June 2013
5  Pilot Aptitude Assessment  RAF Cranwell
13 3rd General Purposes and Finance Committee Meeting Cobham House
18 2nd Technical and Air Safety Committee Meeting Cobham House
24 Election of Sheriffs Guildhall
26 Trophies and Awards Committee Meeting Cobham House

July 2013
11 4th General Purposes and Finance Committee Meeting Cobham House
11 2nd Court Meeting Cutlers’ Hall
16 Benevolent Fund Board of Trustees Meeting RAFBF HQ Portland Place
16 3rd Education and Training Committee Meeting Cobham House
18 New Members’ Briefing Cobham House

September 2013
10 3rd Technical and Air Safety Committee Meeting Cobham House
12 5th General Purposes and Finances Committee Meeting Cobham House
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26 Guild Luncheon Club RAF Club
26 Sir Frederick Tymms Lecture Royal Aeronautical Society
30 Election of Lord Mayor Guildhall

October 2013
2  Pilot Aptitude Assessment RAF Cranwell
10 6th General Purposes and Finance Committee Meeting Cobham House
15 4th Education and Training Committee Meeting Cobham House
22 Environment Committee Meeting Cobham House
23 Trophies and Awards Banquet Guildhall
26 Flyer Show Sofitel, Heathrow
29 Benevolent Fund Board of Trustees Meeting Cobham House

GUILD VISITS PROGRAMME
Please see the Flyers accompanying this and previous editions of Guild News or contact Liveryman David Curgenven at guildevents@dcai.co.uk. These flyers can also be downloaded from the Guild website.

Cover Photo: Catalina G PBYA took part in the flypast over London on Thursday 9 May as part of the commemoration of victory in the Battle of the Atlantic 70 years ago. The photograph was provided by Freeman Jeff Boyling and is reproduced by courtesy of John Dibbs 2011, the photographer. Also taking part in the commemoration was HMS Illustrious, an Affiliated Unit of the Guild; a description of the passage the ship undertook from Portsmouth to Greenwich appears on page 14 of this issue. Freeman Jeff Boyling is also organising a circuit of Great Britain, to be undertaken by the Catalina in August, to mark the 100th anniversary of a similar attempt by Harry Hawker in a Sopwith Waterplane. The Catalina is based at Duxford and operated by Plane Sailing Air Displays Ltd.
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LIVERY DINNER. The annual Livery Dinner was held on 29 May in the Mansion House. The Grand Master, HRH The Prince Andrew Duke of York KG GCVO attended and the principal guest was the Lord Mayor Locum Tenens Alderman Nick Anstee. A full report will appear in the August issue of Guild News.

GUILD LUNCHEON CLUB. The Guild Luncheon Club, now under the guidance of Court Assistants Professor Diana Green and Squadron Leader John Davy, met on Thursday 25th April in the RAF Club. After Grace, said by Air Chief Marshal Sir Stephen Dalton, Chief of Air Staff, 113 Guild members and their guests, including the Master, sat down to an excellent lunch. After the meal Court Assistant Malcolm White (Bomber Command Memorial Project leader), Seb Cox (Head of the Air Historical Branch) and Philip Jackson (Sculptor and monument architect) gave an enthralling talk on the Bomber Command Memorial which now has pride of place opposite the RAF Club in Green Park. Malcolm White described the difficulties and challenges of launching the project which were many and diverse, such that his audience was left wondering how on earth the project ever got off the ground. Seb Cox covered the the historical and political background, in particular describing why it has taken 70 years for a suitable Memorial to be erected to honour the sacrifice made by over 55,000 men of Bomber Command. He debunked a number of popular myths, including also the fact that 'Bomber' Harris actually was offered a peerage at the end of the war, but refused it because of the lack of recognition given to his groundcrews. Finally, Philip Jackson, the Memorial architect and sculptor, gave an utterly fascinating description of how he formed the statues of the 7 aircrew in the Memorial, including also how he won the trust and support of surviving aircrew who initially were very sceptical of whether he would do them justice. Following the the talk, which was received with acclaim, Guild members crossed over to the Memorial for a tour guided by Malcolm White.

As an illustration of the hazards facing the aircrew of Bomber Command, Liveryman Tim Sindall has kindly allowed a letter, written by his father, to be published for the first time in Guild News. Whilst it describes just one incident, of which there must have been many more during the war, it highlights the everyday dangers that beset the aircrew of Bomber Command during the war. It is reproduced in full on page 24.

COBHAM LECTURE. This year’s Cobham Lecture was held on Thursday 25th April at the Headquarters of the Royal Aeronautical Society. Included in the audience were 37 representatives from 24 City Livery Companies, including 17 Masters and 2 Past Masters. After an introduction by the Master, Commander Mark Macleod, the Commanding Officer and Senior Naval Officer, Empire Test Pilots’ School (ETPS), gave a wide ranging review of the history of ETPS. The full text of his lecture is reproduced on page 6 of this issue. After a question and answer session the Director of Aviation Affairs, Liveryman John Turner, gave a vote of thanks, observing that in spite of being a test pilot himself he had learned much that he had not been aware of previously. Following the lecture Guild members and the guests attended a reception in the Royal Aeronautical Society’s Headquarters.

APRIL EDITION - ERRORS AND OMISSIONS. The Editor omitted to include all Past Masters as members of the Court on page 13 of the April edition, the Court List. Assistant Dacre Watson was also re-elected, unfortunately omitted from the report on the AGM. The Editor offers his apologies for these errors which hopefully will not be repeated. He has yet to produce a Guild News which is 100% correct.

GUILD SCHOLARS AND BURSARIES. Some good news has just come in. Seb Krzyzewski, winner of the 2012 Logan PPL Scholarship and John Landymore Trophy, Megan Foley, winner of the 2012 George Dobson Memorial Scholarship and Samuel Woodward, winner of the 2011 Greyburn Scholarship have all gained places on the BA Future Pilot Programme. The Guild congratulates them and wishes them future success in their careers in aviation.

HMS ILLUSTRIOUS - Leading Airman (Aircraft Handler) Stephen Ashcroft received the Guild’s Air Safety Trust Award 2012 from the Master, His Honour Judge Tudor Owen, on the 18th March 2013. The Award was presented aboard HMS Illustrious in the presence of the Commanding Officer, Captain Martin Connell and Cdr Nick Walker (Commander Air). In attendance from the Guild were Past Masters Robert Pooley and Chris Hodgkinson, Warden Chris Ford, Assistant John Denyer, AST Trustee Keith Baldwin, Capt Dave Singleton and Cynthia Robinson.

The Master related that on the night of 19 October 2012 HMS Illustrious was conducting rotary wing flying operations as part of a Task Group in support of Exercise Coriscan Lion in the Mediterranean. The Flight Deck team was overseeing complex aircraft movements on the darkened deck in a realistic, busy, tactical environment. The pace of multi-spot operations is always intense, with aircraft in extremely close proximity to each other and to the deck crews and marshallers responsible for their every move. By night, the challenge is even more acute and the highest degree of concentration is required.

On board were many personnel with diverse backgrounds and varying levels of embarked experience. Vigilance and safety are paramount in such circumstances.

A Merlin Anti Submarine Warfare helicopter of 814 Naval Air Squadron recovered to 5 spot in readiness for a refuel and crew change and it was lashed down with the Gurn running. While the Observer was conducting a short post-flight walkround he tripped over the nose wheel lashing, became momentarily disoriented and, with his attention on the lashing, inadvertently walked towards a Sea King helicopter on 7 spot directly in front. Leading Airman Ashcroft, quick thinking and calmly ran towards the Observer and dragged him clear when he was only a matter of feet away from the Sea King’s turning tail rotor.

In congratulating Stephen Ashcroft, the Master commented: “The Guild values its affiliation with HMS ILLUSTRIOUS, and takes a keen interest in the achievements of Leading Airman’s company. I feel honoured to present this Award to you. Your vigilance and prompt action that night prevented a serious accident and almost certainly saved the Observer’s life.”

The Guild visitors were given a very informative “Capability Brief and Update” by Cdr Nick Walker and, after an enjoyable lunch with the Captain and Heads of Department, a tour of the ship which afforded an opportunity to view an AW159 Lynx Wildcat which had performed a deck landing as part of the ongoing preparation for service. It is expected to be fully operational with the army in 2014 and the Fleet Air Arm in 2015.

BENTLEY PRIORY APPEAL. Known as ‘the spiritual home of The Few’, Bentley Priory in Stanmore, north London, will be reopened as a museum in September 2013 after a seven-year appeal that has raised £13 million. Just £800,000 is still required and lapel badges are being sold at £20 to help reach the target. To order a badge call 010 7580 3343 or email bentlypriory@btinternet.com. See page 18 for an article on the WW2 work carried out by WAAF personnel at Bentley Priory and other similar facilities.

INTER LIVERY QUIZ. Congratulations to a team of Guild Young Members, who won the Inter Livery Quiz on Friday 26th April.
The Master's Message

HIS HONOUR JUDGE T W OWEN

My first ten weeks have been hectic often, tiring at times, enjoyable always and, I'm pleased to report, very gratifying – in one respect in particular.

An extremely busy first week began with an audience with the Grand Master at Buckingham Palace and included, amongst other commitments, two visits to St Paul’s Cathedral and a banquet at Mansion House.

The first visit to St Paul’s was to join the Vintners in celebrating the 650th Anniversary of their first Royal Charter. The Reception provided a very useful opportunity to meet other Masters. I also discovered that I wasn’t the only one who had mused during the Lesson (unsurprisingly, the wedding at Cana) that vintners everywhere must be very grateful that no-one since our Lord has managed to turn water into wine.

The Bishop of London drew a parallel between caring for vineyards in biblical times and the continuing responsibilities of livery companies as an integral part of our modern social framework.

The following evening presented another opportunity to meet fellow Masters and their Ladies when Maria and I attended the Lord Mayor’s Banquet for Masters, Prime Wardens and Upper Bailiff at Mansion House. It was a truly magnificent occasion, enhanced by trumpeters of the Household Cavalry in State Dress heralding the various stages of the evening. People who know nothing about the philanthropic nature of livery companies might criticise such an occasion as extravagant, but they are unlikely to know that we jointly contribute more than £40 million per annum to good causes.

The next morning found us back at St Paul’s which was packed to capacity for the annual United Guilds Service; we were very pleased to be supported by ten members of the Guild, including Liverymen Sandy Howard and his wife Marj from Australia. In the introduction to his challenging sermon the Bishop of Chelmsford, whose diocese includes part of East London, revealed that the Clergy always look forward to the Service: it’s one of the rare occasions when the congregation are dressed as oddly as they are. It was first held in 1943 to raise morale when the City was a bomb site. With pageantry and colourful processions – no one knowingly under-dressed - it still raises spirits.

In 1943, the Lord Mayor hosted an ‘austerity luncheon’ after the Service. The tradition, without the austerity element, continues to this day with Livery Halls hosting lunch. The Guild party joined the Fanmakers at the splendid Skinners’ Hall – a Grade 1 listed building steeped in history and antiquities redolent of the lifestyle afforded by successful commerce throughout the centuries.

The wide range of commitments have continued, thankfully at a slightly less hectic pace, so why do I focus in this message upon the three civic and social events of my first week?

Partly because they provided such a valuable opportunity to quickly get to know many of the Masters alongside whom I’ll be working during my year.

And partly because they caused me to ponder whether any other nation is quite so accomplished at blending charitable work and social life, or as skilful at allowing the past to merge seamlessly with the present. Perhaps nowhere more so than in the City of London? The Livery movement certainly embodies those characteristics.

