## Diary

### APRIL 2015
- 7 **Technical and Air Safety Committee Meeting**
- 9 **Benevolent Fund Board of Trustees Meeting**
- 14 **Environment Committee Meeting**
- 16 **1st General Purpose and Finance Committee Meeting**
- 23 **Assistants’ Dinner**
- 23 **New Members’ Briefing**
- 30 **Luncheon Club**
- 30 **Cobham Lecture**

### MARCH 2015
- 12 **Education and Training Committee Meeting**
- 14 **2nd General Purposes and Finance Committee Meeting**
- 14 **1st Court Meeting**
- 28 **Livery Dinner**

### JUNE 2015
- 18 **3rd General Purposes and Finance Committee Meeting**
- 24 **Election of Sheriffs**

### JULY 2015
- 5 **Garden Party**
- 9 **Trophies and Awards Committee Meeting**
- 15 **Benevolent Fund Board of Trustees**
- 16 **4th General Purposes and Finance Committee Meeting**
- 16 **2nd Court Meeting**
- 22 **Informal Supper**

### VISITS PROGRAMME
Please see the Flyers accompanying this issue of Air Pilot and previous editions of Guild News or contact Liveryman David Curgenven at visits@airpilots.org. These flyers can also be downloaded from the Company’s website.

### FLYING CLUB EVENTS
- **April 24th** Lunch Le Touquet
- **May 29th** Lunch Calais
- **June 17 th** Lunch Oakey Park
- **June 26th** Lunch Deauville
- **July 31st** Lunch Le Touquet

### GOLF CLUB EVENTS
- **April 21st** Spring Meeting (Open Event) North Hants GC
- **May 21st** Prince Arthur Cup (Team Event) Walton Heath GC
- **June 18th** Captain’s Day (Open Event) Hartley Wintney GC
- **July 3rd** Newson Smith Cup (Team Event) East Berks GC
- **July 23rd** Ray Jeff’s Cup (Team Event) Hartley Wintney GC

Cover photo: The Master, Squadron Leader Chris Ford, flies an RAF balloon over the Italian countryside in November 2014. Note the unique design and flexibility of the landing gear. The mountain behind is Monte Viso. A profile of the new Master can be found in this issue on page 6. Photo courtesy Mrs Ruth Cundy
A message from your Editor...

In this edition we welcome our new Master, Squadron Leader Chris Ford, and his partner Sue as they begin their year at the head of The Honourable Company. The Master has had a fascinating career in the RAF and was the very last of the generation of RAF officers trained at Cranwell as Flight Cadets to remain in the Service, retiring in 2011. You can find a profile of his career on page 6 of this issue. We welcome also our new Warden, Malcolm White, and the new Court Assistants.

In January members of the Court were privileged to be taken on a conducted tour of the RAF Museum's World War 1 Exhibition in the Grahame-White factory building at Hendon. The RAF Museum is one of the Company's affiliated units and Malcolm White, who accompanied the visitors, was keen to get the Company more involved with the Museum. You will find a report on this visit in this issue. A completely different story can be found in the description of the new A350 cockpit by Liveryman Peter Chandler, the Chief Test Pilot involved with flight tests of this airliner. My thanks go to Peter Chandler for his article, first published in BALPA's house magazine The Log and reproduced in this issue with their permission. By way of complete contrast you will find an entertaining and instructive article written by Past Master Chris Hodgkinson on The Livery, The Company and The City which reminds us of the traditions and history of the City and Livery Companies. Liveryman Air Vice-Marshall Peter Dodworth's story of the early days of the Harrier, which he described to the members of the Luncheon Club in February, is also reproduced in this issue.

Liveryman Tom Eeles Honorary Editor
LUNCHEON CLUB

On Thursday 5th February some 84 members of the Luncheon Club gathered in the RAF Club Ballroom to eat a delicious meal and to be entertained with a fascinating talk by Liveryman Air Vice-Marshal Peter Dodworth on the introduction of the Harrier into RAF service. The script of this talk is reproduced on page 19 of this copy of Air Pilot. The Master gave a vote of thanks which was greeted with acclaim by all present.

OUT OF THE BLUE TOO

Reviewed by Liveryman Paul Smiddy.

A sequel to, as you have no doubt guessed, Out of the Blue - a well-received compendium of tales from the RAF. Like its predecessor this volume is published for the benefit of three forces charities - the RAF Benevolent Fund, ABF, and the Royal Navy & Royal Marines Charity - so doubly worth its £9.99 cover price.

Much like the 'Boys' titles from Grub Street, any collection of stories will be a little uneven. But the overall quality here is high - their length varies. Some of the shorter ones are ideal for taking the book into the smallest room. However, on second thoughts I counsel against it - the mirth produced may put you off the job in hand so to speak. A game called 'Shirt' is a tale which will have you rocking.

Each contributor is anonymous, allowing a degree of candour which will soon be welcomed by the reader. An early example, in looking back over his service career highlights, Fg Off Bloggs notes: "Air dropping chickens from a Beverley aircraft to troops on exercise, when the bottoms of the air drop baskets broke apart as the parachutes opened. Two hundred chickens in free fall is an impressive sight!" Despite ostensible anonymity, alert readers will discern a contribution from a certain Lightning Mate Past Master, and another from our Buccaneering editor!

Some of the stories are deliciously recounted - the airstrike in a now-'cabriolet' Hawk, comes to mind. Moreover some of the stories shed light on little reported episodes. Only now is the relief of Mirbat being talked about - a battle when the SAS were on the point of annihilation in Oman. This book portrays the Sultan of Oman's Air Force's crucial part in their salvation. Another story illustrates the fact, hitherto unknown to me, that the nose cannon in the later marks of Shackletons were not only useless but also life-threatening (to crews)! Another sheds light on the unreliable nature of French officers under stress (in this case berating ATCOs trying to do their difficult job). Another that took my fancy was "What's in a name?".

There are some moments of levity: an account by a Tornado pilot of his first offensive mission (Gulf War 1), outlining his fears, is as good an account of the emotional aspects going to war in modern times, as one will read. The low point of the book, in my opinion is the story of Op Black Buck (the bombing of the Stanley airfield during the Falklands War). It is extended and tedious, and will only appeal to aficionados of tanking.

But this is soon forgotten and there follows a stream of stories encompassing the surreal and bizarre. Buy the book, and prepare for some puzzled looks as you rock with laughter!

Complied by Ian Cowie, Dim Jones & Chris Long

Halldale Group, 2014

ISBN: 978 095709282

MELANOMA RISK

For roughly every hour of flight time at 30,000 feet, pilots are exposed to the same amount of Ultraviolet A (UVA) (long-wave) radiation as that from a 20-minute session in a tanning bed, according to a recent research letter published by the American Medical Association. Since UVA radiation can cause DNA damage in cells and lead to skin cancer, the study authors "strongly recommend the use of sunscreens and periodic skin checks for pilots and cabin crew." Pilots are exposed to such high levels because aircraft windshields, which are typically made of polycarbonate plastic or multilayer composite glass, do not completely block UVA radiation, the report notes. Worse, the report authors believe the levels could be even higher when pilots are flying over cloud layers and snow fields, since these reflect ultraviolet radiation.

To gather the study data, researchers measured the amount of UV radiation in the cockpit of a Daer-Socata TBM850 at ground level and various heights during several flights and then compared them with measurements taken in tanning beds. The research flights were conducted in San Jose, Calif., and Las Vegas around midday in April. Some of the letter's content is reproduced below.

"Airplane windshields are commonly made of polycarbonate plastic or multilayer composite glass. UV-B transmission through both plastic and glass windshields was reported to be less than 1%. However, UV-A transmission ranged from 0.41% to 53.5%, with plastic attenuating more UV radiation than glass...We first measured UV radiation in the pilot seat inside a general aviation turboprop (Socota TBM 850) through the acrylic plastic windshield at ground level and at 2500, 6000, 10,000, 15,000, 20,000, and 30,000 ft...
Our measurements revealed that the windshield blocked UV-B but allowed UV-A transmission. Pilots flying for 56 minutes at 30,000 ft receive the same amount of UV-A carcinogenic effective radiation as that from a 20 minute tanning bed session. These levels could be significantly higher when flying over thick cloud layers and snow fields, which could reflect up to 85% of UV radiation. UV-A transmission inside airplanes can play a role in pilots' increased risk of melanoma. The extracts from the letter and the information above was supplied courtesy Chad Trautvetter, News Editor, Aviation International News Monthly.

Correction to February Gazette

In the February edition of Air Pilot it was incorrectly stated in the Gazette that Captain Michael Sidney Davis was a member of the Australian Region. He was a much respected member of the Hong Kong Region.

REQUEST FOR INFORMATION

Liveryman Vic Flintham has asked if any Company member can help supply information for a forthcoming history on the VC10 that he is writing in collaboration with Air-Britain. Specifically, he seeks information on overseas operations, carriage ofVVIPs, Government Ministers and the Royal Family, any special aircraft markings, formation flypasts with other aircraft, the fate of derelict and instructional airframes and details of the trials of the K2 crew escape system using dummies. He also seeks photos of Air to Air Refuelling, restoration work in the hangar at Abingdon of ex-BA Super VC10s and the original C1 probe fit in trials in 1966/67. Vic Flintham can be contacted at vic@flintham.org.

ACKNOWLEDGED BY THE COURT

26 FEBRUARY 2015

ADMISSIONS

As Upper Freeman
Captain David Charles ALLERTON
Captain Sean Phillip ASHTON
David John FARROW
Adam Douglas GLENDDINNING (HK)
David John KISTRUCK
Squadron Leader Charles Murray SQUIRES

As Freeman
Mark William FITZGERALD
Craig Robert GRANT (AUS)

As Associate
Eloise Indigo Sequia READER

DECEASED

Patrick MASTERS
Michael WELPLY

RESIGNATIONS

Nigel BREWERTON
Charles BURRELL
John CHORLEY

FORFEIT ALL BENEFITS

Mervyn COUNTER
Sanford KORNBERG (NA)
Mark LINNEY
Iain McNICOLL
David MOFFAT
Michael MURRAY (NZ)
Matthew NOBLE-CLARKE
John POLLOCK
Adam ROGERS
Ian STAIT (OS)
Profile of The New Master Squadron Leader Christopher Ford

PAT MALONE AVIATION JOURNALIST

For 25 years of his RAF career, Sqn Ldr Christopher Ford had to be content to be a passive member of the Guild of Air Pilots and Air Navigators. He knew it did good work and that it deserved his support but his engagement with GAPAN was limited between 1978 and 2003 to attending just a handful of functions. Moving to RAF Northolt for his last 8 years of service meant that he could devote time to the Guild and appreciate the true breadth and depth of its work. This year, Chris Ford (aka Fordy) takes over as Master of The Honourable Company of Air Pilots (incorporating Air Navigators). He is keen to drive home the message to those both inside the Honourable Company and beyond that they can help the Company – and the Company can help them.

