SEPTEMBER 2016
8    General Purposes & Finance Committee    Cobham House
8    Court Meeting    Cutlers' Hall
13   Aviation Careers & Education Committee    Cobham House
20   Technical Committee    Cobham House
21   AST/APT meeting    Cobham House
22   New Members’ Briefing    Cobham House
28   Luncheon Club    RAF Club
28   Sir Frederick Tytms Lecture    4 Hamilton Place
29   Election of Lord Mayor    Guildhall

OCTOBER 2016
13   General Purposes & Finance Committee    RAF Cranwell
13   Pilot Aptitude Assessment    Guildhall
27   Trophy & Awards Banquet

NOVEMBER 2016
5th   Pilots Career Live    Softitel, Heathrow
10th  Benevolent Fund Trustees Meeting    Cobham House
11th  Silent Change    Guildhall
12th  Lord Mayor's Show    Cobham House
17th  General Purposes & Finance Committee    Cobham House
       Court
       Scholarships Presentation

DECEMBER 2016
15th  Carol Service    St. Michael's, Cornhill
       Christmas Supper    The Counting House

VISITS PROGRAMME
Please see the flyers accompanying this issue of Air Pilot or contact Liveryman David Curgenven at visits@airpilots.org.
These flyers can also be downloaded from the Company’s website.
Please check on Company website for visits that are to be confirmed.
September 3rd    Garden Party, White Waltham
September 20th    Southampton University
October 11th    Museum of Army Aviation, Middle Wallop
October 19th    AAIB, Farnborough

GOLF CLUB EVENTS
Please check on Company website for latest information

Photo by CPO Si Ethell.
A message from your Editor...

Many Company members who have developed a career in commercial or military aviation will not fully recognise how transformative the experience of learning to fly can be. (Bear with me here for a moment). Perhaps instructors in GA may glimpse this from time to time.

As a trustee of the Company's Benevolent Fund, I was present at the Royal International Air Tattoo in July when Flying Scholarships for the Disabled made its 2016 awards. Also in attendance were many of the recipients of last year’s awards who had by now completed their course. Their stories were both moving and inspiring. It became clear that each student, unsurprisingly, felt enormous achievement at having progressed to their first solo flight (and in some cases beyond). Yet what was even more gratifying was that for many the experience had transformed the lives of the recipients – giving them the courage and confidence to confront their ailments and seize all opportunities life presents. No doubt similar schemes funded or operated by the Air League and Aerobility achieve similar success. The progress through first solo to PPL is also, of course, transformative for our able-bodied scholarship winners. The Company administers an impressive number of scholarships (gliding, PPL, Fi) each year, and members can be proud of what these achieve for the worthy recipients.

It was very firm reinforcement that one of the Company's principal charitable activities has very laudable aims, great success and is a very worthy effort. Next time you have the opportunity to donate to this worthy cause, please empty your pockets.

Paul Smiddy - Editor
Assistant Marion Woolridge reports on the award by the British Women Pilots' Association of its three 2016 Scholarships. They are:

**Geraldine Hill**, for the BWPA Flying Start Scholarship 2016, worth £1000 towards a first flying qualification; Geraldine will be using this award towards gaining a PPL(A). Geraldine is undertaking her PPL at Cotswold Airport whilst training as an aircraft engineer. She would like to combine the two areas professionally, and has a long term aim of working in air accident investigation.

**Emily Collett**, for the BWPA Flying High Scholarship 2016, also worth £1000 towards further qualifications, training or experience. Emily is already selected for the British Team attending the World Advanced Aerobatics Championships in Poland this year. She will be using the award towards further aerobatic training with the aim of securing a medal for the British Team at this competition. Emily also intends to complete her Class Instructor Rating, for which she has already finished the ground school, to teach and inspire more people to get in to the sport of aerobatics, especially young women.

**Christina Carver**, for the BWPA CATS CPL/ATPL Scholarship 2016, worth £1499, kindly donated by CATS to cover the ground school element for a CPL or ATPL (A) or (H). Christina has been flying since 1986, and has night and IMC (now IR(R)) ratings. Professionally, Christina is currently a police sergeant; her career has included a 6 year posting to the Police Air Support Unit based at Bristol where, as Deputy Unit Executive Officer, her role involved managing the base and flying as air observer on the EC135 T2 helicopter. Christina's plans are now to make a successful career change, becoming a Commercial Pilot either in the CAT or GA flight instructor environment. Having achieved this, she intends to promote flying as a female friendly career choice for women returning to work after a career break.

With a total of fifty impressive applicants, the selectors had some very difficult decisions to make, and would very much like to thank all applicants. They would encourage those who did not receive an award this year to look out for the BWPA Scholarship 2017 announcements, and consider applying again.

**AIR PILOTS SCHOLARSHIPS**


**RNAPPOINTMENT**

As a further illustration of progress being made by female aviators, Lieutenant Commander Kay Burbidge, a RN Observer has been appointed the new Commanding Officer of 829 Naval Air Squadron ("The Kingfishers") at RNAS Culdrose.

Kay joined the Royal Navy in 1988 as a Wren Air Engineering Mechanic and worked at Culdrose on a variety of aircraft. In particular, Sea Kings on 771 and 820 Naval Air Squadrons and onboard HMS Ark Royal during the Adriatic conflict in the early 1990s. In 2006 Kay graduated from Britannia Royal Naval College at Dartmouth and became an Officer.

Returned to RNAS Culdrose for Observer flying training she was awarded her RN Observer's Wings and appointed to 820 NAS once again. Deployments with HMS Illustrious and numerous Royal Fleet Auxiliary ships followed including operations outside UK waters in the Arabian Gulf and Sierra Leone in support of Op Palliser.

After Staff Course and an Observer Instructor's course Kay took up Search and Rescue and instructional duties on 771 NAS. Completing a Helicopter Warfare Instructor's (HWI) course and an Advanced ASW Course, where she was awarded the HWI Student of the Year, Kay also converted to Merlin MK 1 with 824 NAS at Culdrose. Numerous exercises and operations worldwide followed before she started a four year period with 829 NAS, initially as Flight Commander on HMS Monmouth during Op Telic before she was appointed Senior Observer in 2010. Kay also served with HMS Northumberland and HMS Westminster flights, conducting Counter Piracy and Counter Narcotics operations, working closely with coalition and multi-national task forces in a variety of Maritime disciplines.

In 2013 Kay joined the Maritime Warfare School at HMS Collingwood as Officer in Charge Aviation Training Element and subsequently as the 2IC of the Warfare Training Group. She also sat as a Board Member at the Admiralty Interview Board during her time in the Portsmouth area.

**CHIPMUNK OWNERS**

It has been a busy and exciting year for those privileged to own this iconic trainer from de Havilland Canada, celebrating its 70th anniversary. Liveryman Stephen Bruh would like to collate a list of Company members owning a Chippee. Please forward your aircraft details, home base, and email address, to him at sbruhaol.com. In the meantime I should be grateful to receive reports on some of the events that have taken place this year, such as the Old Warden event and the ChipFest.
E-GO PRODUCTION LAUNCH

I visited Main Farm airfield in May for the presentation of the first production e-Go aircraft. The company was formed in 2011, and much of the prototype’s development flying was done by Liveryman Keith Dennison from Tibenham in Norfolk. The e-Go is a single seat deregulated aircraft (SSDR). It is no surprise to learn that this beautiful machine is crafted by an Italian designer, Giotto Castelli. The finish of the first production standard machine is much improved relative to the prototype, and the company expects a consequent improvement in performance figures.