But I do so primarily because they impressed upon me the valuable and relevant, not merely historic, role which livery companies continue to play in today’s society. Before I became a Warden, my interest in the work of the Guild was focused exclusively upon our contributions to aviation as, in effect, a pilots’ association which also happens to be a livery company; I know I’m not alone in that. As I moved closer to the Chair I gradually learnt more about the wider role of the Livery in the City but it wasn’t until that first week that the bigger picture really became clear. I also know I’m not the first Master to experience that.

We are a pilots’ association - all livery companies began life as craft associations of their day. Many of the ancient crafts have long since disappeared but ours continues to flourish and, as a ‘working company’, we have a crucial role to play in aviation. But, in common with all livery companies, we also have philanthropic responsibilities.

We do not, either as a company or as individuals, have the enormous wealth of many of the ancient companies and, relative to our means, we punch above our weight. The response to the recent appeal for donations to the Guild’s three registered charities has been very encouraging but not everyone is able, for a variety of reasons, to donate large amounts and there have been very few opportunities for members to donate small sums. With the support and agreement of the GP&F, three opportunities were put in place: ‘highest charity bid’ for a guaranteed place on over-subscribed visits, ‘whip-rounds’ at the conclusion of visits and an opportunity to make donations at the Reception following the Cobham Lecture.

I am pleased, but not surprised, that they have been a great success. In just over two months, we have raised almost £5000.

I don’t expect donations to continue at that rate, but a steady flow of small sums – the equivalent of loose change – has the potential to generate a significant sum for charity. Every little helps.

In conclusion, and leaving the best news until last, the IPM, Learned Clerk and I were honoured to be received by the Grand Master at Buckingham Palace immediately following my becoming Master. His Royal Highness showed great interest in the work of our Guild, as did our Patron when he received the IPM last December to discuss a working group proposal that we should change our name when seeking a Royal Charter.

I was delighted to announce at the Livery Dinner that Her Majesty graciously approved a proposal, made jointly by our Patron and Grand Master, that we should be known as ‘The Honourable Company of Air Pilots’.

Further, that Her Majesty’s view has been conveyed to the Clerk to the Privy Council in anticipation of our Petition for a Royal Charter in that name.

It is, of course, a great honour which we would be immensely grateful and proud to accept. In accordance with the unanimous wish of the Court, I have written to the Lord Mayor inviting the Court of Aldermen to approve a change of name and to support our Petition to the Privy Council.

Such procedures inevitably take time but I hope that, in the not too distant future, I shall be able to report further good news. My very best regards to you, wherever in the world you may be reading this message.
The Cobham Lecture

Editor's Note: The text of this year's Cobham Lecture is reproduced here courtesy of Commander Macleod, OC ETPS.

The Empire Test Pilots' School From Founding Principles to Future Direction: 70 Years of Flight Test Training

COMMANDER MARK MACLEOD RN

Good evening and thank you for that kind introduction. It is a great honour to stand before the illustrious members of the Guild, Masters and invited guests and deliver the Cobham Lecture this year. To Command ETPS is a rare and humbling privilege. I am the guardian of a unique institution, one with a heritage that has shaped aviation and seen giants in their field pass through its doors. It is often said that if you listen carefully you can hear the echoes of history. That is especially true at ETPS, where, as I hope to show you in the course of this lecture, constant themes resonate throughout our 70 years and remain as relevant in 2013 and they did when first set out in 1943.

Drawing on recently uncovered papers written in 1943 by the first Commanding Officer of ETPS, I aim to set out the founding principles and requirements of an enduring Test Pilot School. By tracing the development of the School, its aircraft and the scope of what is taught in the intense, year-long course, we will look at the evolution of flight test training, the changes introduced by the adoption of an EASA compliant syllabus and the challenges of modernizing a legacy air fleet to provide appropriate training capabilities for the future. What qualities, training and skills will flight test professionals require in the future? Well I hope to convince you those are the same that they needed in 1943 and argue that the retention of a sovereign training capability remains of vital UK national interest.

First, a quote from the distant past: Wayland, after finishing his first set of wings, planned with his brother to try them out.

His brother asked him, "How shall I do this?" - I have no knowledge in this field.

The Wayland-Dietrich Saga (London 1924).


I begin with this quote for several reasons, one of which I will share with you at the end, if only to arouse you from your thoughts and bring you back to where we started. It evokes aviation, a desire to fly, a restlessness to discover what the unknown, beyond earthen bounds, feels like. These are thoughts all pilots can relate to. Who wouldn’t want to make a set of wings and fly away. But unlike Daedalus, whose son Icarus, became so ecstatic with the ability to fly that he forgot his father’s warning not to get too close to the sun and subsequently fell to his death, Wayland had an altogether more sober and sensible companion. An aviator, a fellow pilot yes, but an individual who had given some thought to their proposed undertaking, weighed risk against reward, was prepared to tell truth to power and point out the deficiencies in their plan. Yes, Wayland’s brother was obviously a test pilot.

Borne from a recognition that the nation needed a formal training course to teach pilots to evaluate the increasing complexity of the aircraft and weapons being designed as the Second World War progressed, the Empire Test Pilots’ School welcomed its first student test pilots on 14 June 1943. It was the world’s first dedicated establishment for the training of flight test professionals. At the outbreak of the WWII, the Aeroplane and Armament Experimental Establishment known affectionately as ‘A squared E squared’ moved from East Anglia to Boscombe Down. Test flying had, up to this point, been conducted by a select cadre of experienced military and civilian pilots. Almost all the military pilots posted to test flying duties would have an assessment of “Above Average” flying ability, but in the civilian world some pilots were employed in testing duties because of their dash and courage rather than any technical knowledge - a flair for flying and a barnstorming display by a company pilot yes, but an individual who had given some thought to flying and who would staff it? ETPS archivist Norman Parker, has recently unearthed a paper written in 1943 by Wing Commander Sammy Wroath, the first Commanding Officer of ETPS that details the history of test flying and test flying training from selection to qualities required to curriculum. In it he states: “It ... becomes necessary to select pilots whose manner and ability offer good chances of success (in flight test training). All pilots should be volunteers, pilots who are genuinely enthusiastic about the work; and with a suitable technical background. Preferences should be given to those with engineering or technical experience.”

His opening comments are prescient: “That a high degree of skill is required to operate the present day aircraft is fully recognised, and whilst every effort is made to make the aircraft easy and simple to fly, the means by which this is brought about becomes more and more complicated. Whilst it is safe to assume that much

WWII then provided an acceleration in these areas and this would pose a significant challenge to the nascent flight test community as manufacturing technology and mechanical engineering knowledge began to exceed the theoretical understanding of pilots and flight engineers.

In fact, up until the early 1940’s there was very little training for test pilots beyond the usual, brief, new-type conversion phase - which in some cases, particularly with single seat aircraft, was almost non-existent. The idea of flight test training with an embedded technical objectives is generally attributed to Air Marshal Sir Ralph Sorley, commonly known as “Eight Gun Sorley” for his insistence that the Spitfire and Hurricane needed 8 machine-guns if they were to have an acceptable chance of a kill. In 1943 he was Controller of Research and Development in the UK. All good thoughts from senior officers, it actually originated at a lower level and the initial idea of formalised flight test training seems to have come from Wing Commander Bruin Purvis, then Officer Commanding the Performance and Test Squadron, which Sir Ralph quickly latched onto as a way to address a pressing problem. He was “concerned by the rising number of fatal accidents in test flying together with the lack of standardisation of the flying techniques” and set about addressing the situation. At this time, a test flying tour was often undertaken as a “rest” from operations and there was very little “selection” beyond the aforementioned “above average” flying ability. To address these concerns, the Empire Test Pilots’ School was formed in 1943 as one of several “Empire” schools in the Royal Air Force including the Empire Central Flying School and the Empire Central Flying School. It is the only one to survive with its full name intact. But what was a “test pilot school”? What would the syllabus be and who would staff it?

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His opening comments are prescient: “That a high degree of skill is required to operate the present day aircraft is fully recognised, and whilst every effort is made to make the aircraft easy and simple to fly, the means by which this is brought about becomes more and more complicated. Whilst it is safe to assume that much
research and development work allows of a larger degree of prediction, both of flying characteristics and performance of new designs, the many problems which are continually occurring demand a considerable knowledge of the capabilities of the work is to be successfully carried out, and the results further the field of aeronautical science."

It appears that this paper was written shortly after Wraith assumed command of ETPS in response to Air Marshal Soley’s initiative. At the time he was commanding ‘A’ Squadron (the fighter test), and when the Officer Commanding A&AE, Air Commodore D’Arcy Greig was searching for a school commandant. In his words:

“My first indication that there was going to be a test pilots’ school at Boscombe Down was when Air Commodore D’Arcy Greig met me on the tarmac and told me about it and suggested that I might like to be the Commandant … I was rather loath to leave A Squadron and go across, and run some school which didn’t seem to have any future at all …. I said that I might agree with the sentiments of the whole thing but I was not going to volunteer for the job.”

Perhaps this was on Sammy Wraith’s mind when he maintained that all test pilots should be volunteers, but a promotion to Wing Commander may also have helped changed his mind.

A student on the first course said of Sammy Wraith: “He was an ideal chap because he was known to all of us as a Service test pilot of tremendous practical experience … to this you could add the tremendous advantage of being able to bribe or blackmail all the Flight Commanders to lend us aeroplanes.” Such attributes remain useful today.

In fact, the school struggled for serviceable aircraft to fly throughout its early years and often made do with worn-out specimens of out-dated types. Such challenges would endure and become a recurring theme. The early buildings were less than ideal consisting of temporary Nissen Huts.

These detailed drawings show the Spartan nature of the training facilities and represent the plans drawn up for more appropriate school buildings from 1944. Although the need for ablutions was recognised, it would be some time before the School could afford an inside loo. Recognised, it would be some time before the School could afford an inside loo.

Instructor. “I was the only one around the place with a teaching degree … I was given a broad outline … beyond that it was left entirely up to me … it worked out at about seven months on a daily basis covering broadly the things we taught them - performance testing and testing for handling and stability control. I was told that this was an experimental period and it would be decided after 12 months whether they would continue with it or not.”

In fact, his syllabus, shown here, has been the foundation on which all subsequent syllabi around the world have been based.

The first course started 14 June 1943 with 18 pilots. All were from the RAF or Royal Navy. 5 were sent down after 2 months as being unsuited to test flying. I’m pleased to say the initial failure rate of 28% has improved since then, attributable to the rigorous Selection Procedure. They didn’t graduate - there was no ceremony or diploma, just a simple completion certificate. They were then posted to various research establishments. Within a few years 4 of them were dead.

No 1 course was 8 months long and 10 different aircraft types/marks were utilised. Of note the latest EASA Class A flight test requirements also dictate a minimum of 10 aircraft types be flown on the course. Likewise the students averaged between 80-100 flying hours, the EASA requirement is now 100hrs; student pilots in 2012 typically flew between 120 - 130 hours.

In his proposal for subsequent courses Wraith recommended it should be extended to 9 months long, starting in March, that they should select 30 students via a dedicated Selection Board - he expected 6 to be weeded out by the end of the second month. To deliver this training required a Commandant, 2 assistants (one part-time) and a senior technical instructor, supported by 2 assistants. Today, things are different yes, but identical in many key areas. My training baseline is 23 students, chosen after a 2 day Selection Board. The course is 11 months, but kindly, that includes 1 month of Leave. The biggest difference is in the number of staff, but I now teach Rotary wing students, flight test engineers, systems and have a support team to manage travel, sales, marketing and finance. Equally, we no longer get the students to convert each other onto types which they are familiar with. I think you would agree they got it right, right from the start.

Sammy Wraith was very clear on the qualities required of a test pilot:

- Flying ability and wide experience
- Reliability, patience and capability of painstaking effort
- Keen observance and ability to report
- Knowledge of the work and problems involved
- Enthusiasm of the work
- Adaptability

This is a list that anyone who has worked with flight test professionals or been involved in a selection process would recognise. I will return to the qualities required in flight test professionals in due course.