Chris was born into a military aviation family. His father, John Ford, came from New Zealand in 1942 to fly Bombays, Hudsons and Dakotas on 216(BT) Sqn in the Middle East. After the war, in 1947, he took up the offer of an RAF commission and retired as a Group Captain with an AFC. “So my first ambition was to become a Group Captain and get an AFC,” says Chris. “Alas, I failed miserably on both counts.”

His first memories of aviation were in 1957, flying by Hastings from Lyneham via Istres, Luqa, El Adem, Nicosia and Habbaniya to Karachi, where his father was Air Attache. “It was an epic journey because everywhere something went wrong. Mother had a hatbox containing a Stilton cheese! Every time we went unserviceable for a day or 2 this cheese became smellier and smellier. As we progressed further down the route we were the only 2 passengers at the back of the aeroplane!” When his father was the RAF Station Commander at the RAF Base Butterworth in Malaya in the early 60s the family went to Hong Kong, via Da Nang and back via Saigon in ’64, when the Vietnam War was just building up and Da Nang was a huge airbase. He recalls: “I thought then that I would quite like to fly. In the summer of ’67 I learnt to glide at Dishforth but couldn’t go solo because I wasn’t 16. Sadly we moved away and the opportunity to continue dried up.”

In September 1970, Chris joined 101 Entry at RAFC Cranwell as one of the last Flight Cadets. After almost 2 years of academic work and drill, all the time longingly watching the senior entries flying round the circuit, he sat in a Jet Provost T3 training aircraft for the first time in the summer of 1972. His first flying instructor was Liveryman J B Robinson AFC* (another icon to emulate!) who was brave enough to send him solo on 23rd June that year. Later he went on to the JP 5 and amassed 160 hours. On Graduation he was posted to 4 FTS at RAF Valley. “I went to fly the Gnat, but that was a little bit too much of a handful for me. I got 60 hours on it before being persuaded instead to fly a Vickers Varsity at RAF Oakington. That was sheer bliss! My brain had been overloaded by about 150 percent of doing 420 knots in a Gnat; the Varsity was 150 knots and my brain was working at about 40 percent capacity.”

Whilst at Cranwell Chris had arranged a number of short detachments to Cyprus where his parents were living. On one visit to LXX Squadron at Akrotiri he flew in a C130 to Salalah in the Oman, where the Dhofar Rebellion was in progress. “We taxied into what can only be described as the precursor to the revetments in Afghanistan – 40-gallon oil drums full of sand stacked 4-high. A 4-ton lorry, also with sand-filled drums, was...
then driven across the front of the aircraft for protection - the Adu were firing rockets and guns from the Jebel towards the airfield. Whilst waiting for the aircraft to be 'turned round' I was taken out to observe the forward defensive positions (called hedgehogs). These were bristling with machine guns and all sorts of modern technology to detect the location of the mortars. There weren't many wars going on at the time - not involving the RAF anyway - and I thought 'this is rather exciting... I'd like to come back!' ”

Chris recalled, “at Valley my objective was to fly Strikemasters in the Oman. Of course that didn't work out. Early in 1974 the Sultan of Oman's Air Force announced it was to buy 8 Defenders, the military version of the Islander and I guessed they would be easy to fly after the Varsity. So in 1974, at the end of my training at 5 FTS RAF Oakington, I was posted to the Sultan of Oman's Air Force to fly the Islander. I was an Acting Flight Lieutenant, 23 years old and there were few flying regulations. We didn't wear hats, we didn't salute very often and we used to fly around in desert boots. I was allowed fairly good latitude in my aeroplane and I learnt an awful lot about flying there. I did 950 hours in 18 months and frightened myself but, thank goodness, nobody else! I grew up rapidly, learnt from a mistake or two how to be a safe aviator and work through problems - and how to use one's initiative in the air. I was fired at once or twice and undertook some interesting jobs including ferrying 2 of the new aircraft from Bournemouth Hurn to the Oman. No auto-pilot or anti-icing, only VMC and 5 days at 120 knots. Sadly, Loan Service Tours were only 18 months and whilst I fought to stay for a further 6 months, they winkled me out kicking and screaming back to the UK to RAF Lyneham - to start my proper RAF career.” Chris had now amassed over 1000 hours - but was 3 years behind his peers.

After the OCU Chris was posted to 30 Squadron as a co-pilot on C130s. Their role was strategic transport - Lyneham to Cyprus, Lyneham to Canada, Lyneham to Gibraltar, all at 20-24,000 feet - but he had seldom been higher than 500 feet for a year and a half! Not his first choice of Squadron and some of the time he found it quite frustrating. “This was one reason I joined the Guild. I saw their magazine in the ante-room of the Mess one day and wondered if I ever left the RAF whether the Guild might find me a job. It was networking, 1970s style which, as it transpired, I never used. I subsequently found an escape route. The Special Forces Flight of 47 Squadron then operated these modified aircraft from Ascension to the Falkland Island Exclusion Zone. The 24hr sorties required extra crew but SF didn't have enough personnel. So a navigator from LXX Squadron and I went to augment one of their crews at Ascension. We did half a dozen sorties of up to 24 hours into the exclusion zone and, after Stanley was liberated, we dropped mail and supplies onto the racecourse. When Port Stanley airfield became operational again, the run to the Falklands was usually 14
hours down, a night stop and then 12 hours back. On my first trip south as a Captain, I did 2 refuels from Victor tankers, attempted 4 PAR approaches to Stanley, couldn't get in and then flew all the way back to Ascension - 25 hours in the air.”

Sent to CFS in the summer of 1984, it proved to be a short journey north. The staff soon discovered that, despite what all his peers said, Chris could not 'talk and fly'! However later in his career he was to go on to teach the esoteric aspects of Hercules flying at the Low Flying Training School at Lyneham and on SF. “1984 saw us heavily involved in the relief of the famine in Ethiopia. I was involved in dropping bags of grain from 15 feet agl at 10,000 feet asml on the edge of the performance of the aeroplane, it was quite demanding; we flew with the gear down so if you did touch, hopefully you'd bounce!”

At 38 he transferred to the Specialist Aircrew list and was posted back to 47 Squadron Special Forces. He became the training pilot and Air to Air Refuelling Instructor (AARI) and spent the next 11 years conducting SF and SF-related tasks. This period included Gulf War 1, a significant number of flights in and out of Sarajevo during the siege (watching the crossfire going underneath the aircraft 'like a red tracer washing line') and culminating in preparing crews for Gulf War II. Exercises took him as far afield as New Zealand, South Africa, Norway, the USA and Canada. A tour on The STANEVAL Unit of RAF Lyneham followed before returning to 47 Sqn in late 2001, just in time to take a crew into Northern Afghanistan shortly after the outbreak of that conflict.

In 2003 he left Lyneham to fly Islanders at RAF Northolt. He is circumspect about his duties there but this proved the ideal opportunity to become more involved in the Guild. “For the first time in my career I was not far from London, with a fairly predictable shift pattern so I could take an interest in the Livery Company,” he says. He was 'invited' onto the Benevolent Fund as a Trustee, eventually stood as a Warden and now prepares to take the role of Master.

Chris speaks of the Company as an organisation, properly balanced between past and future: newly-renamed, furnished with the Royal Charter and looking forward to the 22nd century (“if the world lasts that long”) whilst preserving everything good and great about the traditions of a Livery Company in the City of London. “We have to move onwards and upwards and while it's wonderful to have these traditions, all I can say is that tradition is a fine thing to hang your hat on. It shouldn't deter one from moving into the future, incorporating modern ways of thinking, accepting that times change. Our forefathers did the best they could in their era. Our job is to look ahead and try to ensure that we all move with the times.”

“I see the Master's role as promoting the good name and status of the Company within the aviation industry and the City. I hope to achieve this by continuing to enhance the Committees and encourage the whole body of the Company to take part in giving their time, knowledge and vast experiences for the benefit of all,” he says. Similarly he is anxious that every pilot, military or civilian, should know that he or she has a place in the Company because “the greater our numbers, the greater our ability to influence the direction of all aviation. The pressure of work, both in the airlines who are trying to get value for money and in the military which is overstretched, means that it's often difficult to be a fully active member of a City of London Livery Company,” he says. “The camaraderie, the networking opportunities, visits and functions are all very good but that is not enough to wave as a carrot to induce them to join.”

He identifies many a challenge, from the overburden of regulation to the advent of unmanned air vehicles. “We've got to embrace the issue sooner rather than later, because if we don't embrace it soon we will be overtaken by a steamroller of rules from Europe which may completely counteract what we want to do.” Keen to ensure the Company has influence within the aviation fraternity and wishing to promote dialogue, Chris sees the Company well placed to encourage best practice, flight and aviation safety, but with less regulation, in order to promulgate honest peer-reviewed information and enhance the skills of all.

Chris retired from the RAF in 2011 after 41 years of service, having achieved 39 years of continuous flying. His 18,500+ hours spanned most of the globe and included a few conflicts and humanitarian operations. It has also been interspersed with some paragliding and hot air ballooning.

