do not have long records. Prison officers vary. Some are 'dinosaurs' who bully and never call prisoners by name. Female officers tend to be good with prisoners. The Chaplains try to ensure fair play, provide counselling and also advocacy for the mentally ill.

In open prisons inmates go out to work as part of the pre-release process and there are courses in the basic skills for living which have been lost in 20 - 30 years' incarceration. Victim awareness courses in which victims describe to prisoners their own feelings about the crime committed against them are very effective, some prisoners even being reduced to tears. Vernon had been involved in running 'Kairos' Christian faith courses which ran for 3-4 days with the aims of changing prisoners' attitudes and explaining alternatives to violence. Feedback from prisoners of different faiths showed that Kairos was effective but it is no longer allowed because it is not

multi-faith! Drugs are a huge problem in all prisons and play a major part in prison life. Of course prisoners need money so any benefits their partners receive get spent on heroin or crack making their plight even worse. Prisoners are generally willing to change but need help. The current system needs improving. Prison Officers of a higher calibre are required and at present there are no specific training courses for potential officers; they are recruited from anywhere. The release interface is poor, prisoners receiving inadequate assistance to move back into the community often leading to a quick return. More prisons are needed to cope with the growing population which in itself is an indication of the failure of the system.

Vernon did not completely avoid aviation as he told us about a model aircraft club he set up for prisoners. It was very popular and did the prisoners a lot of good but a new Governor didn't approve and stamped it out! An example of the blinkered attitude often found in the system. The interest aroused by this talk could be judged by the large number of questions from the audience. Afterwards Vernon's old colleague, Les Palmer, gave the vote of thanks for this thought provoking talk.

THE V/STOL WHEEL OF MISFORTUNE

Once again John Farley stepped into the breach. This time it was because David Scrimgeour was not well enough to come to Kingston, on 14 March, and talk about the Kestrel Squadron. However, Members were not too disappointed because John gave his talk on the history of V/STOL aircraft development using Mike Hirschberg's V/STOL wheel. This classifies the various basic ways of achieving V/STOL (excluding helicopters), sub-divides each into engineering solutions and finally gives examples of types falling into the various categories. The wheel shows, John explained, 45 aircraft starting with the tilt-rotor Transcendental Model 1-G of 1954 and finishing with the contemporary F-35 Lightning II Joint Strike Fighter.

Turning to the individual types John described their configurations and outlined their histories and achievements. First of the shaft driven tilt-rotor types was the twin-rotor Transcendental 1-G which completed its first transition in December 1954. It was lost due to rotor control failure. The later Model 2 was unable to compete with the twin rotor Bell XV-3 of 1955, built for US Army but also flown for 15 years by NASA and the USAF on research. Tilting propellers were employed by Curtiss-Wright on their twin-propeller X-100 flown with some success in 1960 and on its successor, the four-propeller (at the tips of a pair of tandem wings) X-200 or X-19. Hovered and flown conventionally in 1963, it never completed transition and crashed in 1965. Tilting duct types were the 'successful' (ie VTO-double transition-VL) twin-duct Doak 16 and the four-duct Bell X-22A (1966), and the twin-duct Nord 500 which achieved tethered hover only (1968).

Moving on to tilt-wings John covered the 'successful' twin-prop Vertol 76/VZ-2 (1957), the twin-prop Hiller X-18 (1959) which never hovered and was scrapped, and the four-prop LTV-Hiller-Ryan XC-142 (1964). Five were built and evaluated by the US services but handling and mechanical problems caused a number of accidents. The four twin-prop Canadair CL-84s (1965) were also subjected to lengthy service evaluation but came to nought. The Bell XV-15 (1977) was a tilt-rotor type with twin tilting engines at the tips of a fixed wing. Two examples were flown very successfully and led to the Bell Boeing Vertol V-22 Osprey (1989) which, after a long and troubled development programme, and a number of accidents, is about to enter service with the USMC. The tilt-jets were represented by the Bell Model 65 ATV (Air Test Vehicle) of 1954 which carried two tilting J-44s on the sides of a Schweizer sailplane fuselage beneath a Cessna 170 wing. It did well everything a VTOL should do apart from a full transition, precluded by lack of power.