Having conceived the detail of the course and delivered the first iteration, Sammy Wraith was replaced by Gp Capt McKenna as Commandant ETPS in 1944. No 2 course, the first with an international flavour, had students from South Africa, Canada, Australia, China, America, Norway, New Zealand and Poland. It also featured civilian students from the Bristol Aeroplane Company and the Miles Aircraft Company. It both established the international nature of flight test and the principle that some nations and civilians would pay for the training - the Chinese government handed over £10,000 for each of its students - around £385,000 in today’s money. Believe me when I tell you they got a good deal!

McKenna had just returned from exchange in America. The second course included Major Muehlig USAF who went on to be the first Commandant of the USAF Test Pilot School. Fatalities on the course were not unusual during the early years and this was tragically demonstrated in 1945 when Gp Capt McKenna was killed in a P-51. The principal ETPS trophy, awarded each year to the best fixed wing student, is named the McKenna trophy in his honour. We forget that 2 students, Flt Lt Bonner, RAF and Flt Lt Brady, RAAF, also died on that course.

In October 1945, the school moved to Cranfield where it could “do its own thing”, as this next video clip shows. The fleet comprised 33 aircraft of 19 different types or marks. Whilst this line up represents the apogee in terms of the number of ‘organic’ aircraft within the ETPS air fleet, exposure to the widest variety of aircraft types is still a cornerstone of the course. In 2003 I flew 21 different fixed and rotary wing aircraft and that remains typical of the course today. The wide variety of types resulted in an innovation - Up to this point, the flying tutors role had been to supervise conversion and general flying skills - but not to teach flight test. Sammy Wraith was understandably flagged up as a weakness and rectified from No 6 course.

Another matter that was tackled at Cranfield was the type conversion to four-engined aircraft. The School now had not only a Lancaster but a Lincoln and these types were normally flown by a crew of two pilots, a navigator and a flight engineer. For No 5 Course, two Qualified Flying Instructors were posted in together with two navigators and two flight engineers so that the student flying these types could have the benefit of an experienced crew, wherever this point, they had tended to be left to struggle unaided!

This insight, that the challenges of flying and evaluating multi-engine aircraft are very different than those required to fly and assess a single seat fighter, is significant in light of the changes made to the ETPS fixed wing course from 2012. At the behest of the MoD, and in recognition of the way modern heavy aircraft are flown, evaluated and certified, the traditional fixed wing long course was split into multi engine and fast jet
flight test
• Utter professionalism
• Enthusiasm for the work

We’ve heard different people talking about test pilots specifically, but leaving pure flying ability to one side, I think these are qualities we wish to see in any individual undertaking flight test activities - be that as a test pilot, a flight test engineer, a trials officer. Whilst I might use different terms, I think this list stands scrutiny today and it continues to represent the qualities we seek to identify, quantify and develop in the students in their year at ETPS. If pushed I would add 2 more:
• Willingness to challenge orthodoxy
• Intellectual curiosity

There are of course many additional roles and responsibilities personnel fill in the wider flight test community. As a student I only touch test pilots and flight test engineers. It is an aspiration of mine to see anyone involved in flight test pass through ETPS at some point, if not for all their training, then for part of it, so we can inculcate in each of them a common understanding of the test philosophy we should all be following.

The syllabus redesign enacted by Wroath allowed ETPS to continue to deliver flight test professionals throughout the ‘50s. The course was now 10 months long, commencing in the early part of February and split into 3 terms. Then as now, the first exercise was the cockpit assessment, ideal because it starts the development of a logical and systematic methodology and introduces students to the 7 part paragraph reporting format used worldwide in the flight test community.

Today the planning tools have remained much the same, although we hope to embrace flat screen technology later this year. The timetable has also stood the test of time. A half day dedicated to ground school, a half day dedicated to flying and half a day of report writing. On a serious note, one of the challenges I face is how I plan a course that requires frequent peaks of effort of 60, 80 even 100hrs a week within mandatory European Working Time Regulations that dictate no more than 48hrs a week over a 17 week rolling average. The status quo cannot endure.

The next sea change was to occur in the early sixties. Command of the school passed to Gp Capt Watts who had spent his flight test career in research and development at Farnborough. He realised that systems were increasingly the focus of testing but that the school had yet to embrace this in the curriculum. Thus aerosystems flew into the third curriculum area alongside handling qualities and performance with assessments of symbology in head-up displays one of the first exercises. This was swiftly followed by the increased use of simulators and then, in 1963, a dedicated Rotary Wing test pilot course, though the first helicopter on the ETPS Airfield, a Dragon HC1, had arrived in April 1957. To say it was dedicated rotary wing course would be an oversimplification - many of the ground school lectures related to fixed wing theory and exercises and were often flown in aircraft such as the Canberra, with the tutor sitting beside the student telling him what to do. Then as now, the School was tasked to deliver new training without necessarily having the capabilities or preparation time to meet the demanded requirement.

The start of the 1960s saw a period of fleet renewal, with Chipmunks, Vampires and Meteors giving way to Hunter F1s and F4s, Canberra, Devon Swift and later the Hunter T75s, an aircraft that would go on to be a mainstay of the fleet into the 1990s, but at the time was the first opportunity many students had to experience supersonic flight. Two Vickers Viscounts were acquired from US airline service to replace the Hastings and Shackleton. The Viscounts were an ideal platform to demonstrate more modern cockpit systems, but also meant the School could transport students and staff itself and was no longer wedded to ageing military types with unreliable spares support. The 1960s also saw the beginning of the decline in the number of test pilots required by the British Services and a shrinking in the number of experimental and research establishments. This lead to a drop in British students, an increase in per capita costs and a reluctance to invest further in the Airfield, which began to suffer in terms of credibility for it lacked an aircraft with a true supersonic capability. The arrival of a Lightning in 1966 partially addressed this concern, but it was one of the prototypes, spares support was problematic and there was little maintenance expertise. This underlines an important requirement for the School - yes we desire modern, representative aircraft, but just as importantly we need reliability, supportability and redundancy.

A controversial move back to Boscombe Down occurred in 1968. Farnborough and its airspace was becoming increasingly constrained and the cost of maintaining a dedicated ETPS infrastructure, Airfield, Officer’s Mess and engineering organisation were under scrutiny. Boscombe offered an economy of scale, but a loss of identity and the realisation that the Airfield would now be shared with the resident test squadrons on opposite sides of the airfield. The school was now working with a much reduced fleet with as little as 6 fixed wing aircraft at times, the rotary wing course existing only with the Scout and Whirlwind. Two Beagle Bassets were procured to host the test pilots and these eventually became the school’s first Variable Stability System (VSS). The VSS was seen as compensation for the reduction in the fleet as it could simulate a variety of handling characteristics. Much later, the school would introduce a VSS Hawk to expand the VSS capability, but the Basset lives on to this day and

streams. Whilst there is still a common thread running through both courses, the streams are tailored to the types of aircraft individuals will be evaluating post-graduation. So whilst the fast jet students fly the SAAB Gripen, the multi-engine course evaluate the Airbus A320.

In 1948, the Cranfield site was taken over by a different government department requiring another move for the School, this time to Farnborough where it would remain for 20 years. Here bigger premises were sought as, by 1949, the course size had grown to 30 students. The sizable fleet had changed very little in the post war years with a few Vampire and Meteor jets to complement the piston fighters and transports.

In 1953 Sammy Wroath, now a Group Captain, returned as Commandant ETPS with a specific task. The Air Ministry were questioning the cost of the school and some were maintaining that it was an expensive luxury. Gp Capt Wroath: “My task was to re-vamp the syllabus in such a way that we could cover the whole of the tests with the minimum number of hours (we found, for example, that some of the students got 300 hours, some only 200 hours). By re-vamping the syllabus we came up with something like 105/110 hours. The Ministry gave me half of (the savings) back again so that I was able to buy a new Canberra and Hunter.”

I would draw two important points from this quote. The first is that it was the ETPS Commandant - an experienced and qualified test pilot, or SQEP in today’s parlance, entrusted with training future military pilots. Second, although the syllabus abounded at Farnborough to design a course that delivered the skills they judged the test community needed. Secondly they were financially incentivised to review the course and given half of the money saved to recapitalise the school fleet with more modern aircraft.

On his return Wroath expanded on what he saw as the qualities a test pilot required:

Did these qualities endure? Are they still relevant today? It may be instructive to hear what subsequent ETPS Tutors have required:

- Mental capacity
- Integrity
- Reliability
- Broad flying experience
- Adaptability
- Character and courage
- Mental capacity
- Keen observance

These thoughts are summarised here:

- Adaptability
- Broad flying experience
- Reliability
- Integrity
- Powers of expression
- Above average flying ability
- Character and courage
- Mental capacity
- Keen observance
- Theoretical and practical knowledge of
remains a vital teaching platform, especially for the rotary wing course which has never managed to acquire a VSS helicopter.

Flight Test Engineer training was the next major change. The French Test Pilot School (EPNER) had trained engineers since the middle of the 1940s. In 1973, ETPS followed suit realising that as test pilots and FTEs would work together in flight test that it made sense to train together. G. Maclaren Humphreys, the man who had set out that first syllabus in 1943, was brought in to sit on the first Selection Board. However, throughout the 70’s, ETPS again came under considerable pressure with budget cuts leading to the school having to continually justify its existence in the face of reduced student numbers and calls for its closure. There was a view that the anodyne nature and improved modelling of new aircraft meant there was very little left for the flight test team to evaluate, so flight training could be cut to four or five months. Once again, the school survived on the rationale that the bespoke, sovereign flight test capability provided was of great (if sometimes intangible) worth to the nation. It was also paid for by each course’s students that came from foreign nations and who still demanded the qualities imbued in the ‘long’ course.

Lightnings and Jaguars, Lynx and Sea Kings were now on the fleet and an increased emphasis on systems evaluation continued. The 80’s and 90’s saw renewed collaboration with sister schools with personnel exchanges and the flying of each other’s aircraft becoming crucial in the battle against rising costs.. Those constraints and realities are not new, but they will endure and they are now driving a fundamental shift in the nature of the Airfleet. Rather than teach students on training and frontline aircraft from the UK military inventory we are looking to international collaborations and civilian aircraft. ETPS has extremely successful collaborations with organisations such as NRC in Canada and DLR in Germany, Airbus and SAAB with whom we fly the Gripen. We contract with a number of UK providers of aircraft for Qualitative Evaluations. The move towards holistically considering contracts for military fleets makes it increasingly difficult for us to maintain bespoke FTE-equipped examples of such aircraft outside these contractual boundaries. The FTI is essential to enable instruction in the required airborne test techniques and subsequent mission planning. Moving forward we are trying to cap these costs in innovative ways. We recognise that we do not need absolute truth data to teach - we need representative data to draw the correct conclusions from. If we can use more modern aircraft with ARINC databuses, MILPAC and use Instrumented Flight Data Recorders, we often find the required parameters are available, though control forces remain a perennial problem. Newer aircraft introduce obvious costs in other ways, which is why we are looking to see how we can lease future platforms.

The procurement of the RJs was almost coincident with the school being tasked by the MoD Procurement Executive in 1960. The first, and only female technical tutor was a Mrs Williams in 1954, the first female FTE was Mrs Shaw of the MoD Procurement Executive in 1983. It is my regret that we have yet to train a female test pilot at ETPS. Would anyone care to hazard a guess as to the significance of 1969? It was the first year colour photography was used for the course portraits that adorn the School corridors. With this Lecture I set out to describe the founding principles and requirements of the world's first Test Pilot School. It is amazing to think that in less than a generation we have gone from no formal understanding of how to train flight test professionals to codifying a syllabus and helicopter procurement to replace the venerable Sea King.