The powerplant is a Rotron Wankel engine, weighing only 20kg, notionally produces 30hp, but one of the issues that the company has been addressing is that it is only generating c 26hp at the propeller.

Keith Dennison has done more than 100 test flights to date (in between his day job in China!), and with it being stressed to +4/-2G has been seen to do the occasional barrel roll. He gave a very spirited display at Main Farm with the prototype G-EFUN, before G-OEGO was handed over to its customer, William Burnett, who had just been appointed the company’s new CEO. Keith describes it as delightful to fly, and in his view can be safely owned by low hour pilots. Its operating costs are (conservatively) a derisory £15/hour, with a fuel consumption of only 8 lph! Range is over 300 nm, and current claimed cruise is 90 knots (although the prototype, with all its lumps and bumps, achieves 82kts).

Keith and Giotto both hope for the magic 100 once the powerplant is fully sorted; and Giotto designed the airframe for a 40hp powerplant.

The company has so far grown on the back of a short £1m of crowdfunding. Another round of equity financing is due shortly to fund the initial production run. Seven airframes will be built in the next 12 months, against only 2 firm orders. One of these airframes is destined for the USA. Strong customer interest has thus far had limited follow through to orders until the quality of production aircraft has been demonstrable.

It is a very innovative machine – it would be good to see a UK aircraft manufacturer flourish! The Air Pilots Flying Club will be visiting e-Go shortly.

NEWS ADDENDUM

All four recipients of Master Aircrew certificates at the Court Meeting, preceding the Livery Dinner this year were from the Royal Navy. Excellent organisation by our office therefore to have them awarded by the Master under the watchful gaze of Admiral Lord Nelson!

ARE YOU SOFT OR HARD?

If you no longer wish to receive Air Pilot in the post, and are content to read it online, please contact your regional office, which will amend the mailing list.

HONOURS

Liveryman, past Australian Region Chairman, and Safeskies Australia president emeritus, George Alfred “Peter” Lloyd has been honoured in the Queen’s Birthday awards with admission to the Companion of the Order of Australia (AC), the nation’s highest civil honour.

Peter was recognised “for eminent service to the aviation industry, particularly to the advancement of air safety in Australia, through leading roles with national and international aeronautical organisations, and airport associations”.

He is also the honorary Governor of the Australian Air Sport Confederation and President of Honour of the Federation Aeronautique Internationale. He was previously awarded the Officer of the Order of Australia (AO) in 1990 and an OBE in 1964. Peter, who is now blind, celebrated his 95th birthday with a tandem skydive over Canberra in December 2015!

AeroExpo

I visited this annual aviation exhibition at Sywell in June. Taking Immediate Past Editor Tom Eeles, it turned into a rather spontaneous meeting of Company folk. Amongst others there on the Friday were: Su Ingle, Terry Holloway (manning the e-Go stand, in his capacity as company director), and John and Diana (Green) Davy. Sadly due to gusty winds the air display was cancelled, which caused some sadness with the e-Go crowd since it was one of the few occasions this year when the machine was scheduled to display.
Since my last message perhaps the greatest change in our Country’s Foreign Policy in my adult lifetime has occurred, with a majority vote to leave the European Union. Like many, I remember the original referendum in 1975 to ratify whether we remained members of what was then termed the Common Market. The polling booths for our area were at my school.

“Brexit Means Brexit” is indeed a catch worthy phrase, yet it defies meaningful analysis. As a commentator said, you might as well state: “Blue Means Blue.” In either case, it begs a hundred questions – what shade, tone, hue, tinge, or tint, to continue the analogy?

Brexit means what exactly for UK aviation? There are no obvious immediate answers, if perhaps a few pointers. Take membership of EASA (the European Aviation Safety Agency). The UK is a full member. Will this cease with Brexit? Arguably not for, at the very least, Civil Air Transport: a glimpse of the reach of EASA is given by this link –

https://www.easa.europa.eu/esa-and-you/international-cooperation/esa-by-country

From Benin and Botswana to Uzbekistan and Zambia, the range of affiliates is wide.

A range of menu options exist for a country to choose –  

Membership; Bilateral Agreement; Working Arrangement; Technical Cooperation Activity; or Management Board Observer Status, to name but some of the possibilities.

This gives an inkling of the massive task ahead of us to decide with our nearest trading partners which existing agreements will continue, and to what extent. This is neither to affirm nor to deny the rationale for Brexit, more to suggest the immense amount of work to be done, and hint at the consequential likely timescale.

In that pause, whilst aviation relationships and the regulatory regime are reset, comes the opportunity, if not the obligation, to act and to make the case for the changes we see as necessary to create the dynamic, outward looking, ‘UK air economy’ able to respond to new global opportunities and exploit our historic aviation links with the world.

Arguably the Empire Air Mail Scheme, conceived in 1934 and implemented in 1936, bequeathed a legacy of air routes that set the scene for our national airline to have near global reach from the outset.

How ironic then, that we now set the highest rate of Air Passenger Departure Duty in the world, and thereby hobble our own airline industry unilaterally with costs that render them less able to compete on equal terms with their immediate neighbours.

The Honourable Company of Air Pilots will argue that the only workable solution to an Air Carbon Emissions Tax is via ICAO, and a truly global settlement that confers an equal obligation on all. We will make the case for the abolition of APD, a seemingly essential decision when dire warnings about the likely downturn in the economy were made if Brexit were to occur.

The following is a summary of a report commissioned in 2013 into the possible effect of the abolition of APD in that year, (my emphasis by italics and underlining):

“In 2013 a study by PwC, The Economic Impact of Air Passenger Duty, found that abolition of APD could provide an initial short-term boost to the level of UK GDP of around 0.45 % in the first 12 months, averaging at just under 0.3 % per annum between 2013 and 2015. It stated that this increase would permanently raise UK economic output, to the point where the economy could be up to £16bn larger in the period 2013-15 than under the current system of APD.

In addition, it found that abolition would result in an increase in investment and exports, implying investment may rise by 6% in total between 2013 and 2015, with exports rising by 5% in the same period. Almost 60,000 jobs could be created between 2013 and 2020, and although the abolition of APD would result in £3-4bn in lost revenue to the Treasury, PwC’s “cautious” analysis suggests that this would be offset by increased receipts from other taxes.

The report concludes that this would lead to a positive net gain of £0.25bn per annum for the Government, or in other words, that abolishing APD could pay for itself, though increased Government revenue from other sources primarily due to business growth achieved through the benefits brought by abolishing APD”.

It’s worth bearing in mind that the sums raised by APD are not hypothecated into some kind of ‘green’ fund, they are just additional revenue, which would arguably be greater if it were not levied at all, as explained above. In a post-Brexit world, where interconnectivity and inwards investment on a global scale, (of which air transport is the key enabler), are seen as essential to sustaining our economic life, the case is all but unarguable. Those who might say we set a global example by levying such a tax seem to be blind to the fact that no one else is copying that example.

This Honourable Company of Air Pilots has an innate advantage in this new
global-facing world that we are set to embrace, derived from its all-but-unique international structure. The Regions of the Company live by very differing rule sets in their own civil aviation arenas than that of the UK. Many members of the Company will have experience of both their own jurisdictions, and the EASA one that we had embraced prior to Brexit. I hope very much that we can capture your great comparative experience as we seek to make our advice and experience heard in this new regulatory environment.