Deflected slipstream was tested by the Robertson Aircraft Corporation in a VTOL, four-seat, twin Lycoming, high wing machine with a sliding flap system. It flew tethered in 1957 but was not pursued. The twin propeller Ryan VZ-3 was underpowered and could hover only in a light wind. Ryan's VZ-5 Fledgling with four propellers flew tethered only, in 1959.

In 1957 the Bell X-14 successfully pioneered vectored thrust. Built for the USAF it flew on for many years with NASA on research programmes. Hugh Merewether flew the X-14 in preparation for the P.1127 test programme. We all know the P.1127 story which started in 1960 and led to the Harrier series of in-service fighters with one engine, the Bristol Pegasus, and four nozzles. In 1963 the twin engined, two nozzle Soviet Yak-36 flew, demonstrated complete transitions and high speed flight and led to the Yak-36M/Yak-38. The latest manifestation of vectored thrust was the Boeing X-32B JSF contender. This two nozzle design with straight through flow for conventional flight was defeated in a 'fly-off' by Lockheed-Martin's X-35B, its main problem being hot gas reingestion in spite of an intake jet screen provided by fan bleed air.

Tail-sitting VTOL proved to be a fascinating dead-end. The USN-funded turboprop Lockheed XFV-1 and the Convair XFY-1 flew in 1954 but only the latter completed the transition sequence. The Avon powered Ryan X-13 for the USAF was launched from and retrieved by a cable stretched between two arms on the flat bed of a tipping truck, by means of a hook under the nose. Flown in 1951 complete transitions and high speed flight were demonstrated. In France the annular wing, Atar powered SNECMA C-450 Coleoptere of 1959 hovered but crashed on its ninth flight.

To some extent utilising data from the Rolls-Royce 'Flying Bedstead' of 1953, the RAE's Short SC-1 aircraft had four R-R RB-108 lift engines plus one for cruise. Fully autostabilised, the two built carried out much valuable research flying from 1957. This multi-engined concept promoted by Rolls-Royce led to the experimental Dassault Balzac, a converted Mirage III prototype, with eight RB-108 lift engines and a Bristol Orpheus for cruise. Flown in 1962 it accomplished transitions and high speed flight, but achieved the distinction of fatally crashing twice. Its successor, the bigger and heavier Mirage IIIV, with eight RB-163 lift engines and a SNECMA TF-104/106 or P&W TF-30 for cruise. Although the IIIV fully demonstrated VTOL and Mach 2 capabilities, the concept's complexity and weight led to another dead-end.

Lift plus lift/cruise engined hybrids included the German VJ-101 of 1963 with six R-R RB.145 engines, two in a swivelling pod at each wing tip for lift and cruise, and two in the forward fuselage for lift only. The second aircraft had reheated wing tip engines. VTOL and Mach 1+ were demonstrated but the project faded away. Dornier's Do-31 was a V/STOL transport with two underwing Pegasus for lift and cruise and wing-tip pods each containing four R-R RB.162 lift engines. Two hovering rigs preceded the Do.31 which flew in 1967. Although V/STOL and conventional flight were fully demonstrated and a research programme was flown by NASA this project also faded away. In the USA Ryan converted their XV-4A to take four J-85s in the fuselage for lift and two beside the fuselage for cruise to become the XV-4B Hummingbird II. Flown in 1969 it crashed in less than a year. Germany's last attempt was the VFW-Fokker VAK-191B. This had a centrally mounted, four nozzle, R-R RB.193 vectored thrust lift/cruise engine with a R-R RB.162 lift engine in the front and rear fuselages. It was one of the most complex V/STOL aircraft ever built. Flown from 1971, three prototypes were built but the German Government abandoned their VTOL fighter requirement. In the Soviet Union the Yak-38 Forger

naval fighter of 1971 had a two nozzle vectored thrust Tumansky R-27V-300 in the centre fuselage and two Rybinski RD36-35 lift engines in the forward

fuselage. As an engine failure would cause catastrophic pitching an automatic ejection system fired the pilot's seat if pitch attitude changed by more than 10 degrees. John showed an impressive film of such an ejection off the bow of an aircraft carrier. 231 aircraft were built and served for 15 years paving the way for what was to be its supersonic successor, the Yak 41/141. This aircraft had a similar layout to the -38 except that the reheated Soyuz/Kobchenko R-79V-300 lift/cruise engine exhausted through a single vectoring nozzle between two tail booms. The lift engines were Rybinski/Novikov RD-41s. Sadly the project fell victim to drastic cuts in the Russian defence budget. This successful Mach 1.8 ASTOVL fighter appeared at Farnborough and was the subject of a teaming agreement with Lockheed-Martin for the JAST/JSF programme.