He concluded by saying “It is the greatest honour and privilege to be the Master of a City of London Livery Company, but it is not the Master's Company - the Master is the figurehead, elected by the members to be the representative and the ambassador in the aviation world for one year. If I do it well, I will be sad to see it go. If I do it badly, the next person will take over and hopefully see where I went wrong. I'm under no illusion. Hopefully I will come across as well as possible, be able to hold my head up among my peers and come away at the end with people saying 'OK, he didn't do too bad a job.'”
The Master’s Message

SQUADRON LEADER CHRISTOPHER FORD

In line with many previous Masters I find myself writing this, my first message to you, some time before my installation and in my case some considerable distance form home. I am taking a short break to recharge the batteries in Salalah, which is in the Dhofar region of the Oman. It was here, in the late 60s and early 70s that a counter-insurgency operation was being conducted by troops of the Sultanate of Oman supported by a few expatriate personnel. I was lucky enough to be seconded to 5 Sqn of the Sultan of Oman’s Air Force (SOAF) for eighteen months flying the piston engine Britten Norman Defender aircraft. This was my first tour after my flying training and it was to be an adventure, which set me on the path of wonderful flying for the rest of my aviation career. I will endeavor to regale you with a few stories of the 39 years ‘fun’ over future editions.

Aviation has over the past years become more automated, less hands on (I suspect few could boast 247 landings in one month in this day and age) and less involved for the pilots. Computer-based training enables training schools to ensure the student has a basic knowledge of the systems and operation of the aircraft in question. But seldom does the school go into the finer minutiae of systems, or behind the first few pages of the flat screen. Time, and keeping costs to a minimum, are the drivers behind the length of training provided for pilots of modern aircraft. In the past RAF Ground School training that many a pilot received seemed long-winded and conversion courses were nearly always of 6 months’ duration - BUT we were taught the in-depth details of how systems worked and, more importantly, the ‘what if’s'. Flight Reference Cards, produced by the Handling Squadron at Boscombe Down, were thorough, comprehensive and were supplemented by Aircraft Manuals (often tome sized), Pilots Notes and Standard Operating Procedures. This plethora of paper ensured that pilots were always able to dig deep into the systems and gave the examining staff for each type of aircraft a vast amount of scope for checking the knowledge of crews on a regular basis. Simulator exercises were at least monthly on most fleets and this system of continual training/improvement as well as standardization and checking ensured a well trained and continually developing professional aviator.

Our ethos as a Company is to ensure the highest of standards and professionalism of pilots and those remaining navigators not just within the Company but throughout the aviation world. We can only achieve this by working with you, our members. Your vast expertise and aviation knowledge of world-wide operations should be gathered and exploited by our committees to promote safety, thorough training, best practice and above all a desire amongst pilots to strive for excellence in all their operations. I will be writing to all the membership in June to communicate some changes that will be introduced to the format of the committees and the way they work over the coming months. I look forward to attending many of these committee meetings and would hope that all our members, in UK and in our Regions, will benefit from the opportunity to participate (using SKYPE/Face-time and e-mail) in debate and discussion within working groups by electronic means. Please give your time, enabling the Company to put considered, experienced views out there ‘on the street and in the cockpit’. Your knowledge, experience, passion for a topic and willingness to join the debate and your considered input will enable us to push our Company name once again to the fore amongst the aviation fraternity.

Back to the Oman. Our main bases were at Seeb and Salalah. There was a further single aircraft based at Khasab in the strategically important area to the south of the straights of Hormuz. The squadron’s role was a mixture of light communications, Medevac, delivering Civil Aid Development teams to remote locations and occasionally delivering four-man British Army Training Teams to isolated forward operating bases. It was in the early months of 1975 and I had just achieved 500 hrs total flying. I was mastering the finer points of operating the Defender in the deserts of middle Oman, the mountains and Wadis of the Musandam and the hostile environment of the Dhofar. On the 15th February, whilst relaxing at dinner after a day’s flying, I was contacted by Dan Carter, our Detachment Commander in Salalah, and told we were required to provide top cover/comms for AB205 crews who were conducting Casevac missions close to the Yemeni Border. A patrol had inadvertently found themselves in a mine-field and had taken a few casualties. We set off in the dark and set up an orbit and spent the night relaying comms between the troops and heli crews. I was only really invited along to ensure Dan did not fall asleep! Eventually, shortly before dawn, after the last casualty was on the way to the Field Surgical Team at Salalah and the remaining troops regrouped and recovering to their main base, we were released. It was with some relief that we arrived back at Salalah after 9 very cramped hours of night flying! The loco was the first port of call! Only three weeks later I was given the responsibility of delivering the seventh aircraft from the factory at Bembridge to Seeb. This was achieved (with the help of Barry Cheverton and Bill Shepherd) in 5 days via Nice, Kerkira, Iraklion, Akrotiri, Badanah (now know as Arar) and Bahrain. I achieved 700 hrs on the last leg into Seeb and was ‘growing up’ fast. With hindsight I can now fully understand why young pilots wish to set out for Papua New Guinea, Indonesia or the African bush to get exciting flying and build hours. There is, though, a drawback to this plan - they might never wish to return to the real world and fly to a proscribed system!

The past four years of my apprenticeship as a Warden have flown by very quickly and the AGM seems to have arrived with undue haste! It is with great pleasure that I embark upon the coming year as your 71st Master. Both Sue, my partner, and I will endeavor to serve the Company to the utmost of our ability and stamina. We will do our best to ensure a good balance between Professional Company Business and an active social calendar and we look forward to meeting as many of you as we can in the year ahead.
My first introduction to the formalities of GAPAN (now, of course, The Honorable Company of Air Pilots), was in October 2002 when Chris was presented with his Master Air Pilot Certificate at Guildhall in London, after which we attended the Trophies and Awards dinner. It was a wonderful occasion and, at the dinner, we made the acquaintance of a couple who are still friends today. I remember thinking that to meet and talk to such interesting people (Peter was an ex-Concorde pilot) was pretty exceptional. Furthermore, little did I think then that in 13 years' time Chris himself would end up as The Master!

Since then I have attended a considerable number of events and have met some fascinating characters, not only within the Company itself (I chatted briefly once with Diana Banarto Walker about the vast number of aircraft she had flown) but also shaking hands with Neil Armstrong at a Trophy and Awards dinner. I must admit to feeling terribly proud and excited when I relate these events to friends and colleagues, who are very envious of my connection to the Company!

Having been born in and lived in Bristol for the first 11 years of my life my parents and I moved to Hampshire where I still live today. I commute daily from Winchester to London to my job at the Foreign & Commonwealth Office. During my 35 years' service I have served in several areas, both geographical and corporate, and have had postings to Singapore, West Berlin and Brussels as well as Temporary Duties in Bangkok, Jakarta and Kuala Lumpur. Travelling has always been high on my list of things to do in life and I have been lucky enough to visit over 40 countries, both personally and professionally. So I really look forward to The Master's Tour and especially to the shopping trips beforehand!!

My hobbies have varied throughout the years but have included horse riding (which most girls love!), playing the piano, wine appreciation and tasting (I have completed one course) and, when time allows, cinema and theatre. My one regret was not having learnt to fly when I was in Singapore. I was younger, the weather was beautiful and I had sufficient money to pay for it! However I love being a passenger, especially in a smaller aircraft, and have also accompanied Chris in a hot air balloon, the most memorable time was in Italy when we reached a height of 6,000 feet.

So a busy and challenging year beckons. I look forward to supporting Chris and The Company and to arranging some events for the ladies throughout the year. I also look forward to meeting members and their guests at the various events.

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**Profile of The New Warden**

**Air Commodore Malcolm White OBE (RAF RETD)**

Following flying training, and an 18-months tour on the Hunter, he spent most of the next 30 years flying the Harrier and to a lesser degree the Chinook, Puma and Gazelle helicopters - basically, anything which could hover; plus, the inevitable desk job in the Ministry of Defence and Command Headquarters in Germany, and the United Kingdom. Essentially a “Cold War Warrior”, Malcolm served with the British Army on the Rhine; operated the Harrier from aircraft carriers with the Royal Navy and the United States Marine Corps, and also experienced the extremes of flying operations in the Arctic, the deserts of the Middle East, the tropics in Belize and the world of the South Atlantic. All made safe and possible by a team of superb engineers, and the mighty Pegasus engine.

His command appointments developed from a Flight in Germany and twice in the Falkland Islands; to Number IV Squadron at Royal Air Force Gutersloh, where he led the introduction of the night attack, Harrier GR.7, and ultimately the RAF air base at Laarbruch in Germany, where he was also the RAF Harrier Force Commander. He went on to attend the Higher Command and Staff Course at Camberley, before being appointed Commandant (Air) at the Joint Services' Command and Staff College. His final appointment in the services was as Director Joint Force Training and Standards at the Permanent Joint Force Headquarters, Northwood. He retired from the RAF in 2001, but not before he had secured his PPL; flown solo in a glider, and learned to fly a balloon, albeit badly.

Malcolm then moved to the commercial sector to become immersed in the aerospace business: initially with Northrop Grumman and since 2008, as a consultant to a company in the UK, where he continues today. In parallel to his business responsibilities he has worked in the Charity Sector: first a 10-year term as a Trustee at the RAF Museum, and from 2010 as Chairman of the Bomber Command Memorial Project; a Memorial which was opened by the Queen in June 2012.

Malcolm and his wife Vanessa live in London, and have 3 children. In their quieter moments they share a passion for cooking, an allotment and rugby; and when they have time, walking the coastal paths of the UK (and elsewhere) with their Cocker Spaniel.

Air Commodore White has been a Liveryman since 2006 and in January 2015 was elected as a Warden to The Court of The Honourable Company of Air Pilots.
The Company’s Annual General Meeting, 9th March, 2015

BY THE EDITOR

The Company’s 86th year sees the new Master, Squadron Leader Chris Ford, taking over from Dorothy Saul-Pooley, who becomes the Immediate Past Master. The new Master has had a distinguished career in the Royal Air Force, he has been a member of the Honourable Company for many years and holds the honour of being the last Flight Cadet to serve in the Royal Air Force. His career profile appears on page 6 of this issue. Warden Peter Benn becomes Master Elect and Assistant Malcolm White is the newly elected Warden.