ETPS today is dealing with challenges that would have been familiar to any of my predecessors over the last 70 years. We continue to train students from a multitude of nations and have a multi-national staff. Yes a majority of my tutors are QinetiQ civilians but all have either served in the military or delivered trials programmes for the UK MoD.

An ageing Airfleet and the delayed arrival of new capabilities means it can be a constant juggling act to keep the syllabus moving on at the required tempo. This adds to the workload and stress on both staff and students. We need to eliminate single Points of Failure and make smarter use, where we can, of synthetic training devices. We have to share a finite number of aircraft and flying hours with our colleagues on the rotary and heavy aircraft test squadrons. I am seeking to make an old building fit for the purpose of delivering complex, technical training in 2013. The squeeze on defence spending, enduring operational commitments and, perversely, the number of new, particularly rotary wing aircraft coming into service, make it difficult to gain access to frontline types. We have a strong cadre of partners, both here in the UK and abroad and collaboration, or the use of 3rd party providers all have a role to play. We do though recognise that one of the unique strengths of ETPS is that it is ETPS tutors who continue to deliver the convex and test flight training that creates the optimum training environment.

Before I conclude, I am a test pilot, and so it would be remiss of me not to share some data analysis with you. In its 70 years ETPS has trained some 1646 test pilots and flight test engineers from 26 countries by end of 2012. The maximum number of students on any course was 45 in 1946-47, the minimum number was 17 in 1970. Looking at the historical trend the average is reasonably stable with 21 and in recent years we have seen a decline in the number of fixed wing students, a slow rise in the number of rotary wing, and noticeable rise in demand for FTE training. The first Royal Navy Commandant was Captain Hickson in 1960. The first, and only female technical tutor was a Mrs Williams in 1954, the first female FTE was Mrs Shaw of the MoD Procurement Executive in 1983. It is my regret that we have yet to train a female test pilot at ETPS. Would anyone care to hazard a guess as to the significance of 1969? It was the first year colour photography was used for the course portraits that adorn the School corridors.
instructional methodology that has repeatedly supported experimental flight test programmes at the cutting edge of aviation technology. The lead UK test pilot on the F-35 Lightning II programme is both a graduate of ETPS and a previous Principal Fixed Wing Tutor at the School. By tracing the development of the School, its aircraft and the scope of what is taught in the year-long course, I hope I have illustrated the evolution of flight test training, the changes introduced by the adoption of an EASA compliant syllabus and touched on some of the challenges of modernizing a legacy air fleet to provide representative training capabilities for the future.

The past 70 years of flight test training history have seen many changes but also many enduring principles:

1. There will always be a requirement for standardisation in flight test. That is demonstrated by the stability in what we have taught and by the close bond and uniformity between the 4 recognised Western Schools

2. Flight test professionals need to have innate flying ability, should be specifically selected and should be volunteers with a technical background. Broad experience across a range of aircraft types and within different roles is highly desirable and makes for a more rounded graduate.

3. A safe and efficient flight test capability is crucial to a nation whether at war or at peace. It is not a reactive capability that can be spun up quickly; flight test professionals are strategic assets. Whilst not a popular truth with military manning, the majority of test pilots in the UK and European flight test community started in the military and were trained at ETPS. Choke the supply and you will inevitably erode the capability.

4. Technical ground instruction is as important as airborne instruction. It seeds the understanding of why you need to fly a specific test technique and what the results mean.

5. A robust and reliable air fleet of variety is essential. No aircraft, no aircraft evaluation.

6. FTE training is as important for producing efficient flight test as test pilot training. It is a team effort.

7. Systems will continue to grow in significance for flight testers. The challenge becomes teaching relevant principles that can be adapted to the increasing complexity and integration of systems architectures. To do this we will have to remove content elsewhere.

I contend that the principles the first CO ETPS, Wg Cdr Sammy Wroath, espoused which would have been written during his second tenure as CO ETPS in the mid-1950s. I hope I have done his legacy justice here tonight. Thank you.

Gazette

APPROVED BY THE COURT ON 9 MAY 2013

The following graduates from Coastal Pacific Aviation - all (NA) (GYM)
Jared BISTRITAN
Andrew Michael BURNS
Andrew Edmund Anthony COPS
Graham Preston CROOKES
Devinder DEOL
Travis Eryn EVoy
Brendan Jason GANSNER
Hok Kan HUI
Michael Bradley Jose HUTCHINSON
Brett Mckenzie MILLER
Parisma PATEL
Rajan Nath SHARMA
Robert STRONG
Ryan Spencer VAN DYK

ACKNOWLEDGED BY THE COURT 9 MAY 2013

TO REGRADE

To Livery
Captain David Andrew SINGLETON
Christopher John Pembroke GREEN
Ernest Bruno SEEMANN
Paul Edward HEWETT
Alastair Campbell PINNER
Nicholas Clive GOULDING
Air Chief Marshal Sir Stephen DALTON
Group Captain Richard Myron THOMAS
Captain John Patrick TOWELL

DECEASED
David Roslin DANIEL (AUS)
Brian LAMPLUGH
Leonard Brand WILLIS (AUS)

RESIGNATIONS
Kelly CRAWFORD (HK)
Keith GILCHRIST (NZ)
Michael MYLAN (OS)
Paul RADLEY (NZ)
David SCOTT (NA)

FORFEIT ALL BENEFITS
Adrian BEASANT (HK)
Melinda BENSON
Gian BLOWER (OS)
Colin CRAWFORD
Anthony CREESE
Sophie DAVIES
Thomas GRIFFIN
David HOY
Robin LLOYD
Peter LAVENDER
Thomas MACKLE
Michael POLANSKY (HK)
Mark RANDALL
Andrew RAWLINSON
Glen REGHENZANI (HK)
Ashley WALKER (HK)
Guild News copy deadlines prevented this brief article being submitted to appear in the April issue but hot on the heels of the Guild AGM in London came the Hong Kong Region’s own Annual General Meeting on the 19th March.

With the Guild in London being known in the City as very much a ‘Working Guild’, so can the same be said of the Hong Kong Region. It is testament to this fact that approximately forty members and their guests still managed to find time away from operational duties in order to attend the AGM and subsequent dinner at the Hong Kong Aviation Club.

It was in fact a most diverse turnout comprising, in addition to guests, retirees, pilots of various disciplines, cadets and aspiring aviators. It was particularly gratifying to see so many ‘local’ attendees and a special mention must go to regional stalwart Freeman Capt. Hendra Mahendra who brought his wife and parents along with him for the evening, all the way from Indonesia.

Particular thanks, as ever, go to our HK Regional Administrator, Ian Fogarty, who facilitated the event, and the sterling effort put in by the Social Secretary, Jeremy Russell has also to be acknowledged. Of course the unsung heroes of the volunteer army that keep the HK Region on the map under the stewardship of Regional Chairman, Tony Fung, must not go unstated and whilst copy constraints preclude everyone being mentioned here, all members of the Regional Committee are listed on the Guild Website under the Hong Kong link.

One or two candid snapshots of the evening are kindly provided courtesy of our resident ATC Colleague (retired), Freeman Phil Parker.
AUSTRALIA REGION

Where is Viscount VH-TVR?

LIVERYMAN RON AUSTIN, AUSTRALIA REGION

T

his Trans Australian Airlines (TAA) type 700 Viscount was procured in the late 1950’s from Cuba to join TAA’s 700 and 800 model fleet. Only specific crews flew this A/C as there were some operational differences in the cockpit layout. It was operated within the TAA fleet for several years but is now part of the Marshall Aerospace at Moorabin Airport.

In the years since retirement it has been located at several display locations including a preschool site. When it arrived at the Museum the interior of the cabin had been carelessly stripped but the exterior of the aircraft is complete. The Museum intention is to restore the cabin to enable visitors to view the luxury of a 1950’s prop-jet.

Some members of the TAA 25 year Retirement club decided to assist this project. John Beeton enlisted the assistance of ex TAA engineers from airframe, electrical and engine trades and also enlisted enthusiasts from other sections, even from the company Finance section.

With their assistance the seats and carpets have been re-fitted and one forward bulkhead has been replaced. Lighting panels above the seats are now being installed. Many of the cockpit instruments and fittings are still in place.

The final presentation will be a static recreation of a working cabin which will surprise visitors with the large windows, width of the aisle and comfort of the seats.

Visit to Marshall Aerospace and Defence Group, Cambridge Airport, 23rd March 2013

LIVERYMAN DAVID CURGENVEN

D

epite appalling weather conditions in many parts of the country, 17 members and their guests managed to make it to Cambridge airport where, of course, there was no snow at all, just a little sleet blowing in the wind!!

We were delighted to be greeted by Liveryman Sir Michael Marshall and Liveryman Terry Holloway. They both had to leave to attend a function at Duxford, but not until Terry had given us a very interesting discourse on the history of the Marshall Group of Companies.

Founded in 1909 with little capital as a chauffeur drive company in Cambridge, Marshall moved into the retail motor business in 1910, obtained the Austin Distributanship for Cambridgeshire in 1920 and entered the aviation business in 1929. Founded in 1909 with little capital as a chauffeur drive company in Cambridge, Marshall moved into the retail motor business in 1910, Marshall Aerospace (MA) specialises in the conversion, modification, maintenance and support of military, civil and business aircraft; and its capabilities include engineering design, manufacture and test; and the provision of personnel, training and advice. MA holds many type approvals, granted by national and international authorities, airlines, airframe manufacturers and defence agencies, which enable the Company to design and certify modifications and perform maintenance on a number of civil and military platforms. Based on its 475 acre site in Cambridge since 1937, the Aerospace business has an annual turnover in excess of £240M and employs over 1500 people. The company has a worldwide customer base and the company continues to explore global engineering support opportunities. Whilst much of the company’s activities are based at Cambridge, MA is also established in Australia, Canada, The Netherlands, the Middle East and Colombia.

After a tour of the hangars, which contained an assortment of Tristar, Hercules (including the very first RAF Hercules) and business jets under heavy maintenance, we enjoyed a hot lunch and no-one went hungry as we had catered for 27 people. The 10 members and their guests who were unable to be there because of the very unseasonal weather (a year ago it was 20°C) missed a most enjoyable visit and we hope that we will be able to arrange a similar visit in the future.

The photograph was taken indoors as photography was not allowed in the hangars and it was far too cold to go outside and pose in front of an aircraft!!

Our thanks go to the team at Marshalls who entertained us so well.
Guild Visit to Heathrow Control Tower

FREEMAN RICHARD PIPER

Thanks to the work of David Curgenven, 12 lucky winners from the ballot of 59 including the new Master, visited the impressive 87m tall control tower in the centre of Heathrow airport. After being conducted through both the BAA and NATS security checks, Phil Layton (Manager ATC) gave a comprehensive briefing assisted by watch leader Andy Mercer before we ascended the tower to visit the “Cab” at a working height of 84m; the tallest in the UK and eclipsed in Europe by towers such as the 100m tower in Amsterdam.

Phil explained the highlight of his 8 years at Heathrow had been the move from the old to new tower and the transition from paper to electronic systems. This had required significant planning and activity, with the new tower initially shadowing the old one, but it had proved successful. Interesting, of the 60 current controllers at Heathrow, 30 had never worked in the old paper based flight strip manner. The new methods using Electronic Flight Progress Strip (EFPS) and touch sensitive screens with no keyboards results in much faster processes with fewer assistants. Phil also commented that controllers follow a very different path in terms of training and experience than in the past resulting in much younger controllers from the computer gaming generation seeming to take over!