I have also argued in the Livery Dinner speech for the abolition of VAT on UK flight training for professional qualifications. This is surely an absolute requirement. As with the Empire Air Mail Scheme, so with the UK Flight Training System: pioneering work that set global standards of reach is now enfeebled by taxation. Robert Raymond Smith-Barry AFC created a method of flight training that became known as ‘The Gosport System’ just meters (or will that soon be feet once more) from where I am writing this. His system was adopted worldwide. Lord Trenchard called Smith-Barry; “The man who taught the Air Forces of the world how to fly”.

UK Flight Training, both military and civilian, remains one of the most respected in the world, and yet we choose to demand a 20% supplement of those who would pay for it, when close competitors in neighboring Europe do not. In a new economic order, where the United Kingdom wants to earn its way in the world, the abolition of this tax must also be an early priority.

Aircrew fatigue is the corollary to much airline rostering in a post-EASA-sub-part Q world, sub-part Q being the European rules on flight time limitations for aircrews. Sub-part Q introduced a considerably less exacting regime of control than its predecessor, Civil Air Publication 371, as applied to UK registered aircraft prior to the adoption of Sub-Part Q.

The lessening of restrictions was justified by the requirement to have a Fatigue Risk Management System (FRMS). Such a system seeks to capture instances of aircrew fatigue (and modify rostering in consequence), because it responds to reports of fatiguing schedules within a company in that way. It is a ‘self-correcting’ system. Or it would be if two things were in place – firstly a ‘just culture’ within the airline concerned, enabling the reporting of such events without fear of a prejudicial outcome for the reporter, and secondly, a willingness actually to report fatigue when historically this has led to the would-be reporter facing career-compromising consequences.

To its credit, the UK CAA has led seminars on creating that ‘Just Culture’, however the stark reality is that aircrew still do not feel able to report fatigue for fear of the consequences to their careers of doing so. This cannot be acceptable. The Honourable Company of Air pilots will seek to have CAP 371 re-introduced to the UK, with an upgraded form of FRMS, on the basis that it needs a total culture change to embed the principle of open reporting in an airline, and until it is abundantly clear that such a culture of open reporting can be universally established, then the more restrictive rule set is essential to preserve air safety.

If there is an element of repetition to some of these themes it is because, vital though they are to the success, prosperity and safety of our aviation industry, hitherto there seems to have been no response at a regulatory or political level. With the massive consultation and renegotiation exercise about to get underway, it is our belief that this may change. The Honourable Company of Air Pilots will make its policy input heard in this dynamic environment, and I would urge any member of the Company, both from the Regions and from the UK, with views on these and other topics to contact the Director of Aviation Affairs at DAA@airpilots.org.

Summer has at last arrived, with some excellent days for flying. The Visits Team and the Flying Club continue to arrange superb events, and I am very grateful to them all on our behalf for all the work that they do.
I have already sent a personal message of thanks to those who kindly supported my Appeal for the year 2015-2016 but I wanted to write to all our members to update you on the donations received – and how they were distributed!

When I set out my plan for the year at the AGM in March 2015 I said that I hoped to raise £10 per person in the Company (not even the cost of a meal in London!). My objective was to split this evenly between providing a PPL Scholarship and assisting both London’s Air Ambulance (LAA) and ORBIS. Whilst throughout the year close to £13,000 was raised (though sadly not from our total membership!) I am eternally grateful to those who did donate.

Firstly I must thank Liveryman John Robinson (aka JBR) for kindly donating the profits from the sale of his autobiography *Life of Flying*. A highly entertaining read with many anecdotes and stories of John’s many successful years in aviation – with even a couple of references to this writer! His generosity raised some £2,000 and is very much appreciated.

To all those who supported the visits organised by Freeman David Curgenven and his group of helpers, the few pounds not spent on lunches, admin or donations to the host also went towards my Charities. Thank you.

Through fundraising I was able to achieve my primary objective – to provide a PPL Scholarship for Oliver Dunnett, a 17 year old, who will fly at Wickenby this summer. I hope that Oliver will do well and that a report of his progress, from application to PPL, will appear in a future edition of Air Pilot. Furthermore I look forward to presenting him with his Certificate at the ceremony after November’s Court meeting.

Because the full target sum was not achieved I restricted my donations and support to both the LAA and ORBIS to £2,500 each.

The members of the Company and the Ladies made two separate visits to London’s Air Ambulance (both of which have been comprehensively reported in Air Pilot). On each visit a cheque was presented and, supported by a further very generous individual donation, approximately £2,500 was given to the LAA this season. I handed a final cheque for £500 to the LAA’s chief pilot, Upper Freeman Neil Jeffers, next to their original helicopter at RAF Northolt on 25th May. I had hoped to see the new addition to the fleet, however it was getting airborne just as I arrived to make the presentation.

In mid May I was very pleased to be able to present a cheque for £2,500 to Liz Allen, head of major fund raising and Allan Thompson, the Director of External Relations, at ORBIS. This was very well received and ORBIS are pleased to report the arrival of their second MD10 aircraft. The aircraft was kindly donated by long-term partner, Fed-Ex, and was custom designed to bring the best medical technology and training direct to areas of need. It includes a 46-seat classroom, state-of-the-art AV/IT room, patient care and laser treatment room, operating room, sterilization room and both a pre-and post-operative care room. It features a modular design, 3D technology and live broadcast capabilities enabling ORBIS, alongside its team of over 400 medical volunteers, to train more doctors, nurses and healthcare professionals than ever before.
To give you an indication of just how much can be achieved by donations, however small, it costs just 25p per person to provide and distribute an antibiotic to prevent the onset of Trachoma in the rural regions of Ethiopia. Currently £10 will pay for an operation to restore sight to Trachoma sufferers and £20 will pay for a Cataract operation.

To you all, here at home, in Hong Kong, Australia, New Zealand and North America who gave so generously and for the amounts others were able to give, I thank you for supporting these good causes this past year. I appreciate there are many requests from other charities so I am delighted that we managed to achieve so much. I hope you will be as generous, or perhaps even more so, for The Master’s Charities this year. They are, for those who may have missed it, Cancer Research and The People’s Mosquito.
Back again to the magnificent Drapers’ Hall for the 58th Livery Dinner. Eleven new Liverymen were clothed by the Master, and Master Aircrew certificates were presented to four servicemen (all from the RN).

Melding the traditional and the modern, our Honorary Chaplain, the Venerable Ray Pentland started proceedings by reading a suitably aviation-related Grace from his iPhone!

Warden John Towell introduced the principal guests. These numbered Rear Admiral Sir Jeremy de Halpert, Master Shipwright; Professor Chris Atkin, President of the Royal Aeronautical Society; Ian Lumsden, Master Pavior; Sir Roger Bone, President of the Air League; Master Poulter, Rory Kemp; Wing Commander Paul Mounsey, OC 4(R) Sqn; HRH Prince Hamza bin Al Hussein of Jordan, who had just been clothed as an Honorary Liveryman; and finally our guest of honour, HRH the Duke of Kent.

Continuing the rather dark blue mode, our Master, Captain Peter Benn, noted with pleasure that we have been granted an affiliation with HMS Prince of Wales, one of the two new carriers. He looked forward to this being a very useful projection of our military power, as long as it had a full complement of strike aircraft on board. He also paid tribute to Major Tim Peake AAC, then still orbiting somewhere overhead on the International Space Station.

