



AirPilot

DECEMBER 2019 ISSUE 36





AIR PILOT

THE HONOURABLE
COMPANY OF
AIR PILOTS
incorporating
Air Navigators

PATRON:
His Royal Highness
The Prince Philip
Duke of Edinburgh KG KT

GRAND MASTER:
His Royal Highness
The Prince Andrew
Duke of York KG GCVO

MASTER:
Malcolm G F White OBE

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Incorporated by Royal Charter.
A Livery Company of the City of London.

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Except where specifically stated, none of the material
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of the Court of the Company.

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Diary

DECEMBER 2019

4th	AST/APT	Air Pilots House (APH)
12th	GP&F	APH
	Annual Carol Service	St. Michael's, Cornhill

JANUARY 2020

15th	T&A committee	APH
22nd	Instructors' Working Group	APH
23rd	GP&F	APH
	Court & Election Dinner	Cutlers' Hall
28th	Lunch Club	RAF Club
30th	Technical Committee	APH

FEBRUARY 2020

12th	Archives lecture	APH
20th	GP&F	APH
24th	Pilot Aptitude Testing	RAF Cranwell

VISITS PROGRAMME

Please see the flyers accompanying this issue of Air Pilot or contact Liveryman David Curgenven at visits@airpilots.org.

These flyers can also be downloaded from the Company's website.

Please check on the Company website for visits that are to be confirmed.

GOLF CLUB EVENTS

Please check on Company website for latest information

Cover photo: Chief of the Air Staff Air Chief Marshal Mike Wigston addresses the
Trophies and Awards Banquet, October 2019

A message from your Editor...

Just after the October issue went to press, there was a synchronicity laden with irony. The European travel behemoth, Thomas Cook, went into liquidation on September 23rd. On that day the UN Climate Change Summit started in New York.



The broadcast media in the UK went overboard with a welter of vox pop interviews of passengers. “Gutted”, “devastated” were the typical responses of the stressed, fatigued, sunburned faces overseas. Those whose departure from the UK had been annulled were simply stressed. But to take a harsh and dispassionate view of this: the demise of Thomas Cook would not have come as a surprise to any passenger, actual or potential, who had read the financial pages of newspapers for the last year or two. Hamstrung by first its acquisition of MyTravel, and later its purchase of Co-Operative Travel, the group was a juggernaut descending Mount Ventoux with no brakes. The crash was a question of when, not if. Consumers now see travel as a largely risk-free purchase: they will be transported from home to a sun lounger at San Antonio with the same facility (and a slightly shorter timescale) than a package from Amazon Prime drops onto their doormat after a click or two on their keyboard a few hours earlier. The spirit of adventure has dissipated.

Secondly, planning for the mammoth rescue operation must have absorbed a lot of resource at the CAA. (If their press office were more on the ball, I could have informed you of how much!) The execution of the rescue plan appears to have been broadly successful, and the CAA is to be congratulated on its efficient operation.

But the irony? Examples of the beleaguered passengers were a family group who had flown out to the Med for a wedding, another family who had flown to Lanzarote to spread their father’s ashes, a stag party stranded in Crete, and so on. Call me a curmudgeonly Yorkshireman (and many do!), but when I was a lad most of these events essentially took place within a bus ride of one’s home. How much commercial air transport is now for reasons if not frivolous, then at least very optional? The same news bulletins that featured talking heads at Gatwick or Palma, went on to feature an impassioned Greta Thunberg (and a dispassionate Trump) at the UN.

We have had another very successful Trophies & Awards Banquet – congratulations to the Committee that put in the hard yards. This wonderful evening is a missile with multiple warheads: it enables the Master to reciprocate hospitality from other Liveries; it provides him and us with a platform to showcase our dynamic Company; it has become one of the most important ways in which the aviation community can acknowledge and reward the most courageous, diligent, and highly skilled in our fraternity; it enables us to hear from usually the head of civil or military aviation in the UK, or, if not, a major international aviation superstar; and it is an opportunity for reunions and conviviality.

On all these measures the 2019 T&A hit its targets.

Paul Smiddy - Editor

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News Round Up

ARGENTINE REUNITED WITH HIS STEED

Lt Col Francisco 'Pancho' Ramirez, formerly of the Argentinian Army, last saw his UH-1 Huey helicopter at Port Stanley in 1982. Former Royal Navy pilot Bill Fewtrell had flown Sea Kings in the South Atlantic with 846 Naval Air Squadron in 1982, serving initially on HMS Hermes and the RoRo ferry Norland, which carried 800 men of 2nd Battalion Parachute Regiment and men of 848 Naval Air Squadron to San Carlos on 21 May. Bill also flew shotgun with Royal Marine liaison officer Col Peter Reynolds on many missions. In 2004 Peter was the British Defence Attaché in Buenos Aires and had met 'Pancho' Ramirez there and they had become firm friends. Pancho had flown G-HUEY with the 601 Combat Aviation Battalion in Port Stanley. He later expressed an interest in seeing the helicopter again when he visited England.

Bill had identified that the aircraft was now owned by Freeman Mark Fitzgerald. The trip finally came to fruition in October when Pancho along with his wife and daughter (who had flown in from Texas) visited North Weald. Peter, Bill and their families came along too. Mark Fitzgerald later took Pancho and his wife for a short flight in the helicopter.

AIRFIELD CLOSURES

Old Sarum finally closed on 31st October 2019.



THE TOUR OF NORTH AMERICA BY RAFAT

Following on from the photos in the last edition of AP, the Reds have had further interaction with Company members in the final phases of their North American Tour. Upper Freeman Captain John Daly captured some typically superb images at their display at the Great Pacific Airshow at Huntington Beach, CA, at the beginning of October.



LIVERYMAN ALISTAIR BEATON REPORTS ON THE CANADIAN SEGMENT OF THE REDS' TOUR

The Royal Air Force Aerobatic Team visited British Columbia, Vancouver and the Provincial Capital, Victoria, before flying down to California.

The North American Region was honoured to be invited to a VIP Reception by the British High Commissioner to Canada and the Consul General, held on the 8th Floor Pool Deck of the Pan Pacific Hotel, a perfect location from which to view several fly-pasts over the spectacular Vancouver Harbour area by the team. Due to airspace restrictions, the flight demonstration was an outstanding flat (chipped) diamond display, one of the nine members of the team having had to return urgently to the UK to welcome a

new addition to his family!

Bob Leroux (a designated Flight Examiner with Transport Canada), his wife Valerie, Diane Beaton and myself attended this wonderful event on behalf of the Air Pilots - North America Region and very much enjoyed meeting the Red Arrows team, Royal Canadian Air Force personnel assisting with the Red Arrows logistics, British and Canadian Government Officials,



politicians, as well as trade representatives.

In true British tradition the High Commissioner and Consul General treated their guests royally. We were able to enjoy a special Red Arrows cocktail, (red coloured of course), roast beef and Yorkshire pudding, fish and chips, and many other delicious delicacies. The Company wishes to express our gratitude to the British High Commissioner to Canada and the British High

Commissioner for their kind invitation.

At this time I should also like to express our belated thanks to Col Atkins of the Royal Canadian Air Force for his invitation to Company members to attend the annual pre-season practice of our affiliate RCAF Squadron, the RCAF Snowbirds, at Canadian Forces Base, Comox back in April. This was a busy time at Comox, due to a change of Command. I understand Col Atkins may now be serving as a military attaché in the UK.

Bob Leroux and Valerie flew into Comox in their trusty Piper Arrow and I flew a C172 belonging to Vancouver Aviation College, taking along a former pilot student of mine, Ali Khosrowtaj (more recently an Airbus 310 pilot), and his new wife Mahsa. As in previous visits, we received a warm welcome and after watching the Snowbirds' practice, we were able to make a visit the RCAF Museum and the RCAF SAR squadron.

SUMMER SUPPER 2020

Please note that the Summer Supper next year is confirmed as being at Girdlers' Hall on Tuesday 14th July 2020. Access to Girdlers' Hall is not an easy task and their Court has, with the support of the current Master Girdler, agreed to allow us to use the Hall. Past Master Chris Ford would be delighted if you could spread the word as far and wide as possible, amongst your normal contacts. As ever guests will be more than welcome, especially if you owe a chum from another Livery Company a night out.

Chris notes that it will be impossible to keep the cost below £95.00. Primarily the cost of functions, regardless of the style, has been rising far greater than inflation these past years.