The ATC service continues to “squeeze a quart into a pint pot” at the busiest two runway airport in the world. The current 4 terminals serve 90 airlines routing to 170 destinations. There is a limit of 480,000 Air Transport Movements (ATM) at Heathrow and they regularly reach 475,000 ATMs each year transporting some 70m passengers in 2012. Unsurprisingly, BA is the largest operator with 52.8% of movements with Lufthansa second at 5.6%. In terms of aircraft, the largest share of flights is covered by the Airbus 321/320/319 family at a staggering 57% with the Boeing 777 second at 12%. It was a surprise to see the 737 at only 5% whilst the 747 and 767 are at 7% each. The A380 (introduced on 13th March 2008) currently sits at 2% but is steadily growing and further developments will increase the number of Class F taxiways this aircraft needs.

To control all these movements, the normal controller coverage is 2 tower controllers picking up approaching aircraft from 8 miles out, 3 ground controllers each assisted by a Lighting Position Operator (LPO) and one for delivery, giving start clearances which also has electronic links to the aircraft systems for messages. There is one assistant that can be especially useful in coordinating telephone traffic during incidents.

The SIDs are generally followed until 4000ft where traffic is usually routed onto a direct track and the most popular departure is DVR representing 26%. There is a continuous review of efficiency and steady stream of improvements such as the introduction planned in 2017 on radar of time based separation markers to aid controllers. One area that potentially has the biggest impact in terms of efficiency is redesigning the SIDs, which have not changed much from when they were designed many years ago. However, this is a complex task to undertake requiring much consideration and coordination.

It was then time to ascend the tower! The lucky 6 went up the inside lift whilst the rest went in the colder outside lift and had a final 3 flights of stairs to climb! Interestingly, when the BA 777 incident occurred, neither lift was working, adding stair climbing to the additional workload. The handling of that incident and calmly diverting the landing traffic to the other runway, despite the last minute nature of the incident was handled in a textbook manner. Little did we know that a Virgin flight that had pushed back and departed during our briefing was now returning with an engine problem, so we had to delay our visit to the working level until that emergency was completed without further incident. It did mean, however, we had even more time to enjoy the stunning views from the gallery.

We were then taken up in small groups to the working level to the spare position to see the screens the controllers use which include weather, airport taxi plan and aircraft position, radar and EFPS. Apart from some slight glare issues, it was easy to see how they present a very clear picture of the information required to carry out the controllers tasks. When the transition to the new tower occurred on 21 April 2007, one of the biggest factors was to get used to the very different view and position from the old tower they were used to.

At the end of the visit we were joined by General Manager John Brenlow and the Master thanked everyone for facilitating a visit to such a rarely available location and who had made the visit so informative and enjoyable. A collection was then taken in support of the Master’s charity. David is already on the case to try to arrange further visits to accommodate those who were not lucky in the original ballot. Thank you David for making this visit possible.
HMS ILLUSTRIOUS, one of the Guild’s Affiliated Units, sailed from Portsmouth to Greenwich on 7 May with nine Guild members on board. They were a part of a large group of the ship’s Affiliates which included members of the Shipwrights Company, Yeoman Warders of the Tower of London and other City of London representatives. For the Editor, it was a voyage of some nostalgia as the last time he had been on an aircraft carrier was in 1968! Other Guild members were the Learned Clerk, Past Master Robert Pooley, Liverymen Colin Cox, Nigel Harris, Paul Nicholas, Roger Whitefield, and Upper Freemen Peter Cox and Andrew Hoy.

We were met at Portsmouth Harbour Station by Lieutenant Ed Vaughan, Strike Ops, who was to be our host for the visit. Unflappable and ever attentive, he looked after us all with consummate skill throughout the next day and a half. After embarking and finding our cabins we gathered in the spacious Wardroom for a welcome and safety brief given by Commander John Voyce, Commander (E), followed by a brief on the ship from Captain Martin Connell and Commander Nick Walker, Commander (Air). This covered the history of ships named Illustrious and an overview of the current ship’s capability as a helicopter and commando carrier. This could be summarised as ‘Find, Lift, Strike’ - using the Merlin in the ASW role to find, the Sea King 4 (to be replaced soon by Merlin from the RAF) and Chinook to lift, and AAC Apache to strike. After lunch tours of the various departments commenced. Of particular note was the brief on Logistics, given by the effervescently enthusiastic Lieutenant Commander Olly Hanks. Of great interest were the facts that he had only £2.54/day per person food allowance, the ship carried 38 days worth of food, his department held 11,000 separate items and £254,391 in cash. Lieutenant Colonel John Cooper briefed us on the role of the Royal Marines staff, who were responsible for the efficient and timely despatch of embarked troops, known as ‘Ship to Object Manoeuvre’. This was a vital function, as in his view the embarked troops were essentially the ship’s main weapons system. There followed a visit to the upper decks of the island to look at the Goalkeeper weapons system, a high Gatling-type rotary cannon firing 30mm shells, and a smaller mini-gun firing 7.6mm shells. After a short visit to the medical department we returned to the upper decks to witness the ship’s departure from Portsmouth in superb weather conditions. Not long after leaving Portsmouth a Lynx helicopter arrived from RNAS Yeovilton and remained on board until our passage up the River Thames.

The day’s tours concluded with visits to the bridge to learn about how the Officer of the Watch carried out his duties and to see the various navigation and radar systems used to monitor and control the ship’s progress.

All the visitors were entertained at dinner that evening in the Wardroom by the Captain and a selection of the ship’s
officers. The skill of the ship’s chefs was evident in the excellent quality of the evening meal. Following a transit of the congested separation zone in the busy Dover Straits the next morning found Illustrious in the outer reaches of the Thames Estuary, surrounded by wind farms and in completely different weather conditions of low cloud, grey skies and drizzle. As the ship made her way towards the mouth of the river we were given a most interesting demonstration in the hangar of the equipment used for damage control and fire fighting. The range of equipment varied from the very basic - hammers and wooden wedges to block holes in the hull - to the sophisticated - fire proof suits and breathing apparatus for fire fighters. The demonstration was made all the more relevant by the information that in 1986 Illustrious suffered a major gearbox fire that might have resulted in the loss of the ship but for the skill and tenacity of the fire fighting teams. By mid morning the weather was improving and the ship was moving steadily up the Thames, accompanied by three tugs, a police launch and some police RIBs. It was not long before the Queen Elizabeth suspension bridge appeared ahead, a dramatic sight, the clearance between Illustrious’s masthead and the roadway did not look very much. The Lynx was brought up from the hangar and launched, to join a police helicopter patrolling overhead and doubtless to take photographs. It was indeed a spectacular passage up the winding and narrowing river, assisted by a brisk flood tide, past new building developments, commercial premises and container port facilities, with the impressive backdrop of the London skyline of tall buildings growing ever larger ahead of us. The next obstacle was the Thames Barrier, appearing impossibly narrow for the ship to get through, but it was negotiated without difficulty but the individuals standing on the caissons would have had a most spectacular view. The next manoeuvre was to turn the ship through 180 degrees at Blackwall reach, again executed with skill and without apparent difficulty, although the inhabitants of the flats on the north bank must have wondered whether they might have had an aircraft carrier in their front rooms for the day. The final mile up river, past the Greenwich cement works and the magnificent frontage of the Royal Naval College and National Maritime Museum buildings, was completed by going astern, ultimately to moor up on the buoys near Greenwich Pier and the recently restored tea clipper Cutty Sark. The Guild party, after saying farewell to its hosts, then left the ship once the ship-to-shore boat routine had been established in mid afternoon.

Our thanks are due to the officers, men and women of HMS Illustrious for their forebearance in hosting us so well, in particular Commander Nick Walker, Commander (Air), Commander John Voyce, Commander (E) and Lieutenant Ed Vaughan, Strike Ops. The Guild party will have fond memories of a wonderful visit, the icing on the cake being the passage up the River Thames. It was with sadness that we learnt that HMS Illustrious will be decommissioned in December 2014 after 32 years of service, but hopefully the Guild’s Affiliation will be able to continue with one of the new aircraft carriers under construction.
Editor’s Note. The University of London Air Squadron is one of the Guild’s Affiliated Units. Following a recent visit by the Master to the Squadron’s Annual Dinner, the Squadron’s Chief Ground Instructor, Flight Lieutenant Mark Dunstan, has written the following article describing the Squadron’s recent activities.

University of London Air Squadron Fundraising for the Jon Egging Trust

The Royal Borough of Kensington and Chelsea is famous for its outstanding buildings, often of national importance, such as the Brompton Oratory and the Royal Albert Hall. However, some of its lesser-known buildings are also of significance. Brompton Road Underground Station is one such building, home to several units who represent a small part of the future of the British Armed Forces.

Brompton Road tube station has been closed since 1934 due to its close proximity to both Knightsbridge and South Kensington. Just prior to the outbreak of World War II the street level building together with the lift shafts and lower western passages were sold to the War Office for use by the 1st Anti-Aircraft Division. During the war, it was the Royal Artillery’s Anti-Aircraft Operations Room for central London. Today the building is home to the Kensington Air Cadets, the University of London Royal Naval Unit and the University of London Air Squadron (ULAS), a unit of the Royal Air Force Volunteer Reserve.

ULAS is one of 14 University Air Squadrons with approximately 1000 undergraduate members across the country, many of whom have an interest in joining the Air Force after the completion of their degrees. University Air Squadrons are training units of the Royal Air Force which primarily provide basic flying training, force development and adventurous training to undergraduate students at British universities. These units exist to provide a taste of life in the Service and to give experience to their members in preparation for taking up a career as an officer in one of the RAF’s many branches. With almost 100 Officer Cadet members, ULAS is objectively the biggest - and subjectively the best - of these squadrons. Members are expected to attend training nights, usually on a weekly basis, as well as attending several annual training camps. The flying syllabus of 31 sorties loosely follows Elementary Flying Training (EFT), and allows a student to achieve some ten to fifteen hours of flying per year. The flying training is supplemented with ground training and adventurous training, both in the UK and abroad.

ULAS students undertake the flying training syllabus at RAF Wyton in Cambridgeshire as well as representing the Royal Air Force at ceremonial events in London - such as the unveiling of the Bomber Command Memorial in Hyde Park last Summer, the Sloane Square Remembrance Day Service, and the Battle of Britain Memorial Service at Westminster Abbey - all whilst studying for their degrees.

Alongside these, UAS members undergo standard military ground training, including weapons handling and battle exercises, and participate in inter-Squadron sports competitions and in events such as the Nijmegen marches, a 100 mile 4-day march held each year in Holland. All of these activities aim to develop individuals’ leadership skills and personal qualities, as well as giving an insight into military life in the Royal Air Force.

In addition to training, ULAS has an active social calendar and student-organised events include Christmas and Summer Balls, museum trips and Cheese and Wine evenings during which members present to their parents and university tutors. The highlight of the year is the formal Annual Dinner at the RAF Club in Central London, with invited guests including Members of Parliament and senior Royal Air Force officers, as well as Master GAPAN.

Raising money for charity is something ULAS takes seriously. The Squadron charity for 2012-13 is the Jon Egging Trust (JET). JET was founded by Dr. Emma Egging in memory of her late husband Flight Lieutenant Jon Egging, a Red Arrows pilot who was killed in an aircraft crash at the Bournemouth Air Festival in 2011. This charity’s mission is to help disadvantaged children achieve their potential by developing their confidence and leadership skills, as well as giving them opportunity to meet inspirational individuals from both military and civilian life. ULAS aims to raise the sum of £10,000 for JET by the end of August. In order to reach this ambitious total, the Squadron has planned an equally ambitious series of fund-raising events.

Most of these events are planned for summer 2013, including a coast-to-coast cycle ride, the 3 Peaks’ Challenge, a 46-mile endurance march around the former Pathfinder RAF stations, the four day marches in Nijmegen, Holland, and a land-based transatlantic row involving every member of ULAS.

Hopefully the enormous effort on the part of the students and staff will result in ULAS not only reaching, but surpassing the £10000 target. To donate to the ULAS charity appeal for the Jon Egging Trust, please visit www.justgiving.com/LondonUAS.