Peter recorded the achievements of the Air Cadet organisation (ACO) in the 75 years since its foundation, inspiring many members of successive generations to study STEM subjects, and in many cases, begin a career in aviation. He noted with regret how its ‘elder’ organisation, the University Air Squadrons, had lost much of their role in elementary flying training. He remarked on the sadly much reduced opportunities for training to solo standard within the ACO. Against a backdrop of a global demand for 400,000 new pilots over the next 20 years, Peter pointed out that UK Flight Training Organisations were handicapped relative to international competitors by the imposition of VAT. Further he suggested that the increasingly pervasive habit of making embryo airline pilots pay for their first type rating should be outlawed by European regulators. Given recent problems with the UK regulator, the Master suggested that airlines should...
consider seconding experienced captains to the CAA; he underlined that the Company always desires open lines of communication with the regulator.

Harking back to his comments on the ACO, Peter concluded by asking for a toast to 'The Next Generation'.

In his speech the Duke of Kent welcomed the opportunity given by the Livery Dinner to meet new friends, especially in the magnificent surroundings of Drapers' Hall. He praised the Master for his “eloquent” update, and was gratified that the Company was “engaging fully in the challenges facing the industry.” The Duke was pleased with the international reach of the Company, and remarked that it was a particular pleasure to welcome HRH Prince Hamza, as Jordan had long been a friend of the United Kingdom. The formal proceedings concluded with his toast “The Honourable Company of Air Pilots, may it flourish root and branch for ever.”
After a brief welcome to all Members and their guests from Graham Powell, the organiser of this visit, he introduced Ralph Steiner, the Museum Director. What an entertaining and genial host he certainly proved to be for the afternoon! In the main hangar there were three DH 98 Mosquitos, including the first prototype W4050, and Ralph concentrated on these three exhibits. He kept up a volley of amusing anecdotes, and even produced, like a magician, a wing bolt, machine gun and cannon ammunition, to prove all the points he was making to his captive audience. We were encouraged to hold and examine closely, sections of the lightweight construction of the Wooden Wonder as the Mosquito became known. In essence sheets of birch ply and balsa wood were moulded and glued together to form the fuselage. “Where you glue you also screw” was a mantra used in the construction of the key parts. The wing spar was built in one piece from laminated planks of spruce. We were shown the simple method of fixing the metal fixing plates for key components to the wooden frame. An ingenious semi-drilled plug was glued into place with a metal disc on top. This then acted as a base for further metalwork. We saw the simple construction of the Mosquito undercarriage suspension system which was a series of rubber type “lego bricks” enclosed in a tube. The two Merlins powering the Mosquito, were held in place by just four fixing points and bolts. The large cannon fitted to certain Mosquito derivatives (the “U boat hunters”) had an ammunition feed derived from the cigarette vending machines of the time! And so it went on. Over 41 variants of the Mosquito were built in total, and it became the most versatile aeroplane in WW11.

This was just an amazing performance from a man now on a mission to deliver a brand new hangar project, to ensure that the de Havilland name lives on both nationally and internationally. But more of that later. With Ralph centre stage in our Group photograph in front of the Mosquito, he then opened up all the outside exhibits so that we could explore on our own before meeting up for coffee and biscuits later.

It is the only museum dedicated to de Havilland aircraft. Under the leadership of Geoffrey de Havilland, the de Havilland Aircraft Company was responsible for many major innovations in aviation technology including other iconic aircraft, the Comet 1a (the world’s first jet airliner), the Vampire, and the Tiger Moth. The company also designed the famous Horsa Glider used on D Day and at Arnhem. De Havilland was also a designer and manufacturer of aero engines and rocketry, examples of which are on display at the museum. Additionally the DH Dragon Rapide restoration project has started, staffed by unpaid volunteers; additional volunteers are always wanted to join the team.

A brief history of the Museum

The moated Salisbury Hall has some traces of the Roman occupation, the cottage home of Nell Gwynn is alongside the moat, as well as the home of Sir Nigel Gresley, who designed the Mallard steam locomotive. Jenny, Lady Churchill, lived at the house with her second husband, and was visited by her son Winston.

Aviation arrived at Salisbury Hall in October 1939 when de Havilland used it as the design office for the top secret Mosquito. The prototype W4050 was taken by road to Hatfield and reassembled for its first flight by Geoffrey de Havilland, the son of the founder, on 25 November 1940. The assembly building was then doubled in size to allow the completion of four further Mosquitos at Salisbury Hall. The last three were flown out of the adjacent fields to save a month of dismantling and reassembly.

During the 1930’s de Havilland had acquired the Airspeed Company started by Neville Shute and colleagues, based at that time in Portsmouth. The Airspeed design team for the Horsa had been moved to Hatfield, but in October 1940
Hatfield was bombed, destroying the Airspeed design office, the Technical School, and much work in progress for the Mosquitos. As a result Mosquito production was dispersed around the UK and the Horsa design team moved to Salisbury Hall. Preliminary design work was undertaken at Salisbury Hall on the “Spider Crab” later to be known as the Goblin jet powered Vampire. Salisbury Hall was then abandoned and allowed to deteriorate until a new owner Walter Goldsmith (WG) arrived in 1950s. The property was restored and during this process they discovered the DH Mosquito connections through drawings on the walls. WG made enquiries with de Havillands’ and found that the company were looking for a home for the Mosquito prototype. A Mosquito Appeal was started with the help of Sir Geoffrey de Havilland, John Cunningham and other partners, and this became the main hangar, later renamed the Walter Goldsmith hangar. The Museum first opened to the public on 15 May 1959, and it was the first aviation museum to operate as a registered charity, with proceeds to be sent to the RAF Benevolent Fund. Post war farm buildings were then converted to house the Aeroshop and the DH Engine display in memory of the chief designer Major Frank Halford. He was responsible for the design of all the de Havilland piston engines from the Gipsy onwards plus the jet engines including the Goblin and the Ghost for the Comet, as well as the Sprite and Spectre rocket engines. The current exhibits on show at the Museum:

**The Cierva C24 Autogiro G-ABLM**
Based on the cabin of a DH 80 Puss Moth, this is a two seat tandem cabin autogiro. First flight from Stag Lane in September 1931. C of A granted 23 April 1932. It flew in the Brooklands to Newcastle Race 6 August 1932. And is now on permanent loan from the Science Museum since its restoration.

**Airspeed AS 58 Horsa Glider**
Arrived at the Museum on 21 December 1975. It was found in a field near Banbury and was being used as a garage. Thought to have made a heavy landing during training from Brize Norton.

**de Havilland DH82a Tiger Moth G-ANRX**
Arrived at the Museum in July 1976 having been recovered from East Anglia where it had been in use as an agricultural aircraft. It was taken on charge at 5MU Kemble on 9 February 1939.

**de Havilland DH82b Queen Bee - LF789**
A radio controlled target for naval and coastal guns. It is a rare Scottish built example from February 1944.