The transition from old Court to new took place on 9th March, with the Master, Master Elect, Immediate Past Master, Wardens, Learned Clerk and Chaplain processing the short distance from Merchant Taylors’ Hall across Cornhill to St Michael’s Church for the Annual Service. Here around a hundred Company members and their guests had assembled and the Company’s Honorary Chaplain, The Venerable Ray Pentland, assisted by the Rector of St Michael’s The Right Reverend Dr Stephen Platten, conducted the Service.

Afterwards in Merchant Taylors’ Hall, non-members listened to a talk on the Freedom of the City of London by Murray Craig whilst Company members assembled in the Parlour for the Annual General Meeting and swearing-in of the new Court. The Master’s Annual Report, previously distributed with February Air Pilot and available on the Company website, recorded another very successful year for the Company. The Report focused on all areas of the Company’s activities, ranging from the Regions, the work of the Committees, the Benevolent Fund, Visits, Promotional Activities, Social, Aviation and Sporting Activities and the Young Members. She concluded her Report with a special word of thanks to the office team for the immense amount of work they did behind the scenes with a minimum of fuss and a ready smile, and thanked them personally for the support given to her during her year as Master.

The Hon. Treasurer, Liveryman Nick Goulding, reported that “The Honourable Company’s financial result for the year ended 30 September 2014 was a modest but satisfactory general fund surplus of 1.6% which has been transferred to the general reserve. Fees, quarterage and Livery fines had increased by almost 3% while Investment income rose by a very satisfactory 7%. Total income in the year was in fact a little over 1% lower than 2013, but this was substantially due to the 2013 income having benefited from a higher level of gains realised on changes in composition of the investment portfolio. The 2014 income was in fact slightly greater than 2013 income if the realised capital gains were excluded from both years.

Expenditure in 2014 was nearly 9% greater than the level incurred in 2013, but this was largely due to Royal Charter and change of name costs of a “one off” nature. If these “one off” costs were excluded, 2014 expenditure would have increased by approximately 2.8%.

Improvements in financial markets during 2014 have not been as marked as in 2013 but the Honourable Company's investments have nevertheless increased in value by 2%. As a result of this, the net assets increased in the year by 2%. The financial result for 2014, a year in which a substantial amount of “one off” expenditure arose, could reasonably be considered to have been very satisfactory.

The Treasurer indicated that while the Honourable Company's budget for 2015 envisaged a modest surplus in the absence of any special donations and before any investment gains or losses, a degree of caution should continue to be exercised in anticipating the potential out-turn. Careful monitoring of income and expenditure against the budget would remain important throughout the
year so that appropriate action could be taken if it became necessary. In conclusion, the Treasurer expressed his grateful thanks to the Learned Clerk and his team for their willing help and support throughout the year. He also thanked the other members of the General Purposes and Finance Committee for their helpful contribution and thanked the Auditors for their professional assistance.”

The results of the Court elections for Assistant were announced; Liverymen Keith Baldwin, Richard Piper, Robin Keegan, Jonathan Legat, Richard Thomas and Marion Wooldridge were elected and Liveryman John Denyer was re-elected. The new Court was sworn in, the appointments of the Guild Officers were confirmed and the new Master, Squadron Leader Chris Ford, was installed.

After the Annual General Meeting the new Master and his partner, Sue Jones, greeted members at a champagne reception which was followed by the AGM supper in the Great Hall.

In his inaugural speech, the Master began by thanking the staff of Merchant Taylors’ Hall for their hospitality and to the new Immediate Past master, Dorothy Saul-Pooley, the Company's first lady Master, for steering the Company on a straight course throughout her year. He continued by noting that he could not claim to be the first RAF officer, or even the first Squadron Leader, or balloonist, to lead the Company but he could claim to be the first person from the birthplace of aviation in England to be Master as he came from Malmesbury. To the amusement of all present he described how 1000 years ago a Benedictine monk named Elmer attempted to fly by equipping himself with wings fixed to his wrists and legs and leaping from the Abbey tower. After travelling successfully for 200 yards he crashed to the ground, breaking both legs. However, Elmer was not deterred from preparing for a second flight, and added a tail for stability. When news of this second attempt reached the Abbot, he forbade Elmer from any such effort. "Had Elmer been allowed to proceed and prove the theory of flight all those years ago, just think where aviation might be today”, observed the Master.

He continued "As a Company we must encourage innovation and the continuation of our fine aviation heritage. To this end I implore all of you to give back to aviation the benefit of your experiences. The knowledge you have acquired is invaluable as you contribute to debate and consultations. Whilst there are many who give much time to the committees, I am sure there are many more within our Company who could give so much but are not able to come to Town. The DAA would love to hear from you and include you in any future working groups. Spread the word please, for there are many with strong views on specific topics and we could use your energy, knowledge and drive to put together well-balanced papers to inform the aviation business and encourage debate." He noted that in the past the Court was made up of senior serving military officers and CAA officials but that it was more difficult to engage similar people today for fear of a conflict of interest, but the Company would continue to seek to have a valued and respected voice within aviation.

He noted that, regarding safety in the air, the proliferation of small UAVs was a cause for concern and that the Company could work closely with the authorities to ensure the safety of aircraft by highlighting the threat that unregulated growth in all aspects of RPAV activity brings.

He outlined the three good causes which he would be supporting during his year. The first was to encourage youth into aviation by asking Air Pilots Members to provide as much money as possible towards a PPL Scholarship during the 2016-17 year, the second was to support the London Air Ambulance who are raising money to purchase a second MD902 and finally to raise as much as possible for ORBIS. "ORBIS operate a unique DC10, which is a fully equipped mobile teaching hospital," he said. "On the outside the aircraft is like most other aircraft. Inside, it's like no other - it hosts an ophthalmic hospital and teaching facility. It flies all over the world to locations where volunteers treat patients and train local doctors and nurses, who will then go on to treat thousands of..."
people in their own countries. It can cost as little as £10 to save someone’s sight in some of the remote places where they work. So please do help me support ORBIS this year. Your donation could be the gift of sight.

After outlining the many and varied social, sporting and visits planned for the coming year he gave special thanks to all who had encouraged him over the past few years and who either directly or indirectly put him in the position of Master. Both he and Sue hoped they would do justice to the faith placed in them and looked forward to working closely with the Clerk and the office staff in the smooth execution of both Company and Civic duties.

He concluded by proposing the toast, “The Honourable Company of Air Pilots, may it flourish root and branch forever.”

The speech was greeted with acclaim by all present.

The Master and his Lady process in
From the desk of the Director Aviation Affairs

LIVERYMAN JOHN TURNER

INTRODUCTION

Aside from variations in the intensity of the Intertropical Convergence Zone (ITCZ) the challenges faced by airline pilots are the same throughout the world, which reflects the global nature of airline operations. We do face local variations, for example, in approach and radio procedures but the Company’s view is that these should be eradicated wherever possible by regulation; we support the global standardisation of airline operations and seek the adoption of best safe practice everywhere. We also see increasing coordination between the world’s major regulators of aviation. Our challenge as a Company is to ensure we exert an appropriate level of influence in this changing world.

We continue to debate pilot manual handling skills and the susceptibility of those skills to fade as airline operators increasingly mandate the use of automation. There is little point in advocating more manual handling as operators have already seen that they suffer less ‘incidents’ when pilots use the highest level of automation, which then becomes driven by their Safety Management System. Other potential remedies tend to focus on either training pilots to cope with ‘startle’ or providing upset/unusual attitude recovery training in a simulator or aerobatic light aircraft. However, no one yet seems to have determined exactly what training would be effective in addressing an issue that has developed slowly over a long period.

Pilot (lack of) knowledge of advanced flight systems also prompts debate as fly-by-wire or fly-by-computer presents pilots with increasingly complex flight systems that exhibit increasingly complex operating logic and failure modes. Every human pilot takes their previous leaning, experience and habits into the cockpit/flight deck; we are very much creatures of habit. In contrast, some aircraft system designs exhibit operating logic that is counter-intuitive to an experienced pilot, especially when previously familiar functions are changed or deleted. Military cockpit development tends to deliberately mimic features of older designs (e.g. positioning and shape of the arrester hook operating handle in F-18 Hornet is very similar to that in the F-4 Phantom) yet we have seen the opposite in flight deck design (e.g. ‘instinctive’ aspects of airliner autopilot design changed from one model to another, even in aircraft from the same manufacturer). A recent UK Air Accidents Investigations Branch special bulletin, suggested that pilot knowledge is not keeping pace with developing technology, or at least that our instinct when the unexpected occurs...
is to revert to previously learned, rather than current correct practice.

Each advance in automation is flagged as making life easier for the pilot and is seen as a reason to reduce training regimes; yet the reality of each advance is that the pilot’s world becomes increasingly complex. While some (non-members!) might argue that the long-term solution is to remove the pilot from the machine altogether, we must ensure that “aircraft are piloted and navigated safely by individuals who are highly competent, self-reliant, dependable and respected”.

Perhaps it is time to actively combine and coordinate the experience and enthusiasm of our global membership so that, rather than striving to influence within our respective regions, we can speak with the combined and coordinated authority of all of the world’s most experienced pilots?

SKYBRARY

The articles we have endorsed on SKYbrary show a miniature of our crest that links to the page http://www.skybrary.aero/index.php/TheHonourable_Company_of_Air_Pilots.

This gives SKYbrary visitors a comprehensive description of the Company, a link to our own website and a list of articles that we endorse. We are responsible for keeping our endorsed articles up to date so you are invited to review one of the articles we have endorsed and to advise me at daa@airpilots.org of any alterations/corrections you feel would be appropriate. It would also be nice to hear of any article you have looked at and believe to be correct, as that will help inform our review schedule!

UK PROFESSIONAL COMMITTEE REPORTS

ENVIRONMENT COMMITTEE (ENVC)

The EnvC working group activity continues apace, especially on ensuring the ‘Aviation Environmental Achievements’ tri-fold is correct and understandable to a lay audience before going to print. It is important that the facts and supporting references are correct so that when you use the information to promote the truth of aviation’s environmental impact you can be assured that you will not be open to challenge.

TECHNICAL & AIR SAFETY COMMITTEE (TASC)

Capt David Harrison completed six years as an excellent chairman with the February TASC. Pending transition to the new committee structure, Capt Miles Stapleton will take over as temporary chairman; the vice-chairman position will be left vacant.