For more information on the University of London Air Squadron, please visit www.ulas.org.uk.
News from DAA
LIVERYMAN JOHN TURNER

On 27 April I represented the Guild at LAA Youth and Education Support Symposium at Brooklands Museum. This not only reinforced how many different organisations are working hard in the field of encouraging youngsters into engineering and aviation-related careers, it also show-cased ‘school build a plane’ and air experience programmes that might be suitable for future Guild involvement as either alternatives or adjuncts to our scholarship programmes.

Continuing the development of liaison with CAA, DAA will have met CAA air Traffic and Aerodromes on 8 May to discuss inter alia CAA work on GNSS vulnerability and the clearance of GNSS approaches.

MEMBERS SURVEY
(for those who may have missed the email circulation).

Part of the remit of my role is to ensure the Guild has the appropriate level of influence with government, the regulator and other aviation bodies; part of this activity includes the need for an effective relationship with the aviation and general media. We already have well-established informal links through our many members who belong to (and are often very active in) many other organisations. In order to allow us to maximise the potential those links provide, and to identify and then fill any important gaps, I have put together a number of questions. I appreciate that everyone’s time is precious so I hope I will only need to ask these once. Rather than set up a ‘survey’ programme, which inevitably restricts the scope of answers, I’ve framed the questions so you can respond by email to daa@gapan.org (or by snail-mail via the Guild office) as fully (or as succinctly) as necessary. Please take the time to review the questions and to respond as fully as possible. I can assure you that the answers will not be used anywhere outside the Guild and that they will be used to help in formulating more effective relationships and media awareness of the Guild, both with the intent of ensuring we fully our aims as effectively as possible.

1. To help me understand the degrees and levels of connectivity that we have with national governments and aviation regulatory bodies (national and international), please answer the following question(s):
   - Do you have connections with national governments and aviation regulatory bodies (national and international)?
   - If so, please outline the level of your connection/degree of influence, for instance do you:
     - sit on standing/regular committees?
     - receive requests for advice? (If yes, please describe)
     - carry out other roles? (If yes, please describe)

2. Many Guild members are also involved with other aviation organisations (I am a Fellow of the Royal Aeronautical Society). To help me understand the degrees and levels of connectivity that we have with other aviation organisations, please answer the following question(s):
   - Do you have connections with other aviation organisations?
   - If so, please outline the level of your connection/degree of influence, for instance do you:
     - help organise conferences?
     - sit on committees?
     - author papers?
     - carry out other roles? (If yes, please describe)

3. It is important that the Guild maximises every opportunity to get its message across to those involved in aviation and to the general public. To help me judge where we already have links (and where we have gaps to fill) please answer the following questions:
   - The Guild is sometimes asked to provide comment or advice on significant aviation issues. Would you be able and prepared to represent the Guild in responding to these requests? If so, what areas would you feel comfortable with (and which would you prefer not to be asked about)?
   - The Guild is sometimes asked to provide comment at short notice on significant aviation events by the press and television. Would you be able and prepared to represent the Guild in television or telephone interviews? If so, what areas would you feel comfortable with and which would you prefer not to be asked about?
   - Do you already have established connections with print or broadcast media organisations? If so, please describe which organisations and level of involvement.

I will start compiling responses at the end of May and look forward to updating you through the Guild News of subsequent actions. Many thanks for taking the time to provide these vital pieces of information that will help the Guild to be more effective at influencing and responding to media and other organisations.

UK AIRPORT POLICY

The Policy Paper has taken up the major portion of my time over the past month. It was approved at the May Court and has been presented complete to the Airport Commission though further effort will continue in using ideas from the paper in formulating an appropriate response to the Airport Commission on-line consultation.

EATC (MARCH)

The committee were denied a cameo by Dieter Harms on MPL when his flight from Frankfurt was cancelled due to heavy snow. (Heathrow remained open!) We hope Mr Harms will be able to attend later this year.

Pilot Aptitude Testing continues though the numbers and levels of recent candidates seem to be consistently low. Mr Russell reported on his research into the approaches taken by commercial training schools on upset/aerobic/LOC-I training, which showed marked variation. Many schools did not see this as a mandatory training segment but would provide it at the student’s cost. In contrast, the committee heard that BA cadets now undergo a specific LOC-I module and Aer Lingus have asked for their cadets’ MCC and JOC to include upset training.

The committee discussed the CAA paper on Regulatory Approach to Recreational Aviation (RA2) and O Russell and P Mathews agreed to conduct a full review and report back. Their written report is now available.

The Instructors Sub Committee continue to make progress in preparing a definitive PPL Instructor Lesson Guide to meet the needs of today’s instructors. To assist in bringing this major project to completion, the sub-committee will sit for a full day in May, rather than joining the full committee in the afternoon.

ENVIRONMENT COMMITTEE (MARCH)

Dr C Miyoshi from Cranfield University, whose background includes predictive mathematical modelling of transport environmental impact, has joined the committee as an external organisation member.

‘Aviation Demand Forecasting (Airports Commission, Feb 2013)’ describes the predictive mathematical modelling undertaken to produce the forecasts, the data used to populate such models, the assumptions made, and the uncertainty surrounding the data and assumptions, and therefore also the uncertainty in the model outputs (i.e. the forecasts). The committee agreed that it should be in a position to have a well-informed view on models of this type, as well as potentially developing the subject further in a Study Paper of its own.

Finally, the Master asked committee members to give some thought to a successor as Chairman when Prof. Green stands down at the end of her term.

TASC (APRIL)

The meeting was well attended with twenty-three members and observers. The meeting was planned without a cameo to provide more time for the extensive list of items that continue under discussion, including Global Navigation Satellite Systems (GNSS) vulnerability, which may be exacerbated by high solar flare activity over the next 12 months, Remotely Piloted Vehicles (RPAS), Aviation Employees and Security, LOC/ Standards of Best Practice, the threat to aircraft from Laser attack, Transition Altitude harmonisation and the potential to move from baro- to GNSS-derived Geo-height and reports from UK Airprox Board and UK Flight Safety Committee.

At earlier meetings, LOC-I events had taken some thought to a successor as Chairman when Prof. Green stands down at the end of her term.

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GAPAN PR Committee Report May 2013

LIVERYMAN STEPHEN SLATER

The prime PR activity in the past months has been maximising the awareness of the appointment of the new Master and using this as an opportunity to brief key editors on the Guild’s recent activities and to continue to push offering Member expertise on developing news stories.

Media response to the appointment of Judge Owen as the 2013 Master has been particularly positive, with references in magazines including Aeroplane, Flight, Pilot and Flyer. Although cuttings from other industry titles have not been seen, we understand that references there can also be expected.

A meeting in March also allowed the mutual introduction of DAA John Turner to the editor of Pilot magazine, Freeman Philip Whiteman. A broad-based discussion raised a number of issues of interest to the magazine, not least pilot strategy, known as the Dowding System, among the WAAF—volunteers who served in the Filter Centre at Bentley Priory and elsewhere during the war are Patricia Clark (nee Robins) and Eileen Younghusband (nee Le Croisette), who put on the WAAF uniform in 1940 and 1941 respectively, when both were just 19.

RAF Fighter Command’s wartime HQ, Bentley Priory, will be opened in September this year as a museum to celebrate all who contributed to the victories in the skies over Britain in 1939-40. Here we highlight the role of unsung heroines of the WAAF who worked in top-secret filter centres at the heart of the UK’s unique air defence system.

During the summer of 1940, Bentley Priory was probably the single most important building in the whole of the United Kingdom. A former country house in Stanmore, north London, it was the headquarters of the Royal Air Force’s Fighter Command, which was led by Air Chief Marshal Sir Hugh Dowding, who since 1936 had been refining a system to protect the country from aerial attack.

The Battle of Britain from July to October 1940 proved that his secret air defence strategy, known as the Dowding System, worked. Improved and refined, it continued to thwart the enemy during the Blitz of 1940-41 and the V1 and V2 rocket attacks in 1944-45. The principles used in this radar-based early warning system are employed in our defence systems today but now computers do the analysis that in WW2 was handled mainly by a small group of young women in the Women’s Auxiliary Air Force, which had been formed in 1939.

A stained glass window at Bentley Priory celebrates their previously overlooked role by showing a WAAF in the Filter Centre, which was the pivotal heart in the Dowding System. Among the WAAF veterans who served in the Filter Centre at Bentley Priory and elsewhere during the war are Patricia Clark (nee Robins) and Eileen Younghusband (nee Le Croisette), who put on the WAAF uniform in 1940 and 1941 respectively, when both were just 19.

A swift response from both the PR Group and the Guild Secretariat raised this ASP. We still failed to get our logo on the press release on the grounds that there were several other players who might ask for similar privileges, but we did ensure our name and role was prominently shown within their news release text.

Editor’s Note: This article, which describes the work of members of the WAAF in Filter Centres during WW2, was originally published in the house magazine of Christopher Ward (London) Ltd, a noted distributor of specialist watches. It is reproduced here with the company’s kind permission. For more information, see werea@christopherward.co.uk

GUARDIANS OF THE SKIES

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bigger secret than what was done at Bletchley Park,” she maintains.

Victory in the Battle of Britain and other air battles over the United Kingdom during WW2 immediately conjures images of the bravery and fortitude of The Few, but the reality of that victory was delivered by an extensive system that integrated new technology, processes communications and a band of highly skilled RAF and WAAF personnel. In 1940 the system enabled The Few in the air and the Anti-Aircraft Artillery on the ground to overcome a numerically much stronger enemy. The success of the Dowding System during the Blitz meant that Hitler’s Operation Sealion, his planned invasion of Britain, came to nothing. In 1932 the British Prime Minister Stanley Baldwin famously declared that “the bomber will always get through”. This widely held view of the indefensible threat of modern aerial attack was challenged by Sir Hugh Dowding, who in the three years before WW2 conceived and organised the development of a unique integrated air defence system. Born in 1882, he was approaching retirement age, but he adopted a maverick stance against many of his superiors and political masters, certain in his view that Britain’s only hope was to keep its meagre air force concentrated on the home front to defeat the expected German onslaught from the skies. Observation, communication of information, analysis and speed of response were the vital elements of his plan. He was one of the first to recognise the potential of radar detection. His system relied on a ring of radar stations on the British coast that had been set up in the mid-1930s by Robert Watson Watt, a radar pioneer working for the Air Ministry. By coincidence, although at separate locations, they both worked in a Filter Centre at RAF Rudloe Manor, 10 Group’s HQ near Bath, Patricia’s first Filter Centre in late 1940 was in a former cowshed - it was always RAF) and WAAF ‘tellers’ who passed on by phone the key elements of the plotting to the nearby Ops Room. During the Battle of Britain, the Filter Centre at Bentley Priory was the only one in the country - the success of the system during the summer of 1940 led to its expansion. A recreation of the Filter Centre will be a feature of the new museum.

Human observation, especially by the Observer Corps, was important to fill in the gaps between radar stations, especially in the early part of WW2 when radar coverage was directed mainly out to sea. The Observer Corps was awarded the prefix ‘Royal’ by King George VI in April 1941 for its contribution during the Battle of Britain. As the war progressed, systems using different radio frequencies were better at tracking aircraft over land. Airborne RAF aircraft also contributed information and, on the ground, bi-lingual personnel, including WAAF, listened in to the wireless chatter of German aircrew. This mass of information needed to be sent, received, analysed and processed very quickly if it was to be useful. Dowding put hundreds of telephone lines underground, to be severed from bomb damage, to enable the information to flow between the radar chain and observer groups, RAF Bentley Priory and the other Fighter Command units. Under the Dowding System, the country was divided into geographical areas, each of which was covered by a Fighter Command Group. These areas in turn were subdivided into several Sectors with a Sector Station controlling two or three airfields.