Another form of hybrid had tip jet driven rotors which were unloaded and autorotated at cruising speeds, with propeller propulsion. The USAF's McDonnell XV-1 of 1955 had a rotor driven by tip mounted pressure jets and a pusher propeller. A Continental piston engine drove a compressor for VTOL and the propeller for cruise. VTOL and conversion to horizontal flight were successfully demonstrated but the principle was not pursued. However, in England Fairey's Rotodyne VTOL airliner was intended to carry 48 passengers from and to city centres. It had a 90 ft diameter rotor and low aspect ratio wings mounting two Napier Eland turboprops. These drove tractor propellers and compressors delivering compressed air to the rotor tip jet units. Its performance was entirely satisfactory but its tremendous noise during take-off made it quite unsuitable for its intended use. During question time the Fairey Gyrodyne and Jet Gyrodyne, Rotodyne predecessors, were discussed.

Several attempts were made to augment VTO/hover thrust by means of ejector nozzles or fans. The US Army's Ryan XV- 4A Hummingbird had a P&W JT12A turbojet each side of the fuselage exhausting rearwards for cruise. For VTOL/hover the exhausts were diverted downwards via complex cross-connected ducting to ejector nozzles in the fuselage. It flew in 1962, with transitions in 1963 and a fatal crash in 1964. The expected augmentation ratio was not achieved and the lift system took up a large percentage of the fuselage volume. The 1977 Rockwell XFV-12A canard fighter with ejector slots in the foreplane and wings was a complete failure, this supersonic design never achieving its planned augmentation ratio or even a VTO. The fan-in-wing configuration was pioneered by the Vanguard 2C Omniplane which had a fan in each wing and a tail mounted propulsive ducted fan. The Ryan XV-5A's twin J-85 exhausts could be diverted to two large wing mounted tip turbine driven fans and a smaller similar unit in the nose for vertical thrust, or could exit through normal tailpipes for wingborne flight when shutters covered the fans. First flown in 1964 the complete transition sequence was demonstrated satisfactorily before the first aircraft was lost. A second flew on until 1966 when it too crashed but was rebuilt as a research aircraft for NASA, the XV-5B

The contemporary manifestation of the fan concept is the Lockheed-Martin X-35B Joint Strike Fighter prototype. Here a nose mounted, shaft driven fan is clutched-in for vertical flight and the single vectoring engine nozzle, using Yak-141 technology, is articulated downwards. In this configuration the hot engine exhaust is far removed from the intakes minimising hot gas reingestion, and the Rolls-Royce fan is very efficient; for a weight penalty of 6,000 lb, 16,000 lb of vertical thrust is gained. Modern fly-by-wire and autostabilisation techniques make flying the aircraft straightforward and although the design in complicated compared with the Harrier modern technology renders it practical.

Finally John touched on some rotor types. The 1960 Kamov Ka-22 was a large transport compound or winged helicopter in which wing tip mounted turboshaft engines drove propellers for propulsion and rotors which were powered for take-off but autorotated in the cruise. It achieved 221 mph and lifted 36,000 lb to 8,500 ft. Piasecki's 16-H1 of 1962 was an early research compound helicopter but the Lockheed AH-56 Cheyenne was a successful winged tandem two-seat attack compound helicopter for the US Army. Flown in 1967 budget cuts led to its demise after ten had been built.

In conclusion John remarked that out of all this effort had emerged just two in-service types: the Harrier series and the Yak-38, intended to be the precursor of the supersonic Yak-141. However, the V-22 Osprey will enter service shortly and the F-35B Lightning II, developed from the X-35B, is expected to enter service with the USMC and Royal Navy in 2015.

ACES, ERKS AND BACKROOM BOYS

Harry Fraser-Mitchell recently came across a copy of 'Aces, Erks and Backroom Boys' by Edward Smithies (published by Cassell PLC in their Military Paperbacks series), now out of print, and noticed that it contained material of great interest to Association members. Harry has obtained permission for extracts to be quoted in the Newsletter....