GARMIN AUTOLAND

It is one of those products that highlights just how fast technology is developing – generally as well as within the aviation sector. On October 30th, Garmin Inc announced the introduction of an autoland system for high-end GA

aircraft. After years of somewhat secretive research the leading avionics manufacturer has come up with rather a ground-breaking product. This is not designed to enable GA aircraft to land in zero visibility. It is aimed to provide a safe return to earth for pilot and crew when the former becomes incapacitated, or if the system detects a similar threat to safety.

In the event of an emergency, the pilot or passengers can activate Autoland to land the aircraft with a simple press of a dedicated button. Autoland can also activate automatically if the system determines it's necessary. Once activated, the system calculates a flight plan to the most suitable airport, initiates an approach to the runway and automatically lands the aircraft – without pilot or passenger intervention.

During an Autoland activation, the system takes into account a breadth of information and criteria. These include weather, fuel on board, runway surface and length, terrain, obstacles and more. The availability of a GPS approach with lateral and vertical guidance to the runway is also required when the system is considering various airports and runways. Even further, the system will automatically communicate with ATC, advising controllers and pilots operating near the aircraft of its location and its intentions.

Throughout an Autoland activation, the system provides simple visual and verbal communications in plain-language so passengers in the aircraft know what to expect. The flight displays show the aircraft's location on a map alongside information such as the destination airport, estimated time of arrival, distance to the destination airport and fuel remaining. Airspeed, altitude and aircraft heading are also labelled in an easy-to-understand format. Passengers also have the option to communicate with ATC by following instructions on the display using the touchscreen interface on the flight deck.

The Garmin Autothrottle system is used to manage automatically aircraft speed, engine performance and engine power

so the aircraft can climb, descend or maintain altitude as needed during an Autoland activation. On approach to land, the system initiates a controlled descent to the airport. If the aircraft needs additional time to descend or slow down during the approach, the Autoland system initiates a standard holding procedure and extends the landing gear and flaps. Once in landing configuration, the aircraft begins its descent to the runway. On the runway, automatic braking is applied while tracking the runway centreline to bring the aircraft to a full stop. Engine shutdown is also automated so occupants can safely exit the aircraft.

At any time, a pilot can easily deactivate an Autoland activation. With a single press of the "AP" autopilot key on the autopilot controller, or the autopilot disconnect button on the controls, an Autoland activation can be cancelled. The flight display shows a message that confirms Autoland has been deactivated and in the event of an accidental deactivation, the system shows passengers how to reactivate Autoland if needed.

One hopes the system's reliance on GPS-based approaches will help to speed up the rather tardy development of such procedures in the UK.

MEMBERS ON SOCIAL MEDIA

En passant, Peter Buggé, Hon Archivist, notes that a picture of HRH Prince Andrew being welcomed at APH, and one of himself showing HRH the archives, appeared on the Royal Instagram account. According to Peter's youngest granddaughter, who knows about these things, they had 23,000 'likes' – leading to her obtaining many brownie points at school!

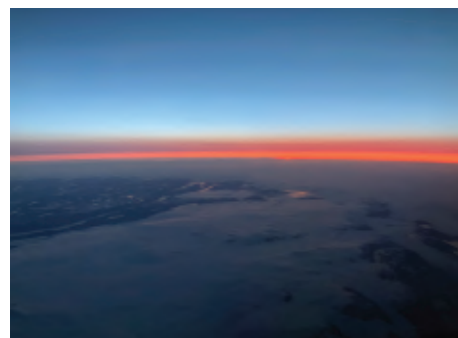
MEMBERS AT WORK AND PLAY

Thank you to the two members below who responded to the Editor's appeal in the last issue. Keep them coming.

Upper Freeman Matt Winwood captured this superb shot of a dawn walk round prior to a flight from Southampton of a Flybe Dash 8 Q400, of which he was SFO.



Assistant David Singleton took the following stunning photos from his office window over Greenland.



And finally (a slight cheat), you will notice in the report on the Trophies and Awards Banquet that one award was given to BA's Concorde Fleet. So a perfect excuse for this historical photo (courtesy of PM Mike Bannister) of the Concorde team in the evening following the final scheduled flight into LHR.

Master's Message

By **Malcolm GF White OBE**

The reality of an editorial lead-time is that any Master will find him or herself reflecting in The Master's Message on what has passed yet addressing events which lie ahead. V and I are minor contributors to this magazine, but we will travel before the next deadline. So, we wanted to add some thoughts before we go.

Firstly, our Hon Editor, Paul Smiddy: Paul delivers a quality journal which I know from many comments has a readership which goes well beyond our membership. It does have impact and to all of you who contribute to the various editions, thank you.

Next, to a second Paul, our Learned Clerk. His monthly e-mail tells us all what we need to know about Company business and as I have learned, it is invaluable. It is a source of up to date information and in addition to what is available to all of us on our Company website, is an excellent source of good communication. That said – Paul can only report on what he is aware of. So please keep Paul and the Secretariat informed.

I believe that accurate and timely communication in our fast-moving industry of aviation is essential. So too our place as a City Livery, where it is vital that we are seen to be informed, relevant, and effective. I could list a raft of events since my last Message to include: the official opening of Air Pilots' House;

many excellent visits organised by David Curgenven; the Air Pilots lunch driven by Chris Ford which was followed by an excellent Tymms Lecture. And then the extremes ranging from joining a Sheep Drive on London Bridge in the rain, to the Election of The Lord Mayor in Guildhall, and the sunshine on the day.

As V put it to me ahead of the Mayoral Election: "Enjoy today – you will be part of an historic moment in our City's History." V was spot on. And I came away with some thoughts on what was said on the day: Charity, Commitment, Professional Expertise and Teamwork. And the support of our partners who give so much behind the scenes.

In the past year we, the Air Pilots, have awarded and sponsored 32 Scholarships: from Gliding to a Private Pilots Licence; and from Flying Instructor courses to academic research. And made other charitable donations, in all amounting to a total of some £185,000. We should be proud of that. It required support and through the commitment of some key members we have been able to make this possible. But should we aspire to do more and if the response is yes – then how?

Equally, we share an understanding of our industry and the challenge ahead. John Turner, our Director of Aviation Affairs, does this very well and his reports to the Court and the journal are in my view, excellent. But I cannot overstate the value of working with a Clerk and four Wardens who are of a like-mind and work together to inform the key tenets of our Strategic Plan. This is not to

dismiss debate or new ideas, but I feel I can report that with the work of our committees there is an effective team "in the cockpit", and one which is well placed to inform the Court in the best interests of the future of our Company. Our financial circumstances are in good order and will be detailed at the Annual General Meeting on 16 March 2020.

Finally, I draft this Message before the Trophy and Awards Dinner, which is a prestigious event in our annual calendar. V and I leave the day after and our Editor wanted my input for the December addition by 7 November, by which time we will hopefully be in Australia. I will leave others to comment on the Awards Banquet, and the many inputs from those who generously report with articles which add to the quality of our journal. Regardless, we look forward to being with you at our Annual Carol Service on 12 December and then enjoying a supper with friends. For those who won't be there and as premature as this may be – Merry Christmas and Best Wishes for a great 2020.



*Not quite a crook -
the stick that is!
The Master
enjoying the
traditional sheep
drive across London
Bridge.*



From the Desk of the Director Aviation Affairs

Liveryman John Turner

AVIATION SKILLS SHORTAGE – INTERESTED IN AVIATION?

An airline engineering director described to me recently the real difficulty he has obtaining suitably qualified people to meet his increasing long-term engineering demand. I imagined there would be a glut following the Thomas Cook collapse but, even then, demand for correctly skilled people, which is driven primarily by planned new aircraft acquisitions, will far outstrip supply.

We need to reduce the predicted global shortage of maintainers and pilots and, as I explained in the last issue, investigative research into what inspires people to work in aviation, planned by the UK's All-Party Parliamentary Group on General Aviation, should provide us that knowledge. Since that work will also help towards the Air Pilots' strategic objective, I also asked all our members to provide me with their reasons for setting off on the aviation path. I have received three responses (many thanks to those individuals who are 0.15% of our membership) with some commonalities, albeit under quite different circumstances and with different results. More data would make this a valuable exercise. Please find time to note down what sparked your decision to follow a career/become involved in aviation, whether that was a seminal moment, an idea that developed over time or just a matter of economics. Please send emails to daa@airpilots.org using the title INTERESTED IN AVIATION or write to me at the office address, Air Pilots House, 52A Borough High Street, London, SE1 1XN, UK and I will cover the results in a future edition.