During an enemy attack, details of incoming aircraft - and, importantly, of friendly aircraft - were sent by the CH stations to the Filter Centre at Group Hq's. Once collated, assessed and plotted on a large table-top map, this information was passed to the Group Operations Rooms and thence to Sector Operations Rooms, where the Controller made the decision when to scramble the fighters. He and his deputy controllers provided pilots with coded courses to vector the fighters to the target. The order to scramble, together with the codename for the area to be patrolled, was relayed by telephone to dispersal huts at the fighter airfields.

Under the integrated Dowding System, the information from the Filter Centre was disseminated to other key parties involved in the aerial combat, such as anti-aircraft batteries, air raid authorities, Balloon Command, and after it was formed later in the war, the Air Sea Rescue service.

In the early days of WW2, it was not thought the WAAF personnel would be able to handle as efficiently as the men of the RAF the calculations and pressure of Filter Centre work. The pool of trained RAF was small and there were increasing demands for personnel to operate systems overseas. It was decided to give women a chance and this proved to be the correct decision because they acquitted themselves wonderfully. “With our smaller hands, we were able to place the small counters that represented hostile and friendly aircraft much more dexterously than men. We learnt very fast to be quick,” says Patricia.

The central work area of a Filter Centre was the table on which was a map covering the Group’s area. Most of the map, Eileen recalls, showed the area of the sea as it was over the water that the early radar located airborne activity. Each radar station in the area was assigned to a WAAF known as a plotter, who communicated with the station through a headset and large mouthpiece that curved upward from the chest. As the information - type of aircraft, number of aircraft, direction of aircraft, altitude, friend or foe - came over the telephone lines the plotters laid down markers on the table. The markers, of different shapes and colours, carried different letters and numbers that represented different information. This information was simultaneously assessed and collated into simple arrowed tracks on the map by a Filterer Officer, who was free to walk round the table and to ‘filter’ the information being laid down by the plotters. The often-frantic activity on the table - Eileen recalls that it was normal that 15 or more plotters would be working shoulder-to-shoulder - was supervised from a balcony on which sat a Filter Officer (who from 1941 was usually WAAF), a Filter Room Controller (who was always RAF) and WAAF ‘tellers’ who passed on by phone the key elements of the plotting to the nearby Ops Room. During the Battle of Britain, the Filter Centre at Bentley Priory was the only one in the country - the success of the system during the summer of 1940 led to its expansion. A recreation of the Filter Centre will be a feature of the new museum.

By coincidence, although at separate times, Patricia and Eileen were both first posted to 10 Group, which covered the south-west of England and south Wales. Their paths crossed later in the war. At RAF Rudloe Manor, 10 Group’s HQ near Bath, Patricia’s first Filter Centre in late 1940 was in a former cowshed - it was later relocated underground. This was symptomatic of the make-do-and-mend reality of the early years of WW2. The Dowding System used the most advanced technology of the day, radar, yet even at Bentley Priory to modern eyes the construction of the balconies in the Filter and Ops Centres and the technical infrastructure looks somewhat Heath Robinson.

As well as analysing and plotting enemy aircraft, Filter Centres had to identify all aircraft operating out to sea to prevent fratricide and enemy forces creeping in...
under cover of returning friendly aircraft. This was achieved electronically by an aircraft sending a signal to the CH radar, although not all aircraft were fitted with this equipment early in the war, and by all friendly movements being notified to Filter Centres. Identification in itself was a complex task. Early in the war it was realised that an organisation to rescue downed aircrew at sea was necessary, so the Air Sea Rescue Service was formed in 1941. The Filter Centres supplied much of its information. “This was very important because quite a few aircraft went down in the drink,” Patricia Clark recalls. “If we tracked one losing height, we were able to alert the maritime rescue services and often pilots were surprised to find a boat waiting for them when they ditched.”

The seriousness of their work throughout the war was made painfully obvious to the WAAF personnel by the alarming fatality rates among aircrew. Eileen Youngusband joined up after a favourite cousin, who was in the RAF, was killed on a training mission. In 1943 the crew of a stricken Lancaster bomber who had been fished out of the Channel was brought to a Filter Centre to discover how their aircraft had been pinpointed so accurately. Patricia Clark became engaged to one of the visitors, an Australian navigator called Ken Lyons. He was killed on an air raid over Germany in 1944, aged 26. She had already lost two cousins who were pilots over Germany in 1944, aged 26. She had already lost two cousins who were pilots in the Battle of Britain. “I wouldn’t say you got used to it, but death was very commonplace,” she says today. Talking to impressive women like Patricia and Eileen today, it is difficult to imagine the prejudices of the times that they and their fellow WAAF personnel overcame. Patricia recalls all her comrades were her age with none of the plotters or Filterer Officers being older than their mid-20s at the most. They were determined to show that they could handle the technical tasks that RAF men were doing. Although the WAAF had been established in June 1939 when war seemed likely, it was not until 1941 that women working in technical roles, such as in the Filter Rooms, were commissioned. Patricia Robins finished the war as a Flight Officer and Eileen Le Croissette as a Section Officer.

Winston Churchill’s comment that ‘Never in the field of human conflict was so much owed by so many to so few’ has passed into legend, but he also wrote in his six-volume history, The Second World War, that ‘All the ascendancy of the Hurricanes and Spifires would have been fruitless but for this system which had been devised and build before the war. It had been shaped and refined in constant action, and all was now fused together into a most elaborate instrument of war the like of which existed nowhere in the world.’ This ‘most elaborate instrument of war’ was the Dowding System. Patricia Clark says “I am now 92 years of age and my fellow WAAF’s have waited a very long time for recognition of the vital part we Filter Centre Plotters, Filterers and Filter Officers played. We were totally dedicated to our work and proud to be considered more than capable and well able, as was doubted, to replace the men who were needed for active service overseas.” Eileen Youngusband adds “It is my firm belief that the Filter Centre was the linchpin of the air defence of Britain and it is time this was celebrated. Many Filter Centre personnel have been puzzled and sometimes upset that their vital work under difficult conditions was never acknowledged. At last the part they played in the Dowding System is now being recognised.”

For an official 1943 film on the Filter Centres, see www.youtube.com/watch?v=wFN4uE2h9hA
Eileen Youngusband’s memoir, ‘One Woman’s War’, details her WAAF experiences. In civilian life she became a successful business woman. www.candy-jar.co.uk/books/onewomanswar
After WW2 Patricia Clark became a successful novelist. Her autobiography, ‘You Never Know’, which includes her war years, was published under her pen name of Claire Lorrimer, www.clairelorrimer.co.uk

An Audit in Antarctica
UPPER FREEMAN IAIN TULLOCH

There cannot be many visual approaches more spectacular....

One of man’s greatest ever feats of navigation took place almost a century ago. Sir Ernest Shackleton’s trans-Antarctic expedition nearly ended in disaster with the loss of his ship Endurance, crushed by pack ice. The 800 mile voyage of the James Caird from Elephant Island to South Georgia was a desperate rescue mission in a 20 foot sailing boat. Its crew survived a perilous landing on a rocky shore followed by a hike across high glaciers to reach a whaling station. All 22 of their comrades were saved after months of extreme privation.

Crossing the Drake Passage from Punta Arenas to Rothera
Above the same ocean, but with dual FMS, GPS, HF, VHF and satellite phone, sitting in the jump seat of a DHC Dash 7 was a much safer proposition. The navigator of the James Caird had to grab his sextant during rare gaps in the cloud while being tossed about like a cork in huge seas. On a calm and cloudless day I was admiring the increasingly awe inspiring landscape as we approached the Antarctic Peninsula. “It’s not always like this” was a comment repeated more than once from the flight deck. But you could tell that they too were enjoying the view.

The purpose of my visit was to assess whether the safety management (SMS) of the British Antarctic Survey Air Unit was up to the highest level of the IS-BAO (International Standard Business Aircraft Operations). Some detailed research and interviews lay ahead.

The four and a half hour flight from Punta Arenas to Rothera was a PNR (Point of no return) flight. This is common practice due to the lack of suitable diversions southbound. The Chilean airfield at Marsh, just north of Rothera, suffers from such appalling weather that its webcam at
the daily met briefing often raises a derisory laugh. Destination weather for PNR must be VMC and the runway is declared sterile once the aircraft is committed. The forecaster has to be in the tower at least 5 minutes before the PNR for a last minute weather update.

Given its strategic position and superior weather factor Rothera is a preferred staging post for short range aircraft flying from South America. The main commercial operator, Kenn Borek Air, operates a large fleet of Twin Otters and Baslers (Turbine DC3s) all over Antarctica. A constructive exchange of safety information and provision of space for their spare parts is typical of the cooperation between polar operators. It is amazing that the DC3, designed 80 years ago, is still giving good service in such a demanding environment.

A visual descent to downwind right hand for RW 36 passed between towering snow-capped peaks, followed a lead in the sea ice, and then the view opened out to reveal a huge bay dotted with icebergs and mountainous islands. There cannot be many visual approaches more spectacular. The 900m gravel runway was impressively groomed. In good conditions it is sprayed with sea water which then evaporates with the salt binding the gravel together. We might as well have been landing on concrete and the Dash 7 could probably have stopped before the half way point. We turned into a wide parking area in front of a surprisingly large hangar and took our first steps on what for many was a new continent.

Normal Operations

The BAS fleet consists of the Dash7 and four DHC6 Twin Otters variously modified for scientific work. For historical and political reasons the aircraft are registered in the Falkland Islands. Regulatory oversight is divided between the Falklands DCA and ASSI (Air Safety Support International), a subsidiary of the UK CAA. Interestingly, beyond 60 degrees south, State supervision is limited by the Antarctic Treaty so the ANO (Overseas Territories) does not apply. No one is going to be prosecuted for low flying.

Getting there.

Although the main task of the BAS fleet is to support scientific research in Antarctica they have to get there first. So a summer only VFR operation has to be preceded by a long ferry flight from Canada to the southern tip of Chile. A lot of IFR is inevitable. The Twin Otters are modified with internal ferry tanks which take up almost all the cabin volume, and their max permitted ferry weight of 17,500 lbs requires them to transit on a permit to fly basis. There is even a fuel dump facility which involves the co-pilot leaping into the cabin to open a valve. This needs lots of practice! The original certification was 12,500 lb max AUW. Each ferry flight involves 10 sectors and around 55 hours of flying. Interestingly, these aircraft are operated single pilot IFR, and no autopilots are fitted. Progressive loss of handling skills is not a hazard in this operation. These ferry flights represent over 20% of the Twin Otter’s flying hours. The Dash 7 carries two pilots, needs fewer sectors, and flies nearly twice as fast.

A forecaster, detached from the Met Office, gives the presentation using a mixture of satellite technology, field observations, and local knowledge. Apart from the usual parameters, horizontal definition and contrast play a vital part in planning the flying programme. Attempting to land on featureless snowfields in low light conditions is not recommended! After the forecast the Field Ops Manager outlines the tasking for the day based on the resupply and science priorities as well as the weather. Provided the Chief Pilot agrees, the tasking then goes ahead. It was reassuring to hear from the Field Ops Manager that his main qualification for the post was “shovelling snow.” A subsequent ride on his skidoo convinced me that he was probably qualified to compete in Formula 1.

Fuel is the Key

The fuel farm is the key to operations not only of aircraft but also vehicles, generators and boats. It is replenished by ship in summer when sea ice conditions allow. As the Field Ops Manager said in his opening brief “This whole operation is all about fuel”. A fair proportion of the flying involves positioning of fuel drums from/to field sites. At the beginning of the season a fair proportion of pilot effort is expended in helping to dig these same drums out of the snow. To give some idea of the expense, a Kenn Borek Engineer told me that private jet fuel supplies at the main tourist site cost $15,000 per 208litre drum!