Frank Baker, a long serving RAF pilot flew the Hurricane and the Spitfire. "The Hurricane was an idiot's aeroplane, very forgiving. If you couldn't fly it you really shouldn't have been in the air. The undercarriage was strong, so well constructed, that you could drop them in very carelessly and get away with it. They would bounce and bounce. If you did that in a Spitfire the undercarriage would have poked up through the wing. The Hurricane was also much stronger. From the cockpit back it was wood covered with fabric. (Editor's note - a common and oft repeated misconception. The rear fuselage was, of course, a tubular metal structure with wooden formers and stringers covered in fabric). You could shoot away great lumps without affecting its performance too badly. Do the same with a Spitfire - the monocoque metal construction wouldn't take the punishment. The Hurricane could turn very, very tightly and in dog-fights it all comes down to who can out-turn the other. The pilot who's got the smallest turning circle will get inside and shoot the other down. Because it had a lower wing loading I found I could turn a Hurricane more tightly than I could a Spitfire so that if a (Messerschmitt) 109 or a (Focke Wulf) 190 stopped to play with me, I could turn inside him. You've got to shoot ahead of him which means you've got to turn tighter.

The first Spit I flew was a Mark 1. It didn't impress me. It seemed tinny; thinner wing; looked very much more delicate than the sturdy, solid, Hurricane. It looked like an aircraft that wouldn't take a lot of a beating. In fact it would take a lot of a beating! It certainly wasn't a case of love at first flight. The undercarriage was pumped up manually. When you were taking off, you went across the airfield pumping away, trying to hold it level with one hand and pumping the undercarriage up with the other! I preferred my Hurricane. I didn't fall in love with the Spitfire until I'd flown the Mark IX. The public's attention was caught by the Spitfire because it was capable of tremendous development. When you consider that it virtually spanned from fighter biplanes to jet fighters - there's no way that the Hurricane could have done that because the airframe couldn't absorb the additional power that was available. (Editor's note - hence the Typhoon and Tempest) The Spitfire was such a clever design that it could.

The first time you flew a Hurricane or a Spitfire, it was the first time you flew it! We had no twin seat models. Quite a daunting experience because you've got a thousand horsepower; it's a lot to let loose! I can clearly recall my first take-off in a Hurricane - I was up at about two thousand feet still trying to find the lever to get the undercarriage up!

HAWKER PEOPLE NEWS

Sadly we must record the deaths of five well known colleagues: Eric Rubython who was Company Secretary and Director & General Manager of Hawker Aircraft Ltd, Commercial Director and Director & General Manager of Hawker Siddeley Aviation Ltd and Deputy Chief Executive of British Aerospace Aircraft Group; Chief Test Pilot Neville Duke; Head of Research Cliff Bore; and Maurice Gilson of the DO. Not a Member, but certainly a 'Hawker person', Air Cdre David Scrimgeour, best known to us when in command of the Kestrel Tripartite Evaluation Squadron in 1964, died on April 1. The Association's condolences to all spouses, relatives and friends.

We welcome new members Mike Azzopardi, Paul Barber, Betty Bore, Arthur Brocklehurst, Keith Chard, Tony Cripps, Barry Elliot, Ann Martin, Graham Roe, Chris Russell and George Smith.