LEARNING FROM OTHERS

October saw publication of two reports into tragic and fatal aircraft accidents. One concerned the Boeing 737-8 MAX accidents in Indonesia on 29 October 2018 and in Ethiopia on 10 March 2019¹ and the other a Royal Air Force (RAF) Hawk TMk1A crash in UK². Although these events could hardly have been more different, they contain some common threads that I thought I should touch on here.

BOEING 737 MAX

The first report, a Joint Authorities Technical Review (JATR) into the Boeing 737-8 MAX flight control system and Manoeuvring Characteristics Augmentation System (MCAS) design and evolution, notes that modern aircraft systems are increasingly complex and automated, as are the interactions and interrelationships between those systems. This makes it increasingly important that Certification addresses all the potential whole-aircraft ramifications of a failure or inappropriate operation by one of those systems. Comprehensive cross-team understanding becomes particularly important where an originally benign part of the design is modified into something much more aggressive. However, increasing system complexity and interdependency also makes it difficult for individual elements of the design and development team – and the certification team – to hold a whole-aircraft perspective. Observation O15.5-A of the report states:

“Information related to the MCAS functionality within the FCC (Flight Control Computer) originally was in the draft FCOM (Flight Crew Operating Manual) and was subsequently removed (around the time of MCAS Revision D, in early 2016), but without a formal process in place to ensure agreement from all disciplines on the removal of that information. Technology, even if it

functions without pilot involvement, may be integrated with other aircraft systems. One system or functional failure could impact other systems requiring pilot involvement.”

The report also questions certification standards, including the time assumed for line pilots to identify and respond to problems. The existing standards have served well for decades but the JATR questioned whether those standards remain appropriate for the complex integrated systems in today's aeroplanes. For example, does today's certification process consider correctly the impact of cascading failures and multiple alarms, along with startle effect, on the pilots' ability to respond appropriately? In discussing certification, the JATR members also recognised the fundamental relationship of certification and operator ability. In other words, the certification process must establish whether pilots who have received the prescribed training and demonstrated the required skills can fly safely the approved aircraft. I would add that it should also consider the expected skill fade that occurs between each session of pilot training.

In the commercial world, pilot training is expensive; it diverts expensive resource away from revenue earning. Yet it is the quality and adequacy of training that stands between a safe and successful flight and an accident. B737 MAX type-rating training did not provide information on MCAS functionality and failure scenarios, yet it was critical for pilots to know and understand how it interfaced with the aircraft's trim system and that it used the angle of attack data from a single sensor.

It is easy to be wise after the event. Nonetheless, in an age of triplex and quadruplex flight control computers, with multiple sources that can be cross-monitored, one wonders why a single, un-monitored data source feeding potentially aggressive MCAS function was considered acceptable. Similarly, why delete MCAS information from the FCOM? Certifying a simplex system with twice the pitch trim authority of the pilots, and the potential to over-

power them in parts of the flight envelope, is equally mystifying, and especially so when the pilots were not told such a failure was possible.

The report recommends the FAA take several actions, including mandating the content of 737 MAX pilot type-training and flight manuals and that, “The FAA should require operators of the B737 to include operation of the manual stabilizer trim wheel throughout the speed range in their recurrent training programs.” The 737 MAX accidents illustrate what happens with an imbalance between certification and pilot training. The whole sequences of events leading to both accidents serves to remind everyone in whatever form of aviation that if you think safety is expensive, just wait until you have an accident.

HAWK TMk1A

The Service Inquiry (SI) Panel’s detailed report into the Hawk T Mk1 crash onto the airfield at RAF Valley on 20 March 2018 ran to 147 pages. It concludes the cause was stalling with insufficient height to recover while initiating a go-around from a Practice Engine Failure After Take-Off (PEFATO). The report also identifies many other, contributory and aggravating factors.

Tragically, the stall left no time for the rear seat occupant to eject and the report recommended a review of the rules concerning carriage of supernumerary crew and passengers. This should remind us all to take care in considering when it is, and is not, safe and appropriate to take others into the air.

The report notes that there were inconsistencies or omissions in the flight and other manuals from which pilots gain an understanding of their aircraft. It also examines the importance of pilot continuation training and recognises that pilot skills attained in training degrade with time. I am sure that pilots in the business jet and airline sectors accustomed to 6 monthly simulator sessions and tests (and sometimes even longer) will recognise these challenges. However, continuation training to refresh

our skills and an awareness of – and mitigations for – skill degradation are important considerations for everyone who commits aviation.

The Hawk’s emergency landing gear and emergency flap extension controls had been operated, though the pilot had no recollection of doing this. These controls are not used when practising forced landings in the aircraft (because the landing gear and flaps cannot subsequently be retracted) but they must be operated during forced landings in the simulator. Shortly before the accident flight, the pilot completed a Hawk simulator session that included emergencies with engine failure and forced landing – requiring him to operate the emergency controls. Emergency control operation was not a factor in the accident but the Panel assessed that flying a practice forced landing soon after completing the complex memory drills in a simulator could, through cognitive failure, contribute to future accidents. All humans have a propensity for ‘slip’ errors, transposing an otherwise correct action into the wrong situation; I know that I can make ‘slip’ errors and will describe one that simultaneously affected three aircraft in a later article. Simply understanding and identifying where slip errors might occur can reduce their likelihood; where possible, organisational and physical barriers are even more effective.

Changing time zones, sleep patterns and circadian rhythm disruption associated with airline crew fatigue were not a factor here. However, the Hawk pilot had been working extended daily hours under continuous pressure. Additional organisational stressors were at play on the day. Quoting from the SI report:

“HF specialist analysis advised that fatigue is linked to attention, decision making, and attitudinal changes; all of which could have a negative influence on actions when performing safety critical tasks.

Whilst acute stress is sudden and intense, chronic stress arises from factors that are in the background of a person's every day activities including work and organisational requirements, cumulative effects of such

stressors can, over time, lead to degraded performance. Chronic stress may reduce a person's ability to respond effectively to an acute stress, such as in an emergency.

If increased levels of stress continue over a prolonged period, a resultant effect is fatigue. The consequence on flying skills can be tunnel vision when gathering and processing information and pilots may not identify information presented to them.”

The SI Panel concluded “...the pilot's working routine was detrimentally affecting his morale, not allowing him sufficient time for rest, consolidation and affecting his fatigue levels.” Which is something of a warning flag for everyone in this busy world, and especially for those trying to get maximum utilisation out of limited human resource. Even with the best training and skills in the world, none of us are immune to fatigue.

OTHER MATTERS

Skill Fade

ICAO is now recognising the difficulties automation creates in maintaining skill levels in the airline sector. At the 40th Assembly, United States, Canada, Peru, and Trinidad and Tobago presented a paper entitled PILOT TRAINING IMPROVEMENTS TO ADDRESS AUTOMATION DEPENDENCY. This called on ICAO to examine pilot training systems and operational policies of a representative sample of Member States to identify:

- The scope of automation dependency globally, and...
- How to ensure air carrier pilots maintain their ability to manage the flight path manually.

In parallel, we see increasing appetite to progress examination of the Pilot Skill Refresher tool that Liveryman Alex Fisher proposed in our Technical Committee and to advertise the concept at the Simulation, Training and Assessment for Resilience and Safety Symposium’ which will be held in March next year in UK.

The next dimension?

Space, particularly its security and safety, seems increasingly to attract attention. Many governments have a new focus on space, not least for their military forces and 'Space Command' is a reality. Just as we begin to recognise the economic potential and importance of unmanned air systems, the safety challenges of space continue to grow. Soon we might even envisage a place for astronauts in the Air Pilots.

CONCLUSION

In aviation we can learn much from others, especially when it comes to mistakes. Our experiences can also help

others. Please help us by sharing your 'interested in aviation' experience.

The linkage between airworthiness and pilot knowledge and skills is easy to forget; they often fall to distinct parts of an organisation, whether airline or regulator but we forget at our peril that safety depends on a safe flying environment, with safe crews under safe management being able to operate a safe aircraft under normal and non-normal conditions. Whether we operate manned or unmanned machines in the atmosphere or in space, crew training and the need to sustain their necessary skills and standards, will remain important.

Merry Christmas.