Field Operations

Twin Otters can be based out in the field for extended periods so communications need to be reliable both for operational and maintenance control. HF and satellite phone are the long range alternatives, HF being the more reliable. Pilots need to be resourceful, experienced, and above all team players. They come from a wide variety of aviation backgrounds from airline to military fast jet. There is no place for prima donnas in Antarctica.
Everyone needs to shovel snow. First year Twin Otter pilots are considered under instruction and are carefully monitored by the Training Captain and Chief Pilot. Landing on unprepared snowfields requires judgement, horizontal definition and contrast. The equivalent of a “touch and go”, called “trailing skis” is the first step in order to probe for hidden crevasses and ridges. It takes at least one and a half seasons before a new pilot is released to prove a challenging new landing site. Although the operation is single pilot VFR, the co pilot seat is always occupied. “Co-pilots” are better described as pilot’s assistants. They are volunteers, normally part of a field party, who are thoroughly briefed on aircraft emergencies including engine shutdowns on the ground. The four Twin Otters are differently modified for science, supplementary fuel, or aircraft instrumentation. All are equipped with TAWS, satellite tracking, ELBs, and SARBEs. The aircraft are over 30 years old but maintenance is fundamental. The hangar is large and well equipped and a team of Canadian engineers takes care of line maintenance and whatever else might be required. Heavy maintenance is scheduled when the aircraft return to Canada. Engineers report to the Chief Pilot who controls their duty hours. If the weather is good pilot hours need watching and if bad the same applies to engineers. When it never gets dark it is very easy to lose sight of the fact that you have been working long hours. Fatigue can lead to failures and in Antarctica these can be severely punished.

Dash 7 Ops

The Dash 7 operates multi crew on wheels only. An air bridge between the Falklands, Chile and Rothera is the principal means of moving science personnel and their specialised equipment to and from the Antarctic. A combined passenger freight arrangement allows for 16 passengers plus the two pilots and the engineer. Most of the flights within Antarctica are resupply between Rothera and Sky Blu, a blue ice runway some 450km into the interior of the continent. PNR operations are commonplace with the same strict rules governing the weather and operation. The aircraft has been extensively modified with an increased AUW, large freight door forward, extra fuel capacity, and EFIS instrumentation. Its ability to carry higher payloads and impressive short field performance has made a tremendous difference to the resupply of field parties further into the continent.

Emergency Operations

Survival, search and rescue, and safety planning deserve special attention. For aircraft landing in strong crosswinds a rescue boat is launched at the upwind end of the runway. Twin Otters can use the 2km ski way above the base in emergency, but more often for training. A sledge with fire fighting gear is permanently available there. Even within the base a system of personal booking out to the various areas is enforced. Search parties are mobilised in the event of no contact within a half hour of expected arrival. Fire precautions are taken very seriously indeed. One cannot count on outside help off base. So no-one travels without a personal survival pack and no aircraft takes off without survival equipment. Aircraft carry tents, primus stoves, fuel, matches, pots, food for 15man days, as well as mountaineering equipment and medical supplies. Position reports are due every 30 minutes and whenever taking off or landing. Should weather deteriorate unexpectedly there is an NDB/DME let down, clearly marked unapproved. The CAA might have some difficulty with OCLs affected by floating icebergs moving with the wind! In whiteout conditions 5 or 6 blind landing sites are available in suitable terrain. The technique involves using mapping radar to pick out a pre positioned drum reflector then using the radar altimeter to set up a slow rate of descent into wind from 5mm out. No attempt should be made to round out, and the pilot is advised to tie himself to the aircraft after shutdown in order to avoid disorientation! This is serious IF!

Safety Management and Culture

On a fine day, there is a glorious walk following the sea shore around Rothera point. The views of mountain ranges, some over 120 miles away, floating icebergs, sea birds, seals, and penguins are absolutely breathtaking. Towards the end of the path climbs to a ridge above the base where a wonderful panorama opens out and there stands, amongst some memorials, a small stone cairn with a brass plaque. It is a simple epitaph to the four men who died after crashing into an iceberg shortly after take-off. My companion on the walk had been an eye witness to the event. The story is tragic but instructive. The commercially operated Canadian Twin Otter had flown many hours southbound even before crossing the 9000 mile Drake Passage. The pilot had brought his father, unbeknown to his employers, in addition to the other two crew members. The aircraft was clearly overweight after refuelling, and a large iceberg had drifted on to the runway centreline. They were behind schedule and the father had to be offloaded at the next stop to avoid discovery by the company. The captain was strongly advised not to take off but insisted that he could clear the iceberg. My companion saw the aircraft pitch up to clear the summit before stalling into the ice. The combination of fatigue, overloading, commercial pressure, violation of company rules, and disregard of local advice proved fatal. Anyone familiar with Prof Reason’s Swiss Cheese model of accident theory will appreciate how everything lined up.

The majority of my audit work involves well equipped modern business jets operating mainly in developed countries. In my first audit report I classified the BAS operation as relatively high risk. It will always remain so, and as anyone who has been involved in relatively high risk activities will realise, there is often an element of chance. A few weeks after my visit to Antarctica a Canadian Twin Otter
ran into terrible weather transiting from the South Pole. Three lives were lost and the bodies cannot be recovered until next season. When there are so many potential hazards risks must be recognised and mitigated based on experience and imagination. But they cannot be eliminated. Training has always had a very high priority in the BAS and is a key element of their risk mitigation strategy. As Gary Player once said to a sceptical reporter, “The more I practise, the luckier I get!”

The BAS Air Unit operated with a mature safety management system well before adopting IS-BAO. Originally the system was developed for the two ships which support BAS logistics and marine research. This intelligent interchange of safety management principles between related departments proved very useful. Regulatory oversight had been minimal, yet given the environment, the safety record was admirable. Flight safety always had a high priority and the challenge of surviving in the polar environment encouraged training and hazard awareness. So after decades of independence it was frustrating to have to justify a successful record to a sceptical bureaucracy. The new regulatory regime may not pay the highest salaries, but the inhabitants seem to be happy and doing a pretty good job.

Aviation and Climate change research
It was the BAS who first discovered the ozone hole over the South Pole which led to the worldwide ban on CFC aerosols. Climate change research is one of the great priorities of the day, whatever opinion individuals may hold about it. Aviation suffers from a bad press in this context. Yet imagine where scientific research would be in Antarctica were scientists only supported by ships, and surface vehicles. We would probably still be using CFCs. We need the research and we need it quickly, and aviation is playing a vital role to support it.

Another Hazardous Voyage
By remarkable coincidence our southbound flight passed within 100 miles of Alex Thomson’s yacht Hugo Boss, eventually 3rd in the Vendee Globe solo round the world race. His father and I have been good friends since our RAF days. Alex faces many dangers, including ice, on these races, and although sailing alone he is part of a team. When he first showed me his boat I was amazed to learn that it had 600,000 GBP of navcom equipment aboard. The James Caird covered 800 miles in 10 days. Alex would be disappointed not to cover over 4000 in that time. Sailing at such speeds is a hazardous business, especially in the Southern Ocean. But at least he had more than a sextant and compass. Like the BAS he has taken intelligent advantage of modern technology to mitigate risk. These two very different organisations are good examples of creative and constructive safety management. They are the antithesis of the prescriptive attitude towards safety management which contrives to stifle any challenging endeavour. Unfortunately the latter tends to be the norm nowadays.

Reflections
A beautiful but haunting photograph of Shackleton’s vessel Endurance hangs in the main block at Rothera. The rigging is shining in the moonlight with the ship covered in ice, trapped and ultimately doomed. It is still hard to believe that everyone survived that desperate situation. “The Boss” clearly had a genius for choosing the safest course of action and his outstanding leadership ensured everyone’s survival. SMS theory might not have been invented, but never can its principles have been put into practice more effectively.

Sitting in the Dash7 on the way home I reflected on how much and how little has changed since those days. The BAS had met the audit standard. It had been a pleasure to see them at work, and the privilege of visiting their Antarctic base was one which I am not likely to forget.
Editor’s Note.
This letter was written by Liveryman Tim Sindall’s father to his sister, immediately after the accident he describes. It gives a vivid picture of the everyday hazards faced by the aircrew of Bomber Command and is reproduced here for the first time by the kind permission of Liveryman Tim Sindall.

The Crash-Landing of Wellington 1C W5710 J-Johnnie on the 28th of August 1941

ROYAL AIR FORCE
MARHAM
KING’S LYNN NORFOLK
TEL NARBOROUGH 261
29.8.41

Dear Do,

You like exciting stories, so here is one. We went to Mannheim last night with a 50 mph wind behind us. Cracked the target good and proper and set course for home. The wind against us put us off course a bit and we stooged over Dunkerque where we got coned and I think it was there that a bit of flak holed one of my reserve tanks. We got to Marham and as we started to come in, so a Jerrie dropped a stick along the flare path. Control told us to go to Honnington. Off we went putting on the one reserve tank and not both as I thought. (There are no gauges for the reserves). Honnington was dead and we could get no reply to repeated calls although we were over the aerodrome.

We saw what appeared to be a flare path some distance away so wandered off there, but it went out. Then the engines cut dead at 1500’. I shouted to ‘Abandon ship’ and the boys went out in quick time. I stretched out for my para, and found someone had taken mine!! I flashed a torch to look for another but there wasn’t one. I swore hard, and then sat back and prayed like mad. Switches off, top escape hatch open, helmet off, landing light on, and went straight ahead at 80 mph. At first I saw nothing but rain, then a field, and another at 500ft then a village, over that, then trees then more fields, very close now, then crash, crash, crash. I went for a six up the front, feet in the air, and an almighty wallop on the head. Lying there when everything had stopped moving I felt my head, and to my horror, in all the blood (fair rushing out it was), a bit of my head came away in me ‘and!

Holding my head steady so that my brains wouldn’t fall out, I plonked my hanky over the hole and tried to get right side up. I did and then up and out of the top hatch holding my hanky with one hand and smoking with the other. I sang hard, and then sat back and prayed like mad. Switches off, top escape hatch open, helmet off, landing light on, and went straight ahead at 80 mph. At first I saw nothing but rain, then a field, and another at 500ft then a village, over that, then trees then more fields, very close now, then crash, crash, crash. I went for a six up the front, feet in the air, and an almighty wallop on the head. Lying there when everything had stopped moving I felt my head, and to my horror, in all the blood (fair rushing out it was), a bit of my head came away in me ‘and!

I sat by the bomb as it was warm in the rain, when BANG the blasted thing blew up. It was one of the explosive ones. I only had one boot on, so hopped along the field holding my hanky with one hand and smoking with the other. I sang and shouted as I went (proper daft, I was) until I found a nettle or something with my bare foot. I only shouted then. At a safe distance I sat on a bank and waited for someone to put in an appearance. Then poor old J for Johnnie started to burn and I sat on the other side of the bank in case an H.E. had hung up too. Various a/c circled around and when it was quiet I shouted for the Home Guard, Fire Watchers, Girl Guides, WAAF’s and anyone else I could think of. After a while, I was still alive so upped and staggered over to the second field towards a church (they have graves there) which I could see by the light of Johnnie. There was a ditch then a road. No house at all. So I started walking until I came to a cottage. Still singing (Psalms this time - my words) as I opened the gate the upper window opened and a female said “Waddywant?” I said “There has been a terrible disaster and a shocking occurrence up the road.” “What’s that fire?” “My aeroplane.” “Oh!” (very suspicious) “your aeroplane!” (I’m a parachutist now) “Have you a telephone or where is there a doctor as I have a hole in my head?” “The doc is round the corner.” Window down with a bang. He was, and then I went to Cromer hospital for stitches and bandage. And here I am back at Marham once more, wangling sick leave.

(The ‘bit of my head’ must have been a bit of Johnnie, which I had broken off!!)

So there you are. Life is never dull. I am due for 6 days about the middle of Sept. so may make it 12 days.

Cheers,

Jimmie