HAWKER ASSOCIATION MEMBERS - JUNE 2007 (Names in **BOLD** still owe **subs for 2006-2007**. **LAST CHANCE**....)
A: Mike Adams (a), Ken Alexander, Peter Alexander, John Allen, Martin Alton, Terry Ansty, Alma Apted, Steve Apted, John Arthur, Alan Auld, Bryan Austin, Mike Azzopardi. **B:** Brenda Bainbridge, Colin Balchin, Ambrose Barber, Paul Barber, Ray Barber, Derek Barden, Peter Barker, Geoff Barratt, Graham Bass, Ken Batstone, Dennis Baxter, Colin Bedford, Anne Beer, Guy Black (A)**,** John Blackmore, Keith Bollands, Paul Boon, Betty Bore, Steve Bott, Pat Bott, Bob Bounden, Alan Boyd, Pat Boyden, Phil Boyden**,** Roy Braybrook, Clive Brewer, Laurie Bridges, **Ian Brine**, Doug Britton, Arthur Brocklehurst, Peter Brown, Christopher Budgen, MP Budgen, Roy Budgen, Reg Burrell**,** Robin Burton, Ron Bryan, .**C:** Richard Cannon, Maurice Carlile, Chris Carter, Bob Catterson**,** Ken Causer, Jeremy Cawthorne, John Chacksfield, Colin Chandler, Keith Chapman, Keith Chard, Gerry Clapp, JF Clarke, John Cockerill, Hank Cole (a), Bob Coles, Percy Collino, Brian Coombes, David Cooper, Paul Cope, **Patricia Cosgrove, Ron Cosgrove,** George Cotterell, Nick Cox, Shirley Craig, John Crampton, Tony Cripps, Russ Culley**,** RG Curtis. **D:** Roger Dabbs, John Dale, Clive Dalley**,** Andy Dalton, John Danse, Afandi Darlington, Jo Davies, John Davie, Ken Davies, Trevor Davies, Diana Dean, Ralph Denning (A), Norman Deviell, Mike Diprose, Richard Dobbs, Mike Dodd**,** Colin Dodds, Lambert Dopping-Heppenstal, Jack Dowson, **Brian Drew**, Dick Duffell, Jean Duffell, Peter Drye, Chris Dunhill, Mike Dyke. **E:** John Eacott, John Eckstein, Andy Edwards**,** Dave Edwards, Barry Elliot, Tony Elliott, Celia Evans, Norman Evans, Roy Evans. **F:** Russ Fairchild, Ian Falconer, **Mike Fantham**, Chris Farara, John Farley, John Farrow, Max Fendt, Stan Field (a), Geoff Fieldus, Mike Finlay, Wilf Firth, Ann Fletcher, Richard Fletcher, Colin Flint, Dave Fowler, Mike Frain, Harry Fraser-Mitchell, Geoff French, Mike French, Heinz Frick. **G:** Roy Gaff, Mike Gane, John Gardner, Patricia Gardonio, Peter Gates**,** Sandie Gear, Tim Gedge (A), Mark Gerrard, Tony Gibbs, John Gilbert, John Glasscock, Pat Goodheart, Eric Goose, John Gough, Andy Green, James Griffin, Barry Grimsey. **H:** Douglas Halloway, Liz Hargreaves, Simon Hargreaves, Bryan Harman, Dawn Harris, Guy Harris, Thelma Harris, Brian Harvie, David Hastie, Eric Hayward, Bob Head, Sheila Hemsley, Jock Heron (A), **Tony Herring** (a), Keith Hertzenberg (a), Frederick Hewitt, Merlin Hibbs, Richard Hickey, Peter Hickman, Vince Higbee (a), Reg Hippolite, Keith Hobbs, Chris Hodson, Gordon Hodson, Derek Holden, Doc Holliday, Ralph Hooper**, Linda Hopkins, Paul Hopkins,** Mike Hoskins, Gerry Howard, Dawn Howes, Terry Howes, Simon Howison, Gordon Hudson, Gavin Hukin. **I:** Pete I'Anson, Len Illston, Maive Impey, David Ince (A), Brian Indge. **J:** Keith Jackman, John Janes, Gordon Jefferson, Harry Johnson, John Johnson, Brian Jones, Ian Jordan, Trevor Jordan, Robin Jowit, Alf Justin. **K:** Brian Kent, **Dennis Ketcher**, Bill King, Dave King, **Martin King,** Charles Kirk, Ralph Kuhn. **L:** Barry Laight, Mike Laker, Charles Lamb, Richard Lane, George Latham, Paul Latham, Pam Lawrence, Andrew Lawson, **Ron Leader,** Geoff Lee, Gordon Lewis (A), Mark Lewis, Vernon Lidstone, Gary Lillistone, Andrew Lloyd, Gary Lockley, David Lockspeiser, Norman Long, Gordon Lorrimer, David Lovell. **M:** Albert Magee, Al Mahoon, Mick Mansell, John Marsh**,** Bill Marshall, Anne Martin, Bob Martin, Dennis Mason, Brian Maton, Don McGovern (a), June McKeon, Ronald Mears, Mike Mendoza, Jim Middleton, Kit Milford, Robert Millar, Jack Mills, Brian Monk, Pat Moon, Leslie Moore, Pauline Moore, Nicholas Morland, Pete Munday, Carole Murphy, Gloria Murphy. **N:** Jennifer Nicholas, Anthea Newman**. 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