**de Havilland DH87b Hornet Moth G-ADOT**

**de Havilland DH89 Dragon Rapide G-AKDW**
Built as a Dominie Mk1, but converted to civil duties and purchased by BOAC who leased it to Iraqi Airways; on return it was used by BEA for Highlands and Islands services. Various owners afterwards and arrived in December 1993 for full restoration.
de Havilland 98 Mosquitos W4050, TA122, and TA634
(A total of 7,781 were built in the UK, Canada and Australia)

W4050
Is the only surviving WW2 prototype to be preserved anywhere. First of an initial order of 50 bomber/reconnaissance examples ordered 1 March 1940. Initial service trials at Boscombe Down February 1941. Moved back to Salisbury Hall early 1959 and on public display May 1959.

de Havilland DH98 Mosquito FB V1 TA122
One of a small number of fighter variants built. Taken on charge in March 1945, and saw service in Belgium and Holland and Germany. Fuselage presented to the Museum in November 1978, with a wing recovered from Israel, and now painted in colours of 4 Squadron in markings of Gp Capt Pickard's aircraft which was lost on the Amiens Prison Raid.

de Havilland DH98 Mosquito B Mk.35 TA634
One of the last to be built at Hatfield in 1945. Modified for target towing and on retirement flown to Speke Airport for Liverpool to display in the new Terminal complex. This did not happen and was used in the filming of Mosquito Squadron in Bovingdon in 1968. Presented by Liverpool to the Museum in May 1971 and has undergone restoration as an example from 571 Squadron, Light Night Striking Force, Huntingdon.

dehavilland DH100 Vampire FB.6 J-1008
The maiden flight was made by Geoffrey de Havilland Jnr on 20 September 1943. Second British jet fighter to fly after the Meteor. The Museum example was built for the Swiss Air Force and delivered on 4 June 1949, and retired in 1974. Flown back to Hatfield in August and moved by road to the Museum in May 1975.

de Havilland Dove 8 G-AREA
Was originally built as a company demonstrator in April 1961 and then joined the Hawker Siddeley flight communications fleet at Hatfield. It last flew in December 1986 and was presented to the Museum in November 1991.

de Havilland DH104 BAE 146-100 G-JEAO
Hawker Siddeley took over de Havilland in December 1959. The BAE 146 Whisper Jet continued the pioneering heritage from the de Havilland Comet through the Hawker Siddeley Trident to the BAE 146. This example first flew in December 1983. After airline service this example was transported to the Museum in July 2009.

dehavilland DH106 Comet 1a F-BGNX
The first of three built for Air France and made its first flight in May 1953 and delivered on 12 June. Following the accidents it was withdrawn from service and returned to Farnborough and dismantled for possible pressure testing. It was delivered to the Museum in March 1985 and is undergoing restoration.

dehavilland DH110 Sea Vixen FAW.2 XJ565
Originally built as a Mk1, but converted to a Mk 2, it flew with all but one of the Fleet Air Arm Squadrons and ended life as a development aircraft at RAE Bedford for arrester trials.

dehavilland DH114 Heron 2D G-AOTI
This example was first flown in July 1956 and used by BEA on the Highlands and Islands services. After other operators it made its last flight in Oct 1986 and was acquired by the Museum in August 1995.

dehavilland DH121 Trident Two G-AVFH
This example was delivered to BEA August 1968 and withdrawn from service in October 1981, after 27,443 hrs and 15,509 landings. The nose and front cabin were donated to the Museum in August 1982.

dehavilland DH125 G-ARYC
The last aircraft to carry the DH initials. Later however designated HS, BAE, Beechcraft and finally Raytheon. It was first announced in April 1961. The Museum's example first flew in September 1961 and was used for Viper engine development, and latterly on
communications flying between Filton and Toulouse in support of Concorde. It was donated by Rolls Royce in 1976 and reassembled in 1979.

**de Havilland Canada DHC.1 Chipmunk T10 WP790**

The first aircraft to be designed and developed by the de Havilland Company of Canada to replace the Tiger Moth. The Museum example was built in Chester in 1952 and used by the RAF until 1973. It was the first aircraft to be restored by the Museum Supporters and put on display in 1978.

**The Future Vision**

Ralph and his Board of Directors are now embarking on the major new Hangar Project following the granting of planning permission in January 2014. Already contacts, plus some support from the Lottery Fund have been forthcoming (£64,000 has, for example, helped the restoration of the Mosquito Prototype), but much more help and support is needed. The total project will cost around £1.5 million, and although £400,000 has already been received, massive help is needed to raise that additional £1.1 million. In this way the valuable outside exhibits can be properly protected from the weather, and the construction of the large new hangar will facilitate all the restoration programmes.

Just launched for example is a “Buy A Plaque” donation scheme – a special and lasting way to make a donation by buying an engraved brass plaque, that will be permanently displayed in the new hangar.

This is an important and worthy cause which deserves the widest possible exposure to maintain our aviation heritage and this famous name.

Do please visit the website to check out the innovative methods to support the appeal by either a donation, a plaque, or a legacy. The web site is: **www.dehavillandmuseum.co.uk**

To thank Ralph personally for the kind invitation and for his enthusiastic and informative presentation, David Curgenven, on behalf of the Honourable Company presented Ralph with a Company shield as a memento of our visit. This was gratefully received and will be put on display.

With grateful acknowledgements to the Museum Guide with original content by Philip J Birtles and updated by the de Havilland Museum 2016.
From the desk of the Director Aviation Affairs

Liveryman John Turner

INTRODUCTION

“He who rejects change is the architect of decay” said Harold Wilson, former UK prime minister. My observations about ‘interesting times’ in the last issue are set to continue with a vengeance following the UK’s referendum on EU membership.

As I write I am immersed in the Farnborough International Airshow ‘validation week’ where the prospective display pilots (and unmanned systems operators) must demonstrate that they can fly their declared display routine safely and within the Farnborough rules to be approved to display in the International Airshow. Farnborough has been affected, like other displays, by the UK rule changes, and has some dramatically different local rules as a result.

Forgive me for concentrating on air displays once more - and perhaps repeating some previous observations - but this segment of a single nation’s air activity has important parallels in the sphere of international commercial aviation, as I hope will become clear.

UK DISPLAY FLYING AND INTERNATIONAL COMMERCIAL AIR TRANSPORT

In the UK there are two air display regulators, the Military Aviation Authority (MAA) and the Civil Aviation Authority (CAA). Each issues regulations in the form of Regulatory Article 2335 for the military and the Air Navigation Order for civilians, though in reality civilians are expected to follow quite precisely the Civil Aviation Publication 403 - Flying Displays and Special Events: A Guide to Safety and Administrative Arrangements (CAP403) that has some significant changes for the 2016 season.

Just to complicate things further, there are military air shows and civil air shows, each covered by the relevant military or civil regulator and rules. Military airshow are those held over military land, or with solely military aircraft participation, while anything else is a civil airshow. Civil pilots may fly at military air shows and vice versa. To cater for this, the two regulators have sensibly agreed that the more stringent of their rules will always apply. However in the face of the different rules that laudable principle raises some particular anomalies.

For instance, RA2335 and the MAA do not consider a flypast (or up to 3 flypasts of the same location for some military display teams) to be a ‘display’. This makes sense if you’ve asked for an aircraft to fly past a military parade or similar. However, CAP403 classifies flypasts as a ‘display’ - actually using the terms ‘flypast display’ and ‘aerobatic display’ when setting minimum heights permitted and weather conditions required. So a military pilot carrying out a flypast at a civilian air show is ‘displaying’ as far as the Flying Display Director (FDD) is concerned yet may not hold a military Public Display Authorisation (PDA).

The issue then is not so much pilot skills as which they are flying, where spectators (those who have paid to attend) and other observers are protected by the CAP403 requirements. RA2335 says military display pilots must be aware of the requirements of CAP404 which says that civilian display pilots must be aware of the RA2335 requirements. However, the position of a military pilot without a PDA doing a non-display fly-past or even a more complex ‘role demonstration’ (that may or may not have been classified as a ‘display’) is less clear.