TASC supported an ‘Alternative Training Approach’ to address some of the pilot lack of skill/recency issues associated with Loss of Control In-flight (LOC-I) events. Committee new business included a review of the guidance in SI2014/05 to CAP493 on declaring ‘Minimum Fuel’ (and its relationship to ICAO Annex 6) and discussion on psychoactive substance testing. The latter noted that the type of test intended would determine whether it should be supported; hair follicle testing can reveal substance exposure from up to 18 months ago while random blood testing raised questions of needle hygiene in some parts of the world as well as sample security and the availability of split samples for independent analysis; sample handling would also be an issue for urine tests. TASC decided that any policy would require full involvement of liaison with the Company’s medical advisers and that whilst testing could be of value, the process should be considered carefully before we support any implementation.

The potential for an ‘Alternative Training Approach’ to combat LOC-I was particularly thought provoking, especially when discussion started to balance the merits of ensuring that pilots don’t allow matters to progress to the point of losing control in the first place against the merits of ensuring that are well versed/practiced in recovering from an upset after it has occurred. One interesting statement was alone the lines of, “why would you expect a pilot to be able to recover from an upset if they had not been able to maintain wings level flight in the first place?” The paradigm that flight simulators must be of the highest possible fidelity to minimise the potential for negative or erroneous training is now deeply embedded; so is the drive of operator costs to fine-tune commercial pilot initial and recurrent training/testing regimes towards historically relevant specific events such as (critical) engine failure close to V1 on take off, rather than equipping pilots to cope with prolonged monitoring of a 'normal' failure-free flight. Work on LOC-I prevention, investigating the effectiveness of and potential for a simple and cheap training aid to refresh critical pilot skills and thought processes prior to each flight, is ongoing.

EDUCATION & TRAINING COMMITTEE (E&T)

January E&T received a cameo from Flt Lt Jim Hobbirk on RAF Central Flying School helicopter (instructor) instruction. This was most enlightening and suggested that the processes taught in the rotary world are much more considered and mature than those provided to fixed wing students.

E&T discussion included the divergence of UK Rules of the Air from those in Europe and the potential for students to need to learn two sets, at least in the short term pending UK adoption of Single European Rules of the Air (SERA). The Instructors Sub Committee expressed concern over the effect of NATS’s changes on the current IMC training syllabus training requirements and advised that lesson guides are being prepared for publication and that planning has stated for the next Instructors’ Forum in 2016. The February E&T cameo was a new venture that comprised a workshop in support of a PhD thesis on “Proactive Safety Management in Commercial Aviation: A Qualitative Framework.” This provoked some interesting and detailed thinking and generated sufficient information and ideas to require a follow-up session to refine the data. The approach was very different from a traditional Company meeting but it was refreshing for the Company members to see (and gratifying to support) a novel and academic approach to improving safety in aviation.

THE NEW AIR PILOTS COMMITTEE STRUCTURE

I have mentioned previously the concept of having globally unified, small, Working Groups (WG) to tackle aviation-related issues on which the Air Pilots needed to express an opinion. We have now devised and the Court have approved a structure that will enable that way of working while also retaining the benefits of the UK committees. More information will be available once the transition programme is established.
The City is an intriguing Institution with traditions and protocol established over the past 800 plus years. A few apocryphal rights associated with being a Freeman of the City of London are now well outdated, but should a new Freeman be tempted to invoke them they might well find them a thing of the past. The first is that a Freeman may be hanged by a silken rope; or to carry a naked sword in public. Another is that if the City of London Police finds a Freeman drunk and incapable, they will bundle him or her into a taxi and send them home rather than throw them into a cell. These along with the right to drive one’s sheep over London Bridge on a whim are now mainly symbolic. There is though still an annual sheep drive over the bridge generally organised by the Company of Woolmen.

Twice a year, the stentorian voice of the Common Cryer, a retired HAC Colonel, calling “SILENCE in the Hall” to quieten the Liverymen of the 110 Livery Companies of the Square Mile, followed by “Oyez, Oyez, Oyez......” is heard in Guildhall to commence the ceremonies of the Election of the two Sheriffs on mid-Summer’s Day and approbation for the Lord Mayor on Michelmas Day. Some might think it odd that the 760 Liverymen gather in Great Hall and up to 400 others (overflows) in the Old Library, who watch proceedings on audio visual, should attend an election the result of which in the case of the Sheriffs is known already if there are but two candidates for the two places. In the case of the Lord Mayor approval is given by the Livery to two names and the winner chosen by the Court of Aldermen. Why do Liverymen attend in such numbers? They come for the spectacle, the history, seeing friends, and in some cases with the older wealthier companies, a free lunch. Historically, the Air Pilots meet beneath Nelson’s Memorial and adjourn for lunch to join other Livery Companies at a larger Livery Hall. Along with the Honourable Company of Master Mariners, the only other Company to use the prefix 'Honourable', few members of the Air Pilots are London based in comparison to the other 110 Livery Companies. Regretfully, few Air Pilots attend these events. Besides the Election of Sheriffs and Lord Mayor, which only Liverymen may attend, there are several other events which any Air Pilot may attend or take part in. The details of these appear later in this article. They are open for all to visit but some need to be booked.

LIVERY COMPANIES

Today there are 110 Livery Companies, the youngest of which is the Worshipful Company of Arts Scholars, to whom the City’s Court of Aldermen granted livery in 2014. The hundredth, the Information Technologists, joined the fold 23 years ago in 1992. No 1 Company is the Mercers (general merchants), founded in 1428, although they go back to at least 1150. The Weavers can trace their history to at least 1130, yet they are now No 42. In 1515/16 the Court of Aldermen settled an Order of Precedence for the 48 Companies then in existence, which was based on the Companies’ economic or political power. The phrase ‘to be at sixes and sevens’ has its origins in the long running, at times lethal, dispute between the Skinners and the Merchant Taylors, which was resolved when in 1484 Lord Mayor Robert Billesden decreed that their numbers should alternate annually. The most senior 12 companies are referred to as ‘The Great Twelve’ and their Masters sit on the podium at the two elections. The crest of the Grocers’ coat of arms, is a camel. The Company dates from 1428 and their original business was importing spices, often delivered to London-bound ships by camel. The Grocers’ name was developed from “grossers”, selling in gross (wholesale). A list of the 110 Companies and a few Companies without livery is at http://81.130.213.163:8002/cgi-bin/lcl.exe.

LIVERY

The word has at least a dozen meanings, one of them “of the consistency or colour of liver”, another – and closer to the mark – is “fed and watered for a fixed charge”. In the City, however, the word means an approved trade and charitable association, and in the old days they would regularly wear a “livery” or distinctive costume, ie a uniform, insignia or symbol in a non-military context. Nowadays, livery is usually worn only by the senior officer(s) at a Court meeting or on special occasions such as the Election of the Lord Mayor.
THE SILENT CEREMONY

This is held on the day preceding the Lord Mayor’s Show, and is one of the most whimsical and anachronistic of the City’s traditions. Dating back many hundreds of years it takes place in Guildhall watched by Aldermen, the City Officers, Masters of Livery Companies and several hundred Liverymen. The ceremony takes place with much pomp and pageantry in a carefully choreographed piece of theatre undertaken with a solemnity befitting the occasion. The Lord Mayor-elect swears the oath of office and thereby undertakes to safeguard the silver and furniture at Mansion House, signing for the “plate”. The outgoing Lord Mayor then moves to the left and beckons the incoming Lord Mayor to his seat, the latter donning a tricorn hat at the precise moment the other removed his – the hat symbolising the official transfer of the mayoralty and the power that accompanies it.

There then follows a series of presentations to the new Lord Mayor of various symbols of office all made with a series of reverences, three steps, bow, three steps bow etc. All the symbols are presented first to the outgoing Lord Mayor and then touched by the Lord Mayor to signify receipt and transfer before being put down on the table. The whole procedure is then reversed with another series of approaches, but this time the objects are removed with the officers walking backwards, still reverencing every three steps. It is an ancient process all watched by hundreds in deathly silence. The purpose one reflects is to transfer the responsibility for the treasures as well as to transfer power, each item of value being sighted by the incoming Lord Mayor. The Ceremony concludes with congratulations being made in an orderly manner to the Lord Mayor, those doing so forming an endless chain and each shaking hands with the new Lord Mayor. The whole ceremony lasts no more than twenty minutes but is a piece of carefully choreographed theatre, re-enacted every year and is well worth watching.

The final necessary piece of ceremony reputedly takes place totally out of sight in the Mayoral limousine on the way back to Mansion House. The tradition is that the Swordbearer removes his fur hat and retrieves the key to the seal of Christ’s Hospital. It is handed to the outgoing Lord Mayor, who passes it to the incoming Lord Mayor, who returns it to the Swordbearer, who promises to “keep it under his hat”.

This ceremony is a very popular event; so much so that last year your author was unable to get a ticket which is obtained from the Air Pilots office.

PANCAKE RACE

In 2004 The Worshipful Company of Foulsters inaugurated the City’s inter-livery pancake race. The original participants were Livery companies in some way associated with the making of pancakes with invited teams from the Mansion House and Guildhall. The number of participants has now expanded and the event takes place each year in Guildhall yard at midday on
Shrove Tuesday.
It is a colourful event which includes competitors running in their regalia and/or fancy dress. Each team consists of four competitors who compete for the Trophy - frying pans are awarded to the winner of each class final.

Traditionally the Gunmakers start each heat with a bang, the Clerk to the Clockmakers is responsible for the accuracy of the timing, the Fruiterers provide lemons, the Cutlers plastic forks, the Glovers white gloves worn by each runner, and the Poulterers the eggs for the pancakes. A recent welcome additional attraction has been a specially commissioned piece sung by the Musicians Company.

Such is the appeal of the event that it has been widened to include Livery Companies and Corporation Departments such as The Old Bailey, preferably with a relationship (however specious) to the making of pancakes. The event has been sponsored for some years by the City caterers, The Cook and The Butler who also sponsor www.LiveryCompanies.com, an index of the Masters and Clerks of the several London City Livery Companies.