¹ **Boeing 737 MAX Flight Control System: Joint Authorities Technical Review - Observations, Findings, and Recommendations.** Submitted to the Associate Administrator for Aviation Safety, U.S. Federal Aviation Administration October 11, 2019

² **Service Inquiry: HAWK T Mk1A XX204 RAF Valley 20 March 2018**

GAZETTE

APPROVED BY THE COURT 21 November 2019

ADMISSIONS

As Upper Freeman

Martin John Forsyth BALSHAW
Paul Raymond BEATH-KELHAM (NA)
David Nicol BOGGON
Simon Peter DONOGHUE
Blair Guy DOUGLAS (HK)
Richard John EVANS (AUS)
Jose McVICAR
Ian John MILLS
Jason Peter PHILLIPS
Scott John RICHES (HK)

As Freeman

David JOY
Donagh Patrick McCULLAGH

As Associate

Chris Shawn DSOUZA (AUS)
Robert Jake MACKENZIE
Zara RUTHERFORD (OS)

Scholarship Winners 2019

Kristoffer AHLNER
David Christopher BELL
Frederic Harrison Clifford BULL
Harvey John DUNMORE
Thomas FERGUSON
John Michael HAILE
Elton Munyaradzi HOVE

Josh REID

Oliver Daniel SUMMERELL

Harry Andrew THOMAS

Roy TARGONSKI

Stuart Patrick LAY

ACKNOWLEDGED BY THE COURT

NOVEMBER 2019

REGRADE

To Livery

Andrew Christopher BOXER-MISSEN
Benjamin Chad GRIFFITHS
Simon Peter McGLYNN
Gary Kenneth RICKARD
Valerie Jane STAIT
Christopher Ian HAZZARD
Mark Richard ADAMS
John TRIBE
Ian Leonard DUGMORE

REINSTATEMENT

As Upper Freeman

Marcus HOWES

As Associate

Robert NORRIS

DECEASED

Michael HOHM (NA)
Roger MILLER (AUS)
Thomas SOPWITH
John LANCASTER
Janet MISSEN
Sir Kenneth WARREN

RESIGNATIONS

Lloyd ADAMS (AUS)
Stephen COLLYER
Rory CUNNINGHAM
Adrian DAVY
Emma D'SOUZA
Peter DUNKLEY
Martin DURHAM
Mark GELLER
Alistair GWILT
Marianne HOVDEN
Stephen JAMES
Alex MACLAREN
Greg MILLER
Peter SMOOTHY
David TURNER

Sir Frederick Tymms Memorial Lecture, 24 September 2019

Paul Mulcahy, Senior Experimental Test Pilot PC24

Freeman Ian Davies

The Master welcomed an audience of ninety people including company Masters, Liverymen and Freemen to the ornate Sovereigns' Room with sky painted ceiling at the RAF Club in Piccadilly on a rather wet afternoon to hear Paul Mulcahy tell us about the development and testing plan for the Pilatus PC24.

Paul began by thanking Past Master Wally Epton for introducing him to the job at Pilatus, which he has so enjoyed for the last few years, and explaining why he was wearing Swiss lederhosen. Pilatus is a successful privately-owned Swiss company with its own airfield at 1450ft amsl at Stans (located at the diagonal centre of Switzerland). Set in a valley between steep-sided granite mountains including the Bergenstock, "interesting" weather conditions are not infrequent. There are some 2,000 employees producing 150 aircraft per year. The company comprises two divisions, trainer aircraft for the government, and business aircraft.

Paul then explained how the project came about, due partly to a request from the Royal Australian Flying Doctors who have used PC12s for many years, which could not cross the continent without refuelling. They wanted an aircraft that could fly twice as far, twice as fast, with twice the load - whilst retaining the short take off unpaved runway capability. The PC12 is the mainstay of the market, with over 2,000 registered around the world. In 2007 the initial design evaluation was conducted, against potential competitor craft such as the Phenom 300 and Citation CJ4. A variety of powerplant options considered, from single piston, single jet, dual piston, or dual jet, for this low wing cantilever monoplane, with a cargo door wide enough for standard pallets, capacity for two pallets, rough field capability, and single pilot operations. Eventually the decision was made to have a pair of Williams FJ44 turbofans, and retractable tricycle landing gear with double bogeys. On 1 August 2014, Swiss National Day, PO1 was rolled out, or rather in the absence of its own power, hauled out by

24 horses onto a Swiss flag on the tarmac. It was not until 11 May 2015 that PO1 made its maiden flight of 55 minutes from Buochs Airport.

The three prototypes were intended for different aspects of development.

PO1 - HB-VXA, *Emmanuelle*, for flight envelope opening, aerodynamics and structures;

PO2 - HB-VXB, *Annabelle*, for avionics systems and autopilot 16 Nov 2015

PO3 - HB-VSA, *Marybelle*, for demonstrations and certification

2,300 hours flight testing were planned from 2015 to 2017, and behind that 27,000 hours of preparation for the data capture on 800kgs of equipment, using 12km of cables.

The initial high-speed taxi tests required a Permit to Fly, lest the aircraft left the ground. Speed was built up to 90 kts with maximum effort braking tests. First flights to test basic systems (gear and flaps, pressurisation) plus stability and control, gave results in line with predictions. Later flights involved the right seat occupant wielding a large silver hammer for flutter tests.

In 2016 artificial ice shapes were attached, then the prototype was brought to Cranfield for pond testing. In June the team brought the aircraft to the Climatic Chamber in Florida for temperature range test. In early 2017 it was time for cold weather testing at Iqaluit, CYFB, at almost 35C below. EASA and FAA approval was received on 7 December 2017.

Further work involved steep approach certification for London City (a 5.5% glideslope) in 2018. This necessitated test flights at 7.5%. Speed checks showed that the test aircraft reached .81 Mach/Vmo 350, although customers will be restricted to .74Mach/Vmo 290. Unpaved runway testing was also conducted at Woodbridge, Suffolk, in 2018.

Interestingly, it was necessary to begin simulator development and production line work at the start of flight testing, in order to be able to train pilots and supply customers in anticipation of the date

formal approvals were expected to be received. The production aircraft performance exceeds the original design specification, and the PC24 can reach 45,000 ft in 30 minutes, with the cost benefit of flying in a straight line above the commercial airways. Maximum cruise speed is 440 KTAS, with a range of 2,000nm.

Developments costs are not published, but are understood to be between \$0.5bn and \$1.0bn. Paul told us the new aircraft are available at 10.7 million, and got quite excited when a member of the audience asked what currency that would be, with the response "We can do a deal, sir - see me afterwards!"

Given that there are around 10,650 airports with 954m paved runways for traditional aircraft, but almost 20,000 airports with 893m of paved or unpaved runways available to the PC24, there is a huge increase in proximity to delivery destination, less administrative procedures, and reduced ground transfer time. Pilatus expects to produce 4,000 units during the design's planned 40-year life cycle, according to the company's chairman.

The new PC24 has no direct competitors and is described as having the versatility of a turboprop, the cabin size of a medium light jet, and the performance of a light jet, which made Pilatus create the new category of Super Versatile Jet (SVJ). Convinced by this compelling proposition, before placing my order I rushed to ask Paul to confirm the type's certification for Courchevel altiport.

Sadly, he told me that is unlikely to happen, so I need not raid the flexible pension drawdown yet.

Master Malcolm White led the vote of thanks before inviting everyone for refreshments.



The Trophies and Awards Banquet

Guildhall 24th October 2019

The Editor (Photos by Gerald Sharp Photography)

The highlight of the Company's year again took place at the City of London's Guildhall on October 24th. At a meeting of the Court in the Crypt beforehand, the Master, Malcolm White, witnessed the clothing of 13 new Liverymen. Air Cdre Ian Stewart, Wg Cdr Alexis Tano, Sqn Ldr Andy Boxer-Missen, Ben Griffiths, Stephen Smartt, John Tribe, David Abrahams, Chrissie McGee, Capt Simon McGlynn, Capt Mark Adams, Capt Christopher Hazzard, Capt Gary Rickard and Capt Valerie Stait were all welcomed into the Honourable Company as fellow Liverymen.

The Master also presented Master Air Pilot certificates to Sqn Ldr Timothy Cadman, Flt Lt Andrew Baker, Cdr Stephen Thomas RN, Lt Cdr Andrew Knight RN, Sqn Ldr Nigel Scopes, Capt Scully Levin, Mrs Jane Nash and Master Air Navigator certificates to Flt Lt Ian Abson, Lt Cdr Stephen Hayton, RN, and Lt Cdr Adrian McWilliams RN.

After the Court meeting members and guests proceeded to the champagne reception in the Old Library, with the Pikemen and Musketeers of the Honourable Artillery Company adding another layer of tradition.