My point is not to try to resolve those issues here. MAA and CAA are aware of them already. Nor is it to comment on how the most honourable of principles can become exceptionally difficult to codify in regulation and to then enact in practice. Rather, I want to highlight that the adoption of two different rule sets, each of which works perfectly well for the two different groups of regulated – up to the point that pilots from both groups become involved in the same airspace – mirrors many of the difficulties inherent in international aviation. Where the rules are not consistent, whether across nations or the larger regulatory groups such as FAA and EASA, there is scope for confusion over procedures and language and different standards required of the pilots who fly through the same airspace and who rely on each other to act predictably and consistently. We have long worked to try to harmonise standards and procedures; this has been a recurring theme for previous Masters during their world tours where they have the opportunity to meet the heads of many aviation regulatory bodies.

In a period where everything seems to be changing, and despite those changes, we should continue to strive for commonality or procedure and language – by which I mean using exactly the same words to convey the same thing as much as using the same ‘language’ - and consistency of standards – piloting, maintenance, etc. across all global boundaries so that international aviation continues to be safe for everyone involved. In the process, everyone may find they need to change so that everyone can, eventually, become the same.

LASERS

I was interested to see that, just as there are encouraging signs of growing political support to address the issue of higher powered lasers and the threats they represent to aircraft, TV news channels were reporting laser strikes (attacks?) on a train driver in the south of UK. It has taken a long time, and several false starts, for aviation to begin to feel it has the necessary support to deal with an evolving safety threat from ever higher-powered lasers in the wrong hands. One hopes the current momentum will be maintained. Certainly it could now be increased if the other sectors for whom this is a problem join us in seeking an effective solution.
On what at times was a very overcast and wet day, 15 of a possible 23 members drove to the Aircraft Restoration Company (ARC) and Historic Flying Ltd (HFL) enclosure at Duxford. No one was able to fly in, hence the lower numbers, and even Past Master Cliff Spink was unable to begin the flying part of a Spitfire conversion for a Dutch student. His initial detail was limited to taxiing.

ARC & HFL have come a long way since beginning to trade with three employees in the Eighties (they now have over 30), and have gained a well deserved world-wide reputation for rebuilding and maintaining war birds, and in particular the Spitfire. After a general brief about flying the many marks of Spitfire and other war birds from Cliff, the party was split into two groups under the expert guidance of two of ARC’s engineers who have many years experience of rebuilding, sometimes from scratch, and maintaining these splendid beasts. To the surprise of some there were no Hurricanes in evidence, but this type is regularly serviced by ARC and also catered for by Hawker Restorations Ltd.

In addition to Mk 11 and 19 Spits, there was a Fennec on view (the French version of the North American T-28 Trojan, one of 150 converted by Sud Aviation to the B variant), a major rebuild of a Mk 19 Spit for the BBMF, and several other rebuilds of other Spits in the hangar. A similar size hangar has just been completed to the west to house the BBMF Lancaster for future major maintenance.

It was interesting, but not surprising, to hear that the aircraft that are re-built frequently reach a higher engineering standard than when they were manufactured during the dark days of WWII. In all, it was a really fascinating visit and our thanks to the founder, Liveryman John Romain, who gave us this opportunity.

After lunch several of us went over to the relatively newly reopened American Museum to see the U2, etc and particularly the B51H, the size of which never fails to impress. One question for the cognoscenti, since all the bomb bays are forward, why does it need such an extended cabin aft of the main wheels?
The Old Bailey

Assistant John Denyer

On Tuesday 24 May 2016, Immediate Past Master Chris Ford led a group visit of the Air Pilots to the Old Bailey. We were met by Past Master David Mauleverer who, during his year as a Sherriff of the City of London in 2001, had an apartment in the Bailey with his wife Annie. With the 35 visitors from the Honourable Company sitting attentively in Number One Court, and sporting his impressive Sherriff’s badge, David outlined the election process for Sheriffs. He described his role representing the City around the world, supporting the Lord Mayor, and his duties in the Bailey. These include looking after the judges and hosting leaders of other world cities such as the Mayor of New York City, Rudy Giuliani.

The “Secondary of London and Under Sherriff” Charles Henty (essentially the Bailey’s MD) was an enthusiastic host with an encyclopaedic knowledge of the Bailey. Following on from David, he gave an informative introduction to the history and work of the Bailey. There has been a jail on the site since 1086, strategically located close to the west gate of the City. On his death in 1423, Dick Whittington left money to rebuild what was by then Newgate Jail. The build was eventually completed in 1539, and included accommodation for the Sheriffs and the City’s first purpose-built court. In 1562, the Worshipful Company of Cutlers gifted a sword to the Bailey which is still hung daily behind the most senior judge sitting on any given day, in whichever court that might be. The Cutlers’ Hall is of course adjacent to the Old Bailey and members of the Air Pilots Court know it well as it is here that most of our Court meetings are held. The current Bailey building opened in 1907, was partially destroyed in 1941, rebuilt in 1972, and then partially destroyed again by an IRA bomb in 1973. Now restored once more, a shard of glass is still embedded in a wall as a reminder of the 1973 bomb.

Mr Henty then conducted us on a tour of the building, including the part everyone was waiting to see – the cells downstairs. One unexpected feature of the court rooms is that, because the Lord Mayor can in principle choose to sit in on any case, his chair is placed centrally at the bench, and the presiding judge sits to one side, even if the Lord Mayor is not in attendance. David Mauleverer explained that the two Sheriffs can, and do, sit at the bench on cases from time to time. Moreover, in some of the court rooms at least, there is no bench, but rather individual desks in front of each judge, Sheriff or Lord Mayor. After visiting the magnificent Grand Hall with its huge statue of Quaker prison reformer Elizabeth Fry, we finished in the judges’ dining room. Here, Past Master Mauleverer thanked Mr Henty for a most interesting and educational visit, and IPM Ford presented on behalf of the Air Pilots a donation to the Sheriffs’ and Recorder’s Fund. The fund aims to “improve communities and help ex-offenders”. And with the words “You are free to go”, the visitors made their way back into the streets of EC4 for a well-earned dinner in a private room at a nearby restaurant.

Time to Fly True

Freeman Miles Stapleton

In aviation, compasses showing Magnetic North have served us well for over a hundred years. The advantages of using magnetic compasses include their lightness and simplicity, and the disadvantages are easily compensated for when operating at low or medium latitudes, but are more apparent when operating nearer the magnetic poles where the lines of magnetic force have a greater vertical component and a smaller horizontal component.

Mariners, however, have been using the True North reference for many years now, as Naval ships, and later Merchant vessels too, have long had a direct True Heading readout from their Sperry Gyrocompasses. These align themselves to True North using the interaction of gyroscopic forces with the rotation of the earth, and thus have no magnetic input whatsoever. These instruments were heavy, and also had some errors at high speed, especially on easterly or westerly headings. Aviators had to wait for INS before they had a good True North display. Astronavigation always worked from True North and courses were then adjusted to magnetic by the navigator.

Most aircraft now do not have fluxgate sensors to find Magnetic North but rather apply a factor to the True North that they get from the INS to create a synthetic Magnetic North. Our understanding is that in many installations the variation table that is used to calculate Synthetic Magnetic Headings is contained in the firmware and so does not get the same regular updates as does the Software. Anecdotally, there is some suggestion that not all aircraft are applying the same factor as some older aircraft may be using out of date predictions of variation.

Most people would agree that an ideal reference point is one that does not move relative to all the other points in which they are interested. The Magnetic North Pole fails this test on two counts. Every day it follows an elliptical path of about 200 miles, but even more importantly, it is on a journey which will take it over to the other side of the True North Pole, towards Siberia.