**CITY BRIEFINGS**

These are organised by the City Livery Committee and are aimed particularly at new Liverymen and Freemen. Partners are also welcome, as are Court Assistants and Liverymen of longer standing, who have not previously been to a Briefing.

There is a short introduction to the work of the Corporation, especially the relationship with the Livery Companies. The presentation is normally given by an Assistant Town Clerk and a member of the Livery Committee. There is opportunity to ask questions of the speakers and the Briefing is followed by a light finger buffet, which provides the chance to mix with other Liverymen and Freemen.

Commencing at 5pm they finish around 7.30 - cost £15 including the reception. Highly recommended if you want to better understand the connection of the Livery to the Mayoralty and the City of London Corporation. There are four a year and application details are contained in the Clerk’s monthly electronic briefing.

For those considering standing for the Court, or once they have been elected, there is an annual Wardens and Court Assistants course also organised by the City Livery Committee. It is a full day and again highly recommended. It is normally held in the Autumn - details via the Clerk.

**MANSION HOUSE TOURS**

Qualified City of London guides run a weekly tour of Mansion House on Tuesdays, except in August. Tours are limited to 40 people and operated on a first-come, first-served basis. The tour lasts for one hour and it is always best to check in advance that the tour is going ahead as other events at the Mansion House may cause changes in the tour schedule. Cost £7 (2014 rates).

**GUIDHALL TOURS.** The tour covers the history of the Guildhall, the governance of the City of London and many of the historical figures connected with the City, including Dick Whittington. This is where the original hustings (a meeting of the household) took place. The names of all the Lord Mayors of London are painted in the stained glass windows all around the great hall. Cost £7 (2014 rates).

Note: If the tours take place on the day that the Court of Common Council meets, visitors are welcome to stay for the Court meeting in the public gallery of Guildhall.

There are FREE tours of the Guildhall Art Gallery and the Roman Amphitheatre every Friday. These tours, and many others, some of which are around £7, may be found at http://www.cityoflondonguides.com/ and http://footprintsoflondon.com/

For both new and existing Freemen, there is an excellent new publication The City of London Freeman’s Guide which is a mine of useful and interesting information, which may be obtained directly from the office of the Worshipful Company of Information Technologists at £10 or £12.50 by post - a Christmas/Birthday present? Complimenting this book is Mellings Discovering London’s Guilds and Liveries again available from the Guildhall bookshop or the usual places for less than £5.

Our Company, now some 2,130 strong, is continually looking to clothe suitable candidates into the Livery. The Livery Committee, chaired by a Warden, would welcome nominations/applications from within our membership for due consideration - nominations to the office please. Members may self sponsor themselves if they feel that their attributes are unlikely to brought to the attention of the Court.
My story is about the early Harrier years and I will describe some of the background, cover in detail the work of the Harrier Conversion Team (HCT) and then outline Harrier GR3 operations.

A brief look at the background then. Early attempts at VTOL mostly seem strange today and range from early American projects involving tail-sitters with powerful turboprops (easier to take off than land!) to jets held up by what looks like a fishing rod; the French even came up with what looked like a VTO beer barrel! Ultimately flat risers became the norm and the French produced a Mirage 3 with lift engines - their contender for NATO Basic Military Requirement 3 (NBMR3) which was a requirement for a supersonic VSTOL ground attack fighter. The practical breakthrough for the UK was provided by the twin-engined Thrust Measuring Rig, known as the 'Flying Bedstead', which was quite large and the Short SC1 - the Rolls Royce proposal with lift engines. However, rival collaboration between Hawker and Bristol Siddeley engines produced Stanley Hooker and Gordon Lewis's innovative development of the Pegasus engine with its four moveable nozzles which led to the P 1127. The success of the P1127 resulted in an order for 9 aircraft called the Kestrel being produced for a Tri-Partite Squadron evaluation programme which was run from RAF West Raynham. The squadron personnel consisted of 4 Americans (USAF and Marine Corps), 4 British and 2 Germans, one of whom was Colonel Barkhorn, the second highest scoring Luftwaffe fighter ace from World War 2 with 301 kills. After crashing one of the Kestrels he was heard to walk away muttering "I think that makes it 302".

As the Kestrel continued through its flight trials, NATO came up with NBMR 3. This became something of a major international competition and the Bristol/Hawker team responded with the P1154 powered by a Plenum Chamber Burning - a form of re-heat - version of the Pegasus - the BS100. Although the 1154 was the technical winner, there was no funding and NBMR 3 fizzled out. The RN and RAF attempted for another 2 years to agree on a joint specification but in 1964 the incoming Labour administration cancelled the project.

However, all was not lost and the story continued with the introduction into RAF service of the Harrier GR1 which was a minimalist development of the Kestrel to an operational aircraft to meet Air Staff Requirement 384. The GR1 had the Pegasus 6 engine with 19,000 lbs thrust; a significant improvement over the 15,500 lbs of the Pegasus 5 in the Kestrel. The GR1 also had the Inertial Navigation and Attack System complete with a Weapon Aiming Computer, from the TSR 2 /P 1154 programmes and this, with the other operational equipment, gave quite a crowded cockpit. It also had an excellent Head up Display which was new to RAF aircraft.

A reminder that, for jet-borne flight, the engine's 4 nozzles could be rotated together to vector the thrust from fully aft to about 15 degrees forward of the vertical. The nozzle actuation system was operated by a single lever just inboard from the throttle: forward for the nozzles fully aft, back to the vertical for hovering and further back for the braking position. Control in jet-borne flight was by reaction controls, situated at the extremities of the aircraft, fed by air bled from the last stage of the compressor and controlled by shutters connected to the associated flying control surface.

The GR1 was supersonic in a dive, would go about 500 nms at low level and carried two 30mm Aden cannons and a variety of weapons, fuel tanks and a reconnaissance pod on its 5 pylons - a fully operational combat aircraft. The Harrier entered RAF service in April 1969 and was immediately entered for the Daily Mail Air Race. The race was to commemorate the 50th anniversary of the first crossing of the Atlantic by Flt Lts Alcock and Brown in a Vickers Vimy,
and was from the top of the Post Office tower in London to the top of the Empire State Building in New York. On 5 May 1969 Sqn Ldr Tom Lecky-Thompson ran from the top of the Post Office tower in central London to a helicopter which took him to St Pancras railway station where he took off vertically in a Harrier GR1 (XV 741). He refuelled at 0.88 Mach from a Victor tanker, landed vertically at Bristol Basin in Manhattan and roared through New York on a motor bike to arrive at the top of the Empire State Building in the winning time of 6hrs 11 mins 57.15secs. Sqn Ldr Graham Williams flew the return leg on 9 May (XV 744) using an E-type Jaguar in New York and landed in a cloud of coal dust at St Pancras before a helicopter and motor bike took him to the top of the Post Office tower just 5hrs 49mins 58secs after leaving the top of the Empire State Building. This gave great publicity to the Harrier, particularly in America where it was their first real exposure to the aircraft. The Air Race was the only time that the ferry tips were used. These 18 inch extensions were bolted on to the wing tips - 'cheap variable geometry' John Fozard called them - and gave improved cruise performance at height but carried limitations that precluded their use for normal operations.

While all this excitement was going on, the introduction of the Harrier into RAF service was taking place at the Hawker Siddeley Aviation airfield at Dunsfold. The HCT consisted of 4 pilots, Bruce Latton, Richie Profit, Dick le Brocq and myself, all with Hunter and instructional backgrounds specially selected by weight - 7 1/2 cwt in all! We began conversion in January 1969 under the watchful eye of Past Master Duncan Simpson, then the Deputy Chief Test Pilot at Dunsfold. The ground training phase lasted 10 weeks and included systems courses at Dunsfold, Rolls Royce, Ferranti, and Spector Aviation for the HUD, Miles Aviation for the simulator and the Royal Navy Weapons School at Whale Island for computerised weapon systems. Briefings on V/STOL aerodynamics were given by John Fozard - then Chief Designer Harrier. From all this the lectures for the subsequent HCT ground school were devised and prepared.

The flying phase started with a short Hunter refresher at RAF Chivenor and a bespoke helicopter course at RAF Ternhill on the Whirlwind which gave 6 hours of hovering and transitioning experience. The Harrier course involved about 8 hours flying in the single seat GR1 - it was about 2 years before the two-seat trainer or the simulator would...
The Harrier Conversion Team, Richie Profit, Peter Dodworth, Duncan Simpson, Dickie Brog, Bruce Latton

enter service. The conversion started with a conventional flight, chased by Duncan in a Hunter, which culminated in a 160 knot conventional landing, the most dangerous activity of all in a Harrier!

Vertical take-offs and landings followed and then a series of sorties transitioning to and from vertical flight. This exercise was carried out with the 4 pilots being flown round the circuit at Dunsfold by Duncan in a Dove - 'Take 40 nozzle about here, flap here, turn over this farm etc'. Short take-offs and landings were the final discipline to be covered from both runway and grass. Subsequently, students started with short landings then VTOL and transitions leaving the hazardous conventional landing until later.

Conversion finished with vertical landings on a 50 ft pad in the middle of a wood near RAF Boscombe Down. This was fairly bold as the final approach was all the way down just over the trees using a couple of small panels in the trees at 12 o'clock and 3 o'clock as hovering cues and the pad was only sighted from about 15ft up. Subsequently 75 ft pads were normally used.

On 16th May 1969 4 Harriers were flown to RAF Wittering and the existing Hunter squadrons started to convert, a flight at a time. The first flight of No 1 Sqn included Sqn Ldr 'Porky' Munro who had been on the Kestrel Evaluation Team. The VTOL and transitions were done on detachment to RAF West Raynham where better quality concrete pads - built for the Kestrel - were available. There followed a further 5 similar courses for Nos 4 and 20 Squadrons, the future staff of the OCU and the US Marine Corps.