Our Guest of Honour was Chief of the Air Staff, Air Chief Marshal Mike Wigston, only 3 months into his new role. Other senior guests included the Master Mariner (Captain Jim Barclay)

and Masters of the following liverys: Coach Makers & Coach Harness Makers (Richard Charlesworth), and Fan Makers (Dr Jeffrey Bines). Col John Bryant (Army Air Corps), Lt Col Chris Ions (AAC Regimental Secretary), Wg Cdr John Chappell (exec officer of our newly affiliated 601 Sqn RAuxAF), and Col E Lee Wingfield (US Air Attaché) and the New Zealand and Australian Air Attachés were the senior military representatives present.

The Beadle, Ted Prior, led the Master and senior guests into the Great Hall for dinner. After Grace enunciated in customary style by our Honorary Chaplain, Air Vice-Marshal the Venerable Ray C Pentland CB, the Master invited the newly-clothed Liverymen to stand and be recognised. With vigorous music from the London Banqueting Ensemble, and very efficient service by the Guildhall's catering staff, the meal was as tasty and efficiently served as usual. After the sung Grace, the Loving Cups were circulated, followed by toasts to Her Majesty the Queen, the Royal Family, and the Lord Mayor and the Corporation of the City of London. The trophies were awarded by ACM Mike Wigston. Whilst the Clerk as usual prefaced each award with an abbreviated citation, the full version can be found on the Company's website.

After the presentations the Master

addressed the multitude: Malcolm welcomed all our guests, and our Young Members present. He reminded us the his mantra for the year – "Inspire to Fly", and, undoubtedly a first for the T&A, quoted Louis Armstrong – "I see skies of blue, and clouds of white, the bright blessed day, the dark sacred night – what a wonderful world". He went on to note some anniversaries occurring that week:

- The world's first parachute jump in 1797;
- In 1911, the longest glider flight (by Orville Wright) lasting 9 minutes and 45 seconds, after which Orville wrote: "The exhilaration of flying is too keen, the pleasure too great, for it to be neglected as a sport".
- And in 2003, the last commercial flight of Concorde.

The Master noted the achievements of our trophy recipients, and proposed the toast to our award winners and guests. He introduced our principal guest, giving us an overview of Mike's career, and highlighting his people skills "on every count to have you with us tonight is particularly special, and [it is] a delight to welcome you here amongst the brother and sisterhood of those who fly".

CAS then rose to give his response. Mike thanked the Honourable Artillery Company's Pikemen, noting that on their home turf, the nearby Artillery Fields, was committed the "first act of aviation in the UK" – a balloon ascent in 1784 by Vincent Lunardi. He regretted that the HAC did not then take the opportunity to re-brand as the Honourable Aviation Company. He paid



The Master presents Chrissie McGee with her livery badge



The Master follows the Guest of Honour into the Hall

tribute to the prizewinners “some brilliant people”, but underlined that aviation is a team game “so I also recognise the teams behind them”.

For those that believe the RAF in ‘peacetime’ is a sinecure, Mike gave us a quick resumé of some of the RAF’s current lesser known operations: a Chinook detachment in Mali; a Typhoon and Voyager detachment to Malaysia (Ex Bersama Lima); and he noted that the UK Air Defence Force is “in a state of constant competition”. He remarked that “it is hard to remember a time when the strategic environment was more dynamic”. Appropriately for a venue in the heart of the City of London, he believed that “the nation’s security and prosperity are tightly interlinked over the centuries”. One hopes the message has been received in Her Majesty’s Treasury! Mike is a strong believer in the benefits of STEM education, and wants his service to embrace those with talent

from all corners of UK society. He concluded by congratulating all the award winners, but as a graduate of the Tornado Force himself (ex OC XII Sqn), Mike was particularly pleased to award the Johnson Trophy to that team. He also name checked Flt Lt Christopher Stradling, who moments later was to receive a Master’s Commendation – the only Tornado aircrew to have amassed more than 6,000 flying hours on the type!

Mike’s speech contained a lot more humility than one has come to expect from someone in his role, and the audience was left feeling comforted that the RAF is in a very safe pair of hands for the next three years.

Full copies of the Master’s speech can be found on the Company’s website.

Afterwards the Stirrup Cup was well used in the Old Library giving a chance for many to offer personal congratulations to the award winners.

The Cowdray Room at the RAF Club presented an opportunity for later conviviality.



Panache (or should that be Eclat?) with the Loving Cup



The Master and Vanessa with ACM Mike Wigston and Kate Wigston



Mr G Chamberlain, Kate Denyer, Asst Dacre Watson, Amy Bloor and Asst John Denyer



The Master with the new Liverymen



“Don’t tell her your name Pike(man)” with Denise Cox



The Master launches his speech

Awards presented on the evening...



THE AWARD OF HONOUR

Stuart King

Seventy-five years ago, Stuart King had the vision to see that aviation was key to bringing help and hope to people in the world's poorest and remotest communities. While still in the RAF he began to build Mission Aviation Fellowship, and on 13th January 1948 with ex-Service colleagues took off for Africa in their first aircraft.

Today, MAF operates 131 predominantly light aircraft in 27 developing countries around the world, and into some 1,400 of the poorest and most inaccessible locations. In 2018, MAF flew over 8 million miles, carried 157,000 passengers (430 per day) and moved over 6,000 tonnes of freight. Every 4 ½ minutes, a MAF aircraft lands or takes off somewhere in the world.

Although Stuart is no longer out there conducting operations, it is his vision and integrity that created the ethos and the professionalism that is MAF today. Stuart King is an extraordinary and visionary man, who over 75 years has done so much to enable aviation bring help and relief to so many of the world's most disadvantaged people. He was unable to be there on the evening, so the award was received by Ruth Whittaker, CEO of MAF UK, to receive on his behalf, in recognition of his outstanding and enduring contribution to aviation, the Award of Honour.



THE JOHN LANDYMORE TROPHY

Elton Hove

Elton Hove won the Donaldson PPL Scholarship this year and completed his training with the Yorkshire Aero Club. From the initial impression that he made upon the scholarship selection committee to the approach he adopted during his flying training, Elton was exemplary. His ground school results were top class and his whole approach to the learning process and personal application required to be a proficient and able pilot were present from the outset. Elton's enthusiasm and determination to achieve his goal was evident to his ground and flying instructors.

As a result of his personal qualities and professional, competent approach to flying demonstrated during his training for a PPL, Elton Hove is awarded the John Landymore Trophy for 2019.



THE SIR ALAN COBHAM MEMORIAL AWARD

Ruth Cundy

As all members of the Air Pilots Company will know, Ruth Cundy's name is almost synonymous with the Company office. For the last 18 years she has been an integral element of the team that makes the whole organisation tick and work as successfully as it does. Her detailed oversight of the Company's operations – and events in particular – is legendary and has helped to create the reputation for efficiency that the Air Pilots Company enjoys both externally and among our members.

There is barely an aspect of the membership and administrative processes of the Company in which Ruth did not have a direct involvement in developing and for which she is a very deserving recipient of the Sir Alan Cobham Memorial Award.





THE GRAND MASTER'S MEDAL

Aaron Pearce

In February 2016, Aaron Pearce was selected to be the new CFI at South Canterbury aero club in NZ which, at the time, was struggling with less than 45 monthly flight hours and the probability of having to start selling aircraft within the next 6 months. However, Aaron succeeded in setting-up a club Gateway program for local schools, and a 2-year aviation programme for international students. He also reinstated a Young Eagles programme, for very young aspiring pilots, which soon became one of the leading Young Eagles programmes in NZ.

South Canterbury Aero Club is now a thriving enterprise and under Aaron's management the club is able to start setting long-term strategic goals backed by the financial ability to achieve them. It now employs additional instructors and has more aircraft. This year club pilots won several of the competitions at the recent Flying NZ National Championships, which is a testament to the standard Aaron trains to and insists upon. Aaron's many achievements have been noted throughout NZ and commended by the Royal NZ Aero Club.

In recognition of his many meritorious aviation achievements, all while less than 30 years of age, Aaron Pearce is deservedly awarded the Grand Master's Medal.



THE SIR BARNES WALLIS MEDAL

Major Thomas Aseltine

During the past 11 years, Major Thomas Aseltine's biggest impact to USAF Special Operations airpower has come through his devotion to experimental flight test, accruing more than 3,600 flight test hours. Major Aseltine and his team, which includes his navigator, Mr Mainak DasGupta, who is also here this evening, are renowned for their ability to quickly turn ideas into reality. When USAF aircrews reported Global Positioning System interference while in combat, Major Aseltine and his team designed, tested, and fully integrated jam-resistant alternative methods of deriving precise location within 60 days of those initial aircrew reports.