Switching to True North would doubtless entail some costs in the short term but those would be more than compensated by the long term savings to chart updates, airway centrelines, and of course to runway identification numbers which currently have to be updated from time to time necessitating temporary runway closures.

If not all countries switched to True at the same time, use could be made of procedures that are used in Polar regions, which can be largely automated, to ensure that pilots are using the correct heading reference for their actual position, so although it would be very desirable, it is not absolutely essential that all countries switch simultaneously.

Switching to True North as the primary reference for aviation offers improved
standardisation right away, and is a necessary precursor to further modernisation of navigation systems.

It is interesting that the Magnetic North Pole is now very close to the True North Pole, and that most of the movement has taken place in the last hundred years. The fact that the Magnetic North Pole and the True North Pole are quite close at the moment might suggest that this is a good time for the aviation industry to switch to True North, as for many users there will be little change involved.

References and Links for ‘True North’
The reason that we can make this proposal now is that we have proper research to work on, which shows how nebulous is the Magnetic North Pole as a reference and indeed how the Earth’s Magnetic Field is weakening. This Research was conducted by the European Space Agency with three satellites and is called the SWARM Project.

References and Sources for True North
https://www.youtube.com/watch?v=O7SjG_7Syp8
http://geo.phys.uio.no/artic/roadto.html#map
http://wdc.kugi.kyoto-u.ac.jp/poles/polesexp.html
http://www.scholastic.com/teachers/article/magnetic-north-pole
http://www.extremesteps.com/pole.htm
This is the first in a series of articles outlining the work of our affiliated units. An Air Pilots visit to 847’s home at Yeovilton provided the ideal opportunity to gain a better understanding of this Wildcat unit.

Arriving several hours ahead of the main Air Pilots group, I was given a warm welcome by the Commanding Officer of 847 NAS, Cdr Graeme Spence. He had been on the squadron since 2011 as Senior Pilot and ExO before being promoted to CO in 2013 ahead of its transition from Lynx Mk9a to the Wildcat (somewhat unkindly referred to as a “Lynx Mk10”, but, as I was to find out, this is harsh!).

847 can trace its ancestry back as both a Fleet Air Arm squadron dating from WW2, and as a Royal Marine unit formed as part of 3 Commando Brigade Air Squadron (3 BAS) in 1968. Operating the Sioux then Gazelle and Scout, 3 BAS saw service in all the usual arenas of the British Army over the following two decades. This included the Falklands campaign, where 847 NAS also operated, equipped with the Wessex Mk 5 in a Support Helicopter role. Incorporated into the Commando Helicopter Force (CHF) in 1995, 847 again saw plenty of action: this included losing its CO when a Lynx was shot down in Iraq in 2006.

The CHF is clearly a RN/Royal Marines establishment, but is the very epitome of joint operations in today’s British military. It has always operated Army aircraft. As befits this environment, Graeme, like many colleagues, has done an exchange tour with the Army Air Corps. The squadron currently comprises 100 personnel of which 16 are aircrew – a mix of RN and RM, topped off with one exchange pilot from the US Marine Corps. 847 completed its last Herrick (Afghanistan) tour in April 2013 with the Lynx Mk 9a. After suitable ‘decompression’, it re-equipped with the Wildcat BRH (Battlefield Reconnaissance Helicopter) in April 2014. Naval Maritime squadrons operating the Wildcat have the HMA version (Helicopter Maritime Attack).

Conversion To Type took 12 months, and so by April last year 847 began the process of Conversion To Role (CTR). 847 has only 6 airframes for its 16 aircrew, who arrive on the squadron after a 13 month course with 652 Sqn (which operates as an OCU, in RAF parlance). By current UK military standards these aircrew fly a very healthy 32 hours a month on average. The CTR programme has centred on a heavy schedule of exercises. Activity in 2015 included Ex Joint Warrior; ship-shore exercises in August; Ex Cougar on HMS Ocean (September to November); a Standards Inspection in December. This year has seen cold weather practice in Norway (which also proved deployability in a C17), another spell on Ocean, and, most recently, a deployment to Nevada to tick the hot/dusty box. 2016 exercises have seen practice with foreign navies; however 847 has yet to work with foreign troops. Most aircrew have been combat ready since October last year.

The commissioning period has had its fair share of problems: some officers believe the type has been brought into service a couple of years too early. One airframe has proved particularly troublesome only achieving 100 hours so far in its service life. This should be set against the squadron’s excellent achievement of 917 flying hours in the
Wildcat's excellent camera, including an IR function; it is easy to discern the movements of individual soldiers at some distance. With charts available to the highest scale, already overlaid with tactical information during the mission planning phase, there can be no better aids to situational awareness in high stress/low altitude operations. The ergonomics of the cockpit are excellent, although in my opinion the seats had inadequate thigh support for a lanky lad such as myself.

So the Wildcat is new, shiny, and a step change from its forebear. And yet. It is as if 847 has been handed a new Lego set for Christmas – but with several key pieces missing. The crews have a very significant wish list of items necessary to extract the maximum potential from this airframe. In my untutored view, the most critical (and simplest) item is an internal fuel tank, for which there would be adequate space in the underutilised rear cabin. Currently the Wildcat’s endurance is at most 2 hours. Given its primary role is to operate from naval ships, transit times to the littoral battlefield are significant. When the QE class carriers come into service, these will no doubt be held beyond the range of shore-based missiles. One is then looking at total sea transits of more than an hour. Loiter time on target will be very brief without more tankage.

Given Wildcat is a capable intelligence gatherer, it makes sense to be able to communicate its intel in real-time to battlefield and naval commanders, and to the Apaches with which it typically goes to war. Yet the data downlink capability is currently restricted. The CHF Wildcats lack radar. To a civilian pilot the most astonishing omission - in a very comprehensive glass cockpit - is a DME. The Wildcat has VORs and the rest of the normal IFR toolkit. Yet 847 cannot now legally fly IFR outside of the UK (where there is a military dispensation). This small omission, saving just pennies, creates unnecessary restrictions when abroad.

Perhaps your initial reaction is that MoD procurers need a rocket somewhere personal for such gross oversights. But of
course this is not the story. Almost all these items were in the original specification (the MoD having awarded the ‘Future Lynx’ contract in 2006). The culprit is yet again the insidious effect of successive cuts in the Defence budget initiated by SDSRs. The Wildcat has a whole-life cost of c.£25m apiece. I would imagine that, in due course, all these missing Lego bricks will be restored to the toy box – but at much greater cost than if they had been included originally. In passing, it is of note that many of these useful/essential items have been fitted as standard to the models exported to South Korea!

In one sense perhaps 847 is a museum piece to be cherished: there was speculation amongst the aircrew that the Wildcat might be the last manned aircraft to perform the duties currently allocated to the squadron – when the airframe is finally retired its role could well be carried out by RPAS in their opinion.

847’s motto “Ex Alto Concutimus” seems to me nowadays rather inappropriate; the Company’s many Latin scholars will recognise it means “We Strike from On High”. 847 fights amongst the weeds! It will always have our encouragement to do so.

My thanks go to Cdr Spence and his men for a very interesting day.

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Airbus Space Operations Centre, Corsham

Assistant John Denyer

On Tuesday 21 June 2016, Immediate Past Master Chris Ford led a group visit of Air Pilots to the Airbus Space Operations Centre at Corsham in Wiltshire. Airbus Defence and Space is the prime PFI contractor for the operation and maintenance of the UK Skynet military communications contract. In addition to operating most of the fixed terrestrial infrastructure, networks and management systems, Airbus have built and launched a constellation of geosynchronous satellites. Both the network and spacecraft operating facilities are based at Corsham, and in addition to the spacecraft controllers, it is also home to spacecraft engineers and orbital dynamics specialists.