As a result of the HCT's experiences, the basic conversion was now twice as long. Without a two-seat trainer extra sorties were needed to consolidate the exercises The Harrier was not intrinsically difficult to fly but the acceleration was fierce and the pilot needed to think all the time about the correct control to use. Although the use of the nozzles was intuitive, the need to apply substantial power rather than pull the control column back to control rate of descent was not. Similarly it was vital in semi jet borne flight to eliminate any yaw. At certain angles of attack and yaw, the induced roll could exceed the power of the roll controls and a number of aircraft were lost through this. Sorties were chased in 2 faithful Hunters - named 'Fred' and 'Nuts' by Duncan who had not yet adapted to the 'new' Phonetic alphabet - and also occasionally in Harriers. Instruction was also given from a caravan situated by the VTOL pad or STOL strip. With a conversion to the INAS, weapons, recce and Air Combat Training (ACT) now included, the course had grown to about 4 months long. The HCT gave all the ground school lectures from airframe/engine systems to the operation of the INAS, WAC and HUD and even constructed all the classrooms and training aids.

The students all found the aircraft exhilarating with so many new activities from VSTOL to INAS Navigation, live weapons training, recce, landing in fields and woods and ACT using the nozzles.

With the arrival of the Harrier T2, the two-seat trainer, in October 1970, No 233 OCU formed, absorbed the HCT and started full operational conversions for first tourists. The T2 was a fully operational aircraft and a very effective trainer. The arrival of the Pegasus 10 with an increase of 1500lbs thrust conveniently offset the T2's extra 1400lbs weight. Towards the end of 1972 the early Harriers started to be converted to the GR3 with the Pegasus 11 with 21,500lbs thrust and, subsequently, equipped with the Laser Rangefinder and Marked Target Seeker in the elongated nose. The GR3, with the associated T4, became the standard Harrier in RAF service until the advent of the GR5 and T10.

The OCU courses lasted 6 months and started with a week's helicopter flying. They involved considerable ground school and simulator time and about 75 hrs flying. The OCU was divided into a Basic and an Advanced Sqn. The Basic Sqn did the VSTOL, instrument, formation and night flying, and ACT, while the Advanced Sqn did the low level navigation, attack profiles, recce and a lot of weapons training. The OCU training was geared to the concept of operations that developed. The normal way of operating from field sites or airhead dispersals was to do a short take off from taxiway, road, metal strip or grass and then, with weapons and most of the fuel gone, to do a vertical landing onto a metal pad or a rolling vertical landing on a strip. The aircraft operated mainly at low level and would primarily use 30mm cannon, SNEB rockets and cluster bombs against armour and other targets as well.

Landing on the 50 ft pad in the wood
as conducting recce with the port oblique camera or recce pod. All of these disciplines were taught at the OCU and specialist courses were run most years to teach experienced pilots to become Weapons Instructors, Recce Instructors or Instrument Rating Examiners. Overall, both the single seat conversions and full OCU courses were very effective training programmes that were geared to the changing requirements of the operational squadrons. The success rate of students was similar or better than comparable operational training on other aircraft and the VSTOL dimension did not become the problem many had forecast.

The RAF Germany Harrier Force became highly skilled at field ops. STOVL and 40 minute sorties gave a rapid sortie rate. Pilots remained in the cockpit for up to 6 sorties at one go and the aircraft each flew up to 10 sorties a day. No 1 Squadron, based at Wittering, used a similar concept on the flanks of NATO but dispersed around an airhead. Subsequently, Harriers were deployed to Belize and in 1982 were sent via Ascension Island and tankers to the carrier HMS Hermes during the Falklands campaign (no en-route diversion!). They also operated from a strip at San Carlos, were modified to carry Sidewinder AAMs and delivered the first RAF Laser Guided Bombs in anger against Argentine artillery near Port Stanley.

In conclusion, all in all it was rather Wagner's Music - better than it sounds and the aircraft glided like a half full gin bottle!

**Editor’s Note**

Peter Dodworth joined the RAF in 1961 after reading Physics at Leeds University. He flew Hunters with 54 Squadron and then instructed on the Gnat at RAF Valley and the RAF Central Flying School. In January 1969 he started a long association with the Harrier as the Flight Commander of the Harrier Conversion Team before commanding the Advanced Squadron of the Harrier Operational Conversion Unit at RAF Wittering. After tours as the Harrier Staff Officer in RAF Germany, OC Operations Wing at Wittering, Air Commander Belize in Central America, and the Directing Staff at Bracknell, he commanded RAF Wittering from 1983 to 1985. His more senior appointments include Director Personnel at MOD, Defence Attache and Head of British Defence Staff Washington DC, and Senior Directing Staff (Air) at the Royal College of Defence Studies. He retired from the RAF in 1996 and then spent 4 years in Industry. He joined the Honourable Company in 1999 and was clothed as a Liveryman in 2004.
Visit to the RAF Museum’s First World War in the Air Exhibition

BY THE EDITOR

On 29th January a party of 19 Honourable Company members, led by the Master and the Master Elect, were privileged to experience a personally guided tour of the recently opened First World War in the Air Exhibition at the RAF Museum, Hendon. The Museum has been affiliated to the Honourable Company since 2004, and we were welcomed by the Museum’s CEO, Maggie Appleton, Karen Whitting the Director of Public Programmes and David Keen, the Access Development Manager (and our expert guide for the visit), and his staff. Our tour started in the Watch Office next to the Grahame-White factory building and in Claude Grahame-White's original office. Here David explained the history of this important building.

Grahame-White had built his factory as the first purpose-built aircraft construction factory in the country before the outbreak of the First World War. It was requisitioned by the government on the outbreak of war and ownership never returned to Grahame-White. After the War he sought compensation from the government, but it wasn’t until 1925 that matters were settled and Grahame-White, feeling that he had not been treated honourably, left the country. The building subsequently saw many different uses at RAF Hendon, including that of Watch Office and Air Traffic Control, until it fell into disuse and decay. It was situated on land acquired by a property development company some 400 yards away from its present position. The developer was willing to dismantle it and move it to the Museum’s site, but as it was a listed building the team had to work closely with English Heritage. It was then rebuilt using original materials wherever possible.

The interior of Grahame-White's office was a fantastic example of the quality of restoration and replication. It appeared completely identical to a very early photograph of the room that we were shown. There were some delightful touches - the logs in the fireplace were off-cuts from the factory, as they were in Grahame-White’s day; there were newspapers and letters on the desk exactly as in the photograph. David explained that in their search for accuracy and to give the impression to visitors that Grahame-White might have just left the room, the tea cup on his desk was given tea stains. Unfortunately an equally fastidious cleaner had removed them! The blotter on the desk even had Grahame White's signature on it, naturally in reverse, obtained by inking over one of his signatures on a copy of an original document then rolling the blotter on it. The room was an amazing example of meticulous restoration and replication.

We then moved on through a room commemorating Claude Grahame-White's contribution to early aviation in this country, to the main aircraft construction hall, passing on our way in the original electrical distribution panel used in the factory, where apparently Grahame-White could monitor excessive use of this precious commodity. David explained in detail the various exhibits, starting with a 1911 vintage Bleriot XXVII monoplane built as a racer and looking remarkably speedy with its builder's early attempt at streamlining. We moved on to an Avro 504, many of which were built in this factory, and a Rolls-Royce Eagle aero engine, the first example of many V configuration liquid cooled aero engines named after birds made by this famous company. A considerable amount of German technology was used in this engine as, on the outbreak of the war, a Mercedes racing car in a London showroom was despatched to Rolls-Royce at Derby where much was copied. Apparently, when a Rolls-Royce engine later fell into German hands in a downed aircraft this was discovered and Mercedes considered taking legal action! We saw an
The Cauldon G3 trainer, which looked almost incapable of flight but was used as a trainer—it was claimed to be so safe that if you wanted to kill yourself in it, you would need to take a pistol. There was a Vickers FB5 suspended from the roof, a pusher-engined aircraft that was the first attempt to produce a fighter with a forward-firing gun before the invention of the interrupter gear. We moved on, past a Sopwith Triplane, to a display cabinet that held many artefacts associated with Baron von Richthofen, the famous Red Baron. These included his flying helmet, his small blue dog mascot and a section of the fabric, somewhat faded with time, from his red Fokker Triplane. All these items had been donated to the Museum by von Richthofen’s relatives. The RFC employed many despatch riders in France, using motorbikes, one of which was on display. Evidently many of the riders were female members of the RFC and these machines must have presented quite a challenge to all, as the braking facility was no more than that which could be found on contemporary pedal cycles, namely, rubber blocks on the wheel rims. There was an original SE5a, which was a very successful fighter aircraft. This example survived the war and was used for sky-writing over London and New York. An example of the RFC’s most successful fighter, the Sopwith Camel, was suspended from the roof, as was a suitably menacingly black coloured FE2b bomber. The most technically advanced German fighter, the Fokker DVII, was also displayed. This biplane had no rigging wires at all and even the plate joining the two wheels of the under-carriage was aerodynamically shaped to relieve the weight of the wheels in flight. It was the only aircraft specifically mentioned in the armistice documents for hand-over to the Allies.

Also on display were two flight-worthy replicas of an Albatros and an RE8, both built in New Zealand and, David hinted, maybe one day they might fly again. After a masterly explanation of the technology of the rotary engine, using a Bentley BR2 engine with cut-away components as an example, David’s guided tour concluded by the huge sliding doors that were installed to allow the enormous Handley Page V1500 four-engined
bom ber to be removed from the factory, although in fact none of these aircraft were actually built here before the war ended.

The Master thanked David for his fascinating and instructive tour which was endorsed by all members of the Company present. We were then left to our own devices for the rest of the day to tour the other parts of the Museum, which is about to undergo a major programme of modification in preparation for the celebration of the RAF's 100th Anniversary in 2018. Apart from one or two minor niggles - Assistant Robinson was upset that the JP5A used by HRH Prince Charles at Cranwell during his flying training bore no record of it, and your editor could not understand why the two Hunters on display had their nose wheel doors closed with the landing gear down - the quality and rarity of the exhibits was outstanding. Of particular note for your editor was the magnificently restored fuselage of a Westland Wallace that he used to play in as a child when it lay abandoned on the edge of the North Airfield at Cranwell.