Major Aseltine's commitment and passion to professional aviation as a leader and innovator, with the ability to produce workable solutions in short time-frames, is deserving of recognition as an innovative and exceptional contribution to aviation, and he is accordingly a worthy winner of the Sir Barnes Wallis Medal.



THE PIKE TROPHY: JOINT WINNER

Carol Cooper

Carol Cooper has to date, dedicated 32 years to flight instruction, incredibly still operating from the same airfield she learnt to fly from all those years ago at Andrewsfield. The enthusiasm and professionalism which she continues to display enhances her excellent reputation as an instructor within the industry.

One of her ambitions is to continue to encourage women to get involved in aviation by giving talks to local Women's Institutes and clubs. Ignoring the opportunities to join the more financially rewarding airline route, she was clear from the very start where she wanted to be. Her love of teaching people to fly at all levels has led to a career that gives her huge job satisfaction. Last September, Carol passed the 25,000-hour mark, all in light aircraft, and for her dedication to training and achievement of the very highest standards Carol Cooper is accordingly awarded the Pike Trophy.





THE PIKE TROPHY: JOINT WINNER

Dorothy Saul-Pooley

Dorothy learnt to fly 30 years ago whilst working in London as an Intellectual Property Lawyer. After gaining her Multi Engine, IMC and night ratings, she then gave up law in 1991 to qualify as a commercial pilot and flying instructor. Over the past 27 years, Dorothy has flown more than 10,000 flying hours of which over 8,500 are instructional, on 120 types and variants of aircraft. As a senior CAA examiner, Dorothy has examined over 700 candidates. In addition to her fixed wing qualifications, Dorothy is also a helicopter instructor having first learnt to fly helicopters in her late 40s.

Dorothy has devoted the past 30 years to flying instruction, and with her desire for excellence has achieved the highest of standards of training, and for which she is a deserving recipient of the Pike Trophy.



THE MYLES BICKERTON TROPHY

Jeffery Milsom

Last year, in order to celebrate the centenary of the Royal Air Force, the Tiger Moth formation team 'Tiger Nine', formed and led by Jeff Milsom, was asked if they could fly a figure '100' at the RAF Cosford display. But, eventually, and after a great deal of effort by Jeff and the team to work-up a suitable display, the idea was vetoed because it would involve flying over the crowd to provide the proper perspective. However, because so much work had gone into the idea, it was decided to go ahead with an already planned rehearsal at RAF Henlow and which was a great success. This then attracted some interest from the display organisers at Duxford and they, along with Jeff, managed to persuade the CAA to allow the team to overfly the crowd for their special display, a permission that is not granted lightly.

Despite less than perfect weather, the display all went according to plan on the day and was very well received by all. For this feat, and his many other outstanding flying achievements during a lengthy career in General Aviation, Jeff Milsom is awarded the Myles Bickerton Trophy.



THE HANNA TROPHY

Nigel Lamb

Nigel Lamb was one of the most accomplished and respected pilots on the Red Bull Air Race circuit when he decided to hang up his flying boots after decades in the air display and competitive aerobatics scene. He had also firmly established himself as a talented warbird display pilot, flying with the Breitling Fighters as well as the Duxford-based Old Flying Machine Company.

Nigel has been a display pilot for over three decades, racking up nearly 1,800 displays in more than 30 countries. His flying skills have also featured in several major movie and commercial productions. For his extensive air display flying career and dedication to the safe but exciting demonstration of warbirds, conducted at all times with utmost professionalism, and in recognition of his outstanding contribution to the art of display flying of historic, vintage or modern fighter aircraft, Nigel Lamb is awarded the Hanna Trophy.





THE ERIC 'WINKLE' BROWN MEMORIAL TROPHY

The F-35 Integrated Test Force

The F-35 Integrated Test Force is responsible for the developmental testing of all models of the F-35 across all the partner nations. Operating the latest 5th generation aircraft on the new Queen Elizabeth Class aircraft carriers was one of the most complex and highest profile flight test programmes ever conducted. The team, consisting of four test pilots, was perfectly suited to the task and proved to be a talented and eclectic element of the overall test regime. All four pilots demonstrated excellent technical understanding, superior flying skills, ability to link simulation to reality and a diverse experience against which to base their analysis and recommendations.

The team has been directly responsible for the in-service delivery of the UK's F-35 aircraft. Two of the team, Lt Cdr Peter Wilson and Sqn Ldr Andrew Edgell, are able to be here tonight to collect the award on behalf of all the team members of the F-35 Integrated Test Force who are deserving recipients of the Eric 'Winkle' Brown Memorial Trophy.



THE JOHNSTON MEMORIAL TROPHY

The Tornado GR Force

The Tornado GR Force formed the bedrock of the Royal Air Force's ground attack capability during over one-third of the period of the service's existence, contributing to NATO's deterrent posture with an all-weather day and night low-level capability that remained unrivalled throughout Tornado's 37-year service life.

Twenty-eight years after service in the first Gulf War, the Tornado GR Force's final homecoming flypast tour earlier this year saw an outpouring of affection for an icon of the Royal Air Force. In addition to the two representatives who will be presented with the award tonight, there are a number of members and guests present here who were Tornado aircrew, including our Guest of Honour – and for whom this award will have special significance.

Characterised by excellence, commitment, dependability and understated professionalism throughout almost four decades of outstanding service to the United Kingdom, and represented by Wg Cdr Matt Bressani (OC 31 Sqn), and Wg Cdr James Heeps (OC 9 Sqn), the Tornado GR Force is awarded the Johnston Memorial Trophy.



THE MASTER'S COMMENDATION

Flt Lt Chris Stradling

As an integral member of the Tornado Force, Flt Lt Chris Stradling has served continually as a navigator for the last 31 years, amassing over 6000 flying hours and completing over 300 operational missions.

Throughout his entire flying career, Chris Stradling remained as enthusiastic about operating the Tornado as he was when he started in September 1987. His 31 years of unbroken service to the Tornado Force is evidence of an outstanding flying career and unrivalled operational record. Whether conducting operations himself or guiding hundreds of students through the Tornado conversion course, the capability of the entire Tornado Force was significantly enhanced by his efforts. Forced to leave the Tornado only because the aircraft was withdrawn from service, his dedication and professionalism remain unquestionable. Flt Lt Chris Stradling is an extremely worthy recipient of the Master's Commendation.





THE BRACKLEY MEMORIAL TROPHY

The British Airways Concorde Fleet

British Airways scheduled Concorde supersonic flight operations began on 21st January 1976 and lasted until 24th October 2003 – exactly 16 years ago. In that time the airline operated just under 50,000 supersonic flights and carried over two and a half million passengers. This was an extraordinary achievement by Flight Crew, Cabin Crew, Engineering, and Marketing and Sales staff. It was a product of continuing dedication and teamwork between these groups throughout the aircraft's airline career.

On the anniversary of the last commercial flight of Concorde in 2003, three individuals attended who are still serving with BA and who served on the Concorde Fleet: Capt John Tye (aircrew), John Dunlevy (engineering) and Suzanne Gordon-Wilson (cabin services). But, in addition to these three representatives who accepted the award on behalf of all former Concorde crew, 15 or 16 other members and guests here tonight, all former Concorde personnel were in attendance.

For the extraordinary achievement of operating the world's only supersonic airliner with unparalleled safety and precision for over two and half decades, an outstanding contribution to air transport, the British Airways Concorde Fleet is awarded the Brackley Memorial Trophy.



THE CENTRAL FLYING SCHOOL TROPHY

673 Squadron AAC

The introduction of the Apache to the British Army led to a step change in capability which needed to be matched by a step change in instruction. Since 2003, 673 Squadron has ensured the Attack Helicopter Force has received a constant stream of high-quality Apache pilots, adjusting output to meet demand. The Squadron has trained every single UK Apache pilot since the Army brought the helicopter into service and taught all Qualified Helicopter Instructors for their Competence to Instruct and category upgrades.



673 Squadron has been outstanding. From its inception it developed new and novel instructional techniques to ensure the successful exploitation of new and exciting capabilities and technologies. It has had a lasting effect on the Army Air Corps and has established a long record of instructional excellence, uncompromising standards and unparalleled output. Represented by the OC, Maj Steve Jones, 673 Sqn AAC is accordingly awarded the Central Flying School Trophy.