We were welcomed by Dr Phil Wadey, who gave an introduction to the facility. The 8 Skynet satellites are “flown” from any of three sites, and the mixed team of commercial and military engineers not only control the spacecrafts’ orbits, but also operate its military communications payload. The payload carries voice, internet, videos, etc and can be used for applications as varied as intelligence and telemedicine.

Airbus engineer Peter Kirkpatrick presented a fascinating history of the UK space programme. Initially, in the late 1950s, the UK operated 60 Thor ballistic missiles from UK soil. Although a US missile, they sported RAF roundels, though the warheads were operated by the USA. Thor was eventually adapted to become the ubiquitous Delta launch vehicle, later versions of which are still in use today. Around the same time, the UK was developing its own Blue Streak missile, built by de Havilland in Stevenage. It was tested in Woomera before being cancelled in 1960. In spite of that cancellation, production continued until 1972! The UK developed a succession of other launchers – Black Knight, Black Prince, and Black Arrow. They were manufactured by Saunders Roe in the now famous hangars at Cowes on the Isle of Wight. Black Arrow launched the UK’s satellite, Prospero X-3 in 1971. It remains the only entirely UK launch of a space vehicle. Black Prince was proposed to be adapted as a launch vehicle with a 1 tonne to low earth orbit capability, but was dropped by the government in favour of supporting Europe’s Europa launcher, which eventually morphed into Ariane.

Jumping forwards in time, in 1966 the
The latest incarnation, Skynet 5, represents another step-change in capability. Now weighing in at 5 tonnes and based on the proven Eurostar 3000 commercial communications bus, it includes 15 x SHF transponders, 9 x UHF channels, and multiple fully steerable downlink spot beams. It also carries 2.5 tonnes of propellant (half its launch mass) to ensure a long life in orbit. All 4 Skynet 5s were launched on Ariane 5 from Kourou in French Guiana.

We then embarked on a tour of the facility, starting in the LEOP (Launch and Early Operations Phase) room. From here, the team, “fly” and test the spacecraft from launch and into its highly elliptical geostationary transfer orbit in preparation for circularisation into its final 36,000km geosynchronous orbit. This is clearly a critical part of the mission, and the supervisor relies on a small team of engineers, including French launch specialists from Toulouse and Kourou. We had observed that there are no communications dishes on site at Corsham and we learned that this is because the commands to the spacecraft are routed via either Colerne near Bath, or Oakhanger near Bordon.

Next, in the space operations room, we saw the screens from which engineers control both the ground segment and the spacecraft. They operate a total of 8 spacecraft – the four current Skynet 5s, the three functioning Skynet 4s, and a NATO IV communications satellite, very similar to Skynet 4. Skynet 5 has a projected life of 15 years, comprising 12 years in geostationary earth orbit (the satellite is at a fixed point over the earth’s surface) and 3 years in geosynchronous orbit (the satellite prescribes a figure of 8 over a fixed point on the surface). In addition to the routine tasks of station-keeping, battery conditioning, and power and thermal management, the payload is configured from this room (eg where the various antennas are pointing, channels in use, etc). The spacecraft has to be particularly carefully managed at two 6-weeks seasons when it is eclipsed by the earth for up to 72 minutes a day, when the spacecraft is operating solely on battery power. Another seasonal challenge is when the sun shines directly into the bolometers that use earth limb detection as a sensory input to the control loops and a set of stabilising momentum/reaction wheels. These “Blinding ops” are more challenging for certain Skynet 4 spacecraft since, unlike the much more autonomous Skynet 5, they have to be performed manually.

Finally, we had an introduction to orbital dynamics. Various forces act on a spacecraft to perturb an otherwise stable orbit. Principle among these are longitude drift, caused by perturbations in the earth’s gravitational field (eg the large mass of the Himalayas has an effect on orbits); inclination drift, caused by solar radiation pressure. Skynet spacecraft are required by international agreement to maintain their position in the geostationary arc to within +/- 0.1 degree so east/west station keeping is a primary requirement. All station-keeping manoeuvres use the finite supply of propellant, and although the Skynet fleet are flown particularly frugally, an efficient way to extend a spacecraft life is to allow it to drift in a north/south plane so that, while it still crosses the equator at the prescribed point twice a day, it drifts above and below equator each 24 hours.

Over an extended period of time, this can limit the ability of users on the ground to use very precise pointing of comms dishes, but on the other hand does provide some transponder coverage of parts of the earth normally over the horizon from geostationary orbit, eg Antarctic research stations.

The visit concluded with IPM Chris Ford thanking Dr Wadey and his team, especially Paul James, for organising and hosting us on one of our most informative visits, and he presented Airbus Defence and Space with an Air Pilots plaque.

This was a most interesting visit, not least for the author of this article who spent the early part of his career after graduation working on a number of these space programmes, particularly Skynet 4 and 5. But all the attendees came away enthusing about their visit and the window it had opened for them on another, rather different part of the aerospace business.
The Editor

The Joint Services Command and Staff College at Shrivenham has three major dining-in nights during its academic year – one hosted by each of the three services. Due to the foresight and kindness of Wing Commander Chris Royston-Airey a handful of Company representatives were able to attend the one organised by the RAF held to commemorate the 73rd anniversary of the legendary Dams Raid (Operation Chastise). Previous tests of JSCSC students’ livers had unsurprisingly focused on the anniversaries of the Somme, and the Taranto Raid.

The Dambusters evening started with aperitifs in the impressive Rotunda of the main building at Shrivenham, followed by a drill display by the Queen’s Colour Squadron. The large gathering exited the building to await the fly past by the BBMF. Sadly at the time its Lancaster was still in rebuild, nonetheless the arrival of the Hurricane was welcomed – one Merlin is better than none!

We were honoured to have as principal guests Sqn Ldr ‘Johnny’ Johnson, the last surviving bomber from the raid, and Mary Stopes-Roe, the daughter of Sir Barnes Wallis, designer of the infamous Bouncing Bomb. Once seated guests were treated to a superb recorded interview with Johnson, still in sparkling form. Tables were named after 617 Squadron crews of that night. The emotional tempo picked up as each table had to stand when its crew departed Scampton. When aircraft returned due to engine trouble, or were shot down by flak or night fighters, guests sat down, to mounting applause. Throughout the meal several ‘vignettes’ were related of episodes during the raid. It was very moving. As most students had that morning completed their final paper at the conclusion of their near year-long course, there was a distinct end of term ambience.

After dinner guests retired to the first floor balcony of the Rotunda to see, with surprise, that where had previously been the ‘parade ground’ of the QCS was now a replica Dam, constructed of large cardboard boxes. More stupendous was the sight of Luftwaffe students dressed in replica German national football strip (at least a size too small for them)! Their task was to act as goalkeepers/flak gunners to prevent destruction of the dam by RAF colleagues lobbing Swiss exercise balls from the balcony. Let us just say we were glad that ‘Johnny’ Johnson and colleagues were more accurate in their aiming (but they were undoubtedly not handicapped by over-indulgence in alcohol at the time)! It was all proof that in the 21st century we do not need the supposed ‘glue’ of the EU to have anything other than a great time with our German neighbours....

The conversation during the evening with students and staff from all corners of Britain’s armed forces was sparkling, and the hospitality magnificent. An evening to treasure.