Our visit was further enhanced by the huge crowd of people in the “Bomber” exhibition hall sitting and waiting patiently to take part in the popular TV programme 'Flog It' that was being recorded in the Museum.

In conclusion, we were privileged to have had an exceptionally interesting and instructive day at the RAF Museum and our thanks go to Maggie Appleton, David Keen and the Museum staff for their efforts, also to the Master Elect and David Curgeonven for arranging the visit.

Footnote:
The RAF Museum is immersed in a major development programme ahead of the RAF Centenary. What we saw in our visit was the first Phase and it was just an example of what will follow.

The Museum would welcome our closer engagement and Membership, and to this end I include an application form at the end of the magazine. Regardless, the Museum is excellent and well worth a visit.
The Airbus A350 XWB is the new long-range twin-engine airliner which had its first flight in June 2013 and received its type certificate in September 2014 after a busy but successful 15-month flight test campaign. The A350-900 is around 67m long, has a 65m wingspan and in a typical two-class cabin layout can fly 315 passengers up to 7,750 nautical miles powered by the latest Rolls-Royce Trent XWB engines. But enough of statistics, I'm sure you are much more interested in what's new at the sharp end. Having been involved as a test pilot throughout the development of the aircraft, I would like to give you a brief introduction to the new features of the A350 cockpit, as well as some background into how - and why - it has evolved to its present state.

**Back to the beginning**

The A350 XWB cockpit has its origins in the first Airbus fly-by-wire (FBW) airliner, the A320 (see Fig.1). This aircraft introduced the side sticks for aircraft control, the non back-driven thrust levers for engine and auto thrust management, an electronic instrument suite (glass cockpit) comprising primary flight display (PFD), navigation display (ND), and electronic warning and systems displays known in Airbus parlance as ECAM (electronic centralised aircraft monitoring). The FBW system allowed Airbus to introduce flight envelope protection to help avoid overspeed, stall, and unusual attitudes. And most importantly, the use of side sticks allowed installation of a sliding table in front of each pilot, greatly facilitating the essential task of meal consumption (and occasionally paperwork).

The larger, long-range aircraft, the A330 and A340, followed on and used a virtually identical cockpit to the A320, establishing the concept of a common cockpit, unique to Airbus. This gave the significant operational and training benefit of easy transition from one type to the other. But as time goes on, maintaining strict cockpit commonality carries the risk of stifling development and innovation; and by the time of the launch of the A380 some important decisions had to be made concerning the cockpit design.

For the A380 cockpit there were basically three choices: change nothing and reuse the A340 design to retain complete commonality; change a lot, and do something really radical; or keep the basic cockpit philosophy but add new systems and interfaces where justified.

As is often the case, the prudent path was the compromise - option three. And so the A380 cockpit (see Fig.2) introduced a number of new features such as the eight large screens (6x8in instead of 6x6in) allowing new formats for flight displays, ECAM, and flight management system (FMS); a cursor and trackball interface as interface with the displays; an integrated on-board information system (OIS) with its dedicated keyboard installed in the sliding table; a consolidated surveillance system bringing together weather radar, transponder and GPWS. However, many of the basic elements of the common cockpit were retained such as the side sticks and thrust levers, the FBW and protections, the PFD and ND formats, the autopilot modes and philosophy (push for 'managed', pull for 'selected'). Thus, the A380 cockpit, whilst not identical to its predecessors, is one that is instantly recognisable to any Airbus pilot, and experience has shown that transferring to the new cockpit is straightforward and intuitive.

**In with the new**

So, to the A350. Initial discussions on cockpit design were somewhat reminiscent of the A380 debate, with some arguing for a reuse of the A330 layout given that many operators would want to integrate the A350 with existing fleets of A330s. However, by this time the A380 was at the end of its flight test campaign and the benefits of many of its cockpit innovations were becoming obvious. In particular the large screen formats and the cursor trackball interface were clear improvements compared to earlier cockpits and also gave considerable scope for further development in cockpit integration. Therefore the A350 cockpit design has been based substantially on the A380, but taking into account both advances in technology and lessons learned from the A380 to add a number of improvements and new features.

At first sight the A350 cockpit (see Fig.3)
looks very similar to the A380, but there is actually a significant difference in that the six main screens are twice the size of the A380 screens (12x8in instead of 6x8in). This is not immediately obvious because in most cases two display formats are shown on a single screen (for example PFD and ND). However, the use of six identical large screens allows the full integration of the outer screen, normally used for the OIS, with the rest of the cockpit. Not only does this enhance redundancy in the case of a screen failure, but it also allows the pilots to temporarily display the OIS on one of the centre screens.

This is particularly beneficial when, for example, both pilots want to refer to a chart or a page from a manual as they can look together at the same screen as opposed to having to concentrate on their individual outer screens (see Fig.4). Another big advantage of the common screens is that the cursor trackball interface can be used on the OIS rather than just the dedicated keyboard in the sliding table; for some applications such as slewing a chart, using the trackball is much easier than the keyboard.

The main Interfaces

One of the main interfaces between pilot and aircraft is the flight management system (FMS) which in previous aircraft is hosted, along with other functions, in the multifunction control and display unit (MCDU). The MCDU has a relatively small screen and is operated using line select keys. For the A380, as touched on earlier, the MCDU has been replaced by a large screen multifunction display (MFD) and is operated using the cursor and trackball. Using large screen formats, drop-down menus, and edit boxes has made the task of manipulating all the FMS functions much easier and more intuitive. That said, a lot of work was needed during the development of the A380 to define the page layouts and interactions for all the FMS functions and, although the screen layout is slightly different, we have retained virtually identical pages and functionality in the A350. Fig.5 shows detail of the MFDs and keyboard and cursor control device. Another development from the A380 which has been retained in the A350 is the use of the extra space available beneath the PFD and ND. A vertical display is added beneath the ND which shows a vertical cut through the terrain and obstacles ahead of the aircraft, or on the planned route. This, combined with a plan view of terrain on the ND, gives a very good awareness of the terrain environment around the aircraft. Beneath the PFD is a display of flap, slat, speed brake, and landing gear position such that these indications, which have a direct relevance to the piloting of the aircraft, are grouped together with the PFD (see Fig.6).

The cockpit of the future

A major change in cockpits over the past few years has been the move away from paper documentation to electronically displayed charts and documents. The A350 follows this trend in that it has a fully integrated OIS as well as on-screen access to checklists and abnormal procedures, including those normally found in a quick reference handbook (QRH).

The OIS, which can be displayed on the outer screens or on one of the centre
screens, receives its data from either the avionics domain or a docked laptop. Charts, performance applications, or aircraft manuals for example are hosted in the laptop which can also be loaded with proprietary company documents such as operations manuals and route briefing guides.

The avionics world houses company communications functions (ACARS) as well as the technical log book and some maintenance applications. The avionics and open worlds are separated by a firewall to avoid any risk of the laptop corrupting the avionics but, for the pilot, a simple toggle switch allows them to easily swap from one domain to the other. On the other hand, there is no limitation in sending data from the avionics to the laptop applications. So, for example, an aircraft system failure alerted by an ECAM message will generate a shortcut in the OIS to all the relevant pages in the aircraft manuals, such as MEL, system description, and abnormal procedures.

**Advanced Communications**

The world of communications has also advanced significantly in recent years. The A350 has numerical keypad-operated radio management panels (see Fig.7) hosting VHF, HF, SATCOM and squawk, such that frequencies can be typed directly into the standby window – particularly handy for those like me who now have trouble remembering six-digit frequencies whilst simultaneously grappling with rotary selectors and replying to ATC! But the biggest advances have come in the form of data-link communication with ATC. The A350 has a dedicated zone on one of the central screens known as the mailbox, where data-link messages from ATC are displayed and can be actioned by either pilot using the trackball and cursor. Outgoing clearance requests, position reports and the like can be prepared in an ATC COM page in the MFD and then transferred to the mailbox for sending to ATC.

It is well known that ground operations with large aircraft at busy and complex airports can be challenging. The A350 has an airport navigation function which can be accessed at five different range scales on the ND (see Fig.8). This allows the crew to see the airport layout in increasing detail right down to individual parking stands and, quite apart from being a great help in finding and following the correct taxi routing, it is a significant safety net for avoiding runway incursions and assisting correct runway identification. The aircraft also has an optional taxi camera system (similar to A340-600 and A380) which allows a pilot to replace the PFD with a hybrid video image showing nose gear and main gear; this feature is also very useful for monitoring ground activity around the aircraft at the gate.

**Flying the A350**

In summary, I hope this has given you a feel for the A350 cockpit in terms of both the new features and the commonality with other Airbus models. But what is it like to fly and to operate? It is probably best to separate the two questions because in terms of actually flying the aircraft, whether hand-flying or on autopilot, we have tried to keep the handling very similar to previous aircraft, particularly the A330. The result of this has been that the A350 has been awarded a 'common type rating' with the A330, meaning that full-flight simulator training is not required to transfer from A330 to A350, and that pilots qualified on both types will have a single licence endorsement. This could be particularly beneficial for those airlines that plan to integrate the A350 into an existing A330 fleet.

However, where pilots should see a significant difference is in operating the aircraft. The new features that I have described have been designed to make it as easy as possible for the pilot to manage all the increasingly complex tasks associated with getting an aircraft safely and efficiently from A to B. Have we achieved that? The best judges are not test pilots but the line pilots who will soon be flying the A350 XWB in service. One airline pilot told me after a recent demonstration flight: “I was pleasantly surprised at how easy the aircraft was to fly. Treating it like an A330 works! The Airbus philosophy shines through with excellent updated interfaces.”

This reaction has been echoed during a number of other demonstration flights, so the omens are good. But of course, although as test pilots much of our time is spent trying to ensure that our customer pilots are happy with a new aircraft, the commercial success depends on the passengers and accountants being happy. That we will see over the coming months.

Peter Chandler is the Airbus chief test pilot, based in Toulouse. A career in the RAF as a fast jet pilot and test pilot was followed by a spell as a long-haul airline captain with Virgin Atlantic Airways. He joined Airbus in 2000 and was involved in all aspects of the cockpit design of both the A380 and A350, and captained the first flight of the A350 in June 2013.