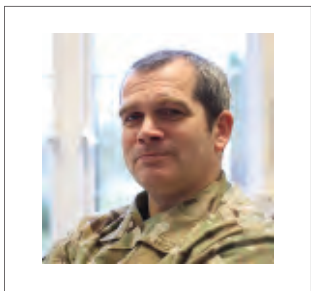


THE CUMBERBATCH TROPHY

WO1 Peter Balcomb

WO1 Peter Balcomb has been exceptional as the Attack Helicopter Force (AHF) Air Safety Manager since March 2012. Whilst the AHF Aviation Safety Team is small in comparison to other JHC Forces, under Peter Balcomb's leadership, the team has produced a commendable output. He has guided and mentored unit Air Safety Officers to become key members of unit-level planning teams and his experience and credibility is recognised and trusted throughout HQ JHC and at the very highest levels of command.

The culmination of his tireless and highly effective air safety leadership has resulted in very positive feedback from a recent Military Aviation Authority audit inspection, which singled out the way AHF had developed pragmatic and locally-tuned processes to deliver safety performance and assurance. He has made an exceptional contribution to Attack Helicopter capability and, for an outstanding contribution to aviation safety, is a very deserving winner of the Cumberbatch Trophy.





THE MASTER'S MEDAL

James Ketchall

James is an adventurer and UK Scouting Ambassador. One of his principal ambitions is to inspire the youth of the world to look up from their phones and seek adventure. His latest exploit, to circumnavigate the world in a gyrocopter, unsupported, commenced on 31 March and concluded on 22 September this year. One of the aims of his trip was to visit a school in every country he landed in and to visit each contiguous state of the USA – which he achieved.



James' first experience of aviation was when he flew an autogyro in November 2016 and he only had 215 hours in total when he set out on the round the world flight. Departure and arrival was at Popham airfield, his local club. Whilst the aircraft had two seats the rear seat was occupied by luggage, fuel and spare parts. He had no support crew save those back at base in UK, using local agencies for assistance. He covered 37,000km with no breaks apart from those forced by weather and rest.

For his epic solo achievement, and inspirational promotion of aviation to young individuals around the world, James Ketchall is a deserving recipient of the Master's Medal.



THE MASTER'S MEDAL

Wg Cdr Rob Caine

IV Squadron is based at RAF Valley and equipped with the Hawk T2. The squadron's role is to complete the training of fast jet RAF, RN and overseas students and prepare them for further training as single seat fighter pilots on operational fighters. On taking over the squadron Wg Cdr Rob Caine identified a significant training capability gap between the output standard from Valley and the requirements of the Operational Conversion Units. The older style of fast jet flying training, using the analogue Tucano and Hawk T1, had resulted in students struggling at the Typhoon OCU.

Despite facing considerable challenges, both in terms of aircraft availability, increasing student numbers and the introduction of new untried aircraft systems, Wg Cdr Caine devised and implemented a world leading, pioneering training system that makes full use of new techniques and technologies. This has enabled a much easier transition to the much more costly OCUs and has attracted attention from many overseas air forces. For his outstanding work in the development of advanced fast jet flying training, Wg Cdr Rob Caine is a thoroughly deserving recipient of the Master's Medal.



THE MASTER'S MEDAL

Carlton Real Rescue 924

In the early hours of 13 March this year, Rescue 924 was tasked to evacuate the crew of a vessel drifting towards the coastline off Lands End. As the aircraft approached the stricken trawler in the dark, it quickly became evident that the only feasible rescue option was by winch. The aircraft was manoeuvred over the vessel to deploy a hi-line and then the winchman, Carlton Real, was lowered to the deck to supervise the winching. Once onboard, he explained to the six-man crew of the trawler that to expedite the rescue, two crewmembers would be winched together, thus requiring only three lifts. He assured them that he would remain on deck until all six crew had been rescued. With the vessel pitching and rolling violently in a huge swell and 20 foot waves, Carlton calmly controlled three successful winches to the aircraft. But then, on the last lift, the hi-line parted leaving Carlton stranded on the trawler. The crew struggled for a number of minutes to deploy a second hi-line, eventually successfully, and once Carlton had been recovered, Rescue 924 returned to base.

This rescue was conducted at night, in atrocious weather and sea conditions with the added pressure that the vessel was slowly drifting towards rocks where it would have been wrecked. This rescue stretched the capabilities of the crew and the aircraft; however, the winchman voluntarily put himself in danger by remaining onboard the vessel throughout the winching operation. It is this exceptional devotion to duty and disregard for personal safety for which Winchman/Paramedic Carlton Real is awarded the Master's Medal.



THE PRINCE PHILIP HELICOPTER RESCUE AWARD

Caernarfon Rescue 936

On 22 August last year, the Caernarfon SAR helicopter, Rescue 936, was tasked to assist in the rescue of an unconscious female walker near the summit of Cadaer Idris in southern Snowdonia. A party of 12 students on a Duke of Edinburgh's Award expedition had been caught out by the poor weather.

Having launched from its base with overcast cloud at 200 feet and limited visibility below, R936 used onboard radar to let-down in the relative safety of Cardigan Bay and then to close with the coastline. Then, hover-taxying along the estuary, the crew eventually found a low-level route to safely navigate the aircraft around a smaller range of hills towards the lower slopes of Cadaer Idris.

Communications at low altitude were problematic with many broken radio calls, but there were increasingly desperate requests for help from the casualties. Given the seriousness of the casualties' predicament, and reports that MRT were also struggling in the increasingly heavy driving rain, the crew took the decision to try and close with the reported site of the incident by hover-taxying up the mountain in cloud, embarking on a lengthy and demanding approach, using all members of the crew to ensure clearances with the rockface.

Eventually arriving on scene at the same time as the MRT, it became clear that 2 of the students needed immediate evacuation by air. The aircraft was positioned crosswind, and both casualties quickly winched to the cabin. With strong turbulence, heavy rain, and the surrounding mountains precluding a climb-out on instruments Rescue 936 started to reverse the route down the mountain, still in thick cloud; another demanding and protracted manoeuvre requiring intense concentration from the entire crew. Conditions had worsened in the Mawddach estuary and, with rapidly diminishing fuel reserves, radar was once again required to safely navigate the aircraft to Aberystwyth followed by a low-level transit to the nearest hospital. After handing over the casualties Rescue 936 routed to Llanbedr Airfield, landing with just 4 minutes' worth of fuel remaining above minima.

This rescue demanded the highest level of skill and teamwork from the crew. An exceptional rescue in extremely challenging conditions. The crew of Rescue 936 - Captain Kate Simmonds, Co-Pilot Dave Kenyon, Winch Operator Rich Taylor and Winchman/Paramedic Alistair Drummond - demonstrated exemplary judgement, handling skills, and bravery. They are accordingly awarded the Prince Philip Helicopter Rescue Award.



*Other awards will presented during the Master's tour of the regions,
and on other suitable opportunities.*

How you can help the Company visibly support Civil Air Transport Safety

Assistant Ed Pooley

Civil Air Transport (CAT) is statistically as safe as it has ever been, but we all know that effort is required to keep it that way as air travel continues to grow apace. Over the course of its history, the Company has supported this objective from an independent perspective in various ways, and continues to do so. However, our role in this respect has diminished in recent years with the passing of UK CAA safety regulation to the EASA. This has removed our ability to engage directly with the regulator because, whilst we are an international body, we are not a 'European Organisation'. We have also not linked effectively with our regions to support CAT safety actively on an international basis; although our regions nevertheless have been able to address their own interests through their national safety regulators as they have wished.

An opportunity has been identified which should get us back on the front foot in the UK, along with our regions, to contribute to the common global good of CAT safety. This involves seeking to establish a network of appropriately experienced members who have substantial recent experience as pilots of multi-crew civil transport aircraft, both fixed wing and rotary wing. This expertise should be capable of identifying how we might make a difference, but will also lend weight to our interventions by providing a consensus-based endorsement of them. This is something which our UK committee system, effective though it is for other objectives such as supporting small group project work and addressing safety in UK leisure aviation and its flight instructor community, cannot do.

A few weeks ago, some of our UK-based members who we believed (records as to member occupation and experience are not comprehensive) may be both 'appropriately experienced and willing' to be part of such a network were invited

to indicate their interest and almost 50 did so from all the main UK airlines – as well as from business jet and rotary wing operators. This means we can continue to develop the initiative in 2020, but it also means we wish to appeal to all our other members who may be interested in joining – both those based in the UK and, especially, those based overseas. The bigger the network, the more ideas it can generate and the more effective its peer review will be. And if we can gain support from our significant non-UK membership, naturally we will be able to present a more global view. The importance of that is evident in the well known differences in the delivery of safety management in all its forms around the world despite ICAO's efforts to normalise standards.

The main aim of the network will be to make a difference to operational safety by drafting, for circulation within the industry, short Company Safety Briefing Notes, which provide examples of good practice or highlight lessons learned from accident and serious incident investigations, which are likely to be of use to others. It will also be able to develop for more formal approval Company Safety Position Statements where there are problems which need fixing but where there is no simple solution, or where progress is too slow. All outputs will be modest – in the one to two page category – and no 'projects' will be attempted: we are simply aiming to harness the collective wisdom of the Company to make a visible, useful, and uniquely independent contribution to CAT safety.

The network will be managed by a small coordinating sub-group of its members who are prepared to devote a little more time to it, but the commitment which any ordinary network member will be making will not be onerous. All communications within the network will be by email, with no formal attempt to

have meetings, even internet-facilitated ones. It is hoped that network members will be able to put forward ideas for potential outputs with a rough outline of their proposed content, but mainly to comment on outlines others have proposed in order to transform them into a publishable short document.

So, if you have significant command experience on any multi crew transport aircraft and are either currently employed as a pilot, or have been in the past five years and still consider yourself in touch with what is in some respects a fast moving world, then please consider getting involved. Let us know by sending a blank email message with the subject 'CAT safety initiative' to cat-network@airpilots.org and we will send you a very short questionnaire to complete and return as soon as convenient but in any case not later than 31 January 2020. Please also note that we are particularly keen to boost the number of network members with either rotary or turboprop multi-crew command experience – it will not have escaped your attention that these two areas are amongst the most challenging. Completing the questionnaire will not commit you but may well be followed by an invitation to join us.

Finally, if you do not yet meet the 'significant command experience' criterion (open definition) but anticipate doing so in the future and are likely to remain interested, please request, complete, and return a questionnaire since if the Network becomes a reality, then sustaining it with new blood, as older members step down, will be crucial!

Visit to RAF Waddington 26th September

The Editor

This was a follow-on visit from last year's (see October 2018 edition), in order to see those aspects of Waddington's operations which we did not have time to cover then.

For this over-subscribed visit thirteen members intended to fly in. The Law of Sod was in full operation, and in the event only two members succeeded in reaching the Lincolnshire base – and on the previous day when the weather was more clement. The last-minute alteration of plans added an unwanted layer of complexity for our unflappable host, Sqn Ldr Natalie Feeley, and Andy Richardson, the visit's gauleiter. In consequence the Editor, as did many of us, endured a sparrow's departure for a 3+ hour drive through soggy Fens.

On this dank morning, our welcome from the Station Commander, Gp Capt Tom Burke, could not have been warmer. His background – in both Tornado and Reaper – made him ideally suited for his role. He gave us a brief overview of changes since the 2018 visit: the number of E3 airframes had shrunk further to four, and its replacement, the E7, was enthusiastically anticipated in the mid 2020's. The Black Buck Vulcan, forlornly on its own at the far side of the airfield, had had a structural survey which was broadly reassuring; the airframe had been sealed, and a business case made for its repainting. He gave us a taster of our day, and underlined that return visits by the Air Pilots were always welcome.

The Sentry's radome

photo by Ian Martin-Taylor



Natalie is OC, D Flight of XIII Sqn, and escorted us to its HQ. XIII Sqn (motto *Adjuvamus Tuendo*, which as you no doubt know means "We Assist by Watching"), is the UK-based squadron operating the MQ9 Reaper RPAS. She gave a comprehensive review of the evolution of the UK's RPAS capability and operations. (See also the December 2018 edition of *Air Pilot* for the 2018 Tymms lecture by the Squadron's Boss, Wg Cdr Mark Jackson, which gave an in-depth coverage of the history and issues of Reaper operations).

Natalie told us that the first armed mission by a UK controlled Reaper was in May 2008, indeed the UK was the first nation to operate armed Reapers. XIII Sqn was re-formed in October 2012. The global nature of its operations, in partnership with its sister unit, 39 Sqn, at Creech, Nevada, is facilitated by a (no doubt expensive) fibre optics network linking Creech, Waddington and the Fixed Site Satcom Terminal (FSST) in Germany. The airframes are controlled by downloads from a satellite and operators endure a two second delay in the effects of control inputs. The launch and recovery phases are controlled by line-of-sight radio. The launch units are obviously deployed to close to the field of operations (it should be noted that the Reaper's endurance is less than that of its predecessor, the Predator). The Mission Control Element (i.e. the 'flight deck' team) for a sortie is either in Creech or

Sqn Ldr Feeley starts her presentation



Photo by Ian Martin-Taylor

Waddington depending on the time of day; the average sortie length is 16-18 hours, so a mission will invariably involve both units (who have sight of the other's satellite feed). Within the UK element a mission will almost always require two crews, as they are only at the controls in the Ground Control Station (GCS) for two hours or so at a time. It is clear that Reaper operations are manpower intensive; the benefit being, of course, that the manpower is not subject to any threat to life.

Waddington is not yet set up for 24 hour Reaper operations. Members might have been surprised to learn that Reaper ops are quite weather-dependent – it has a thin wing and is prone to icing.

The UK's Reaper Force is now sufficiently mature for consideration to be given as to how to provide the best possible career opportunities for RPAS operators after their tour on XIII or 39. So for debate, for example, should we follow the Italians who give their RPAS operators 'real' flying hours during their tour? Is the current flying training (EFT, followed by a basic Instrument Rating

Flt Lt Wisson explains his empire





Flt Lt Northwood describes his playground



A rare sighting of a RC-135W Rivet Joint at Waddington



A demob happy Flt Lt Watson, with members ignoring the seatbelts sign

Test) for them ideal? 70% of the squadron's pilots have the RPAS(P) brevet. Training once on a Reaper squadron is effectively on the front-line, which is a little restrictive.

A Reaper crew comprises a pilot, a sensor operator, and a Mission Intelligence Co-Ordinator (MIC): all roles are manned on a tri-service basis. RPAS could not function without 21st century levels of communication, and comms with other agencies are most often via chat rooms. Missions are obviously a mixture of reconnaissance and strike. The former is aided by, inter alia, a (cloud-penetrating) Synthetic Aperture Radar; the latter by a weapons load which can comprise 2 x GBU12 Paveway II laser-guided bombs, and 4x AGM 114 Hellfire missiles with programmable fusing. The area of reconnaissance is frequently directed by an in-theatre Sentinel, which can oversee a much wider area.

The RAF has lost two Reaper airframes

– both in the launch and recovery phase, when PIO (no doubt exacerbated by the lag after control inputs) is a curse. It has enjoyed good airframe reliability, the systems less so.

It is clear that, even in (or because of) the current state of global conflict, the UK Reaper Force is working very hard – there were no empty GCS for us to visit! Crews work a roster of 6 days on, 3 days off.

Reaper will in due course be replaced by the MQ-9B Protector (again from General Atomics) – an early example made a Transatlantic flight into RIAT last year. It is currently estimated to enter into RAF service in 2021, and is said to be more weather-resilient. Having been certified to NATO and UK standards, it will operate from Waddington (and therefore fly in UK airspace). It will carry both Brimstone missiles and the Paveway IV bomb. Natalie's fascinating presentation elicited a barrage of questions, which she handled with

aplomb.

Then it was on for a briefing from Flt Lt Dave Wisson of the RAF Regiment, who is Exec Officer for the Air Battlespace Training Centre (ABTC). Dave comes from a JTAC background for those interested in RAF/Army front line co-operation. The ABTC is an advanced synthetic training facility for training all levels of the chain of command (on a bi-service basis) in state-on-state warfare. Funding is shared equally between the RAF and the Army. It comes under the aegis of 1 Group, and the Air Warfare Centre, and is operated and supported by the usual mix of UK and US defence contractors, including Boeing.

Exercises are typically at Brigade or Division level. It is heavily data-linked not only to other UK military facilities but also to those of NATO. (A separate new building is in train for F35 ops). But connectivity has a way to go – in answer to a question from a member (clearly with inside info!), connection to the sims at Benson is in the pipeline – just as it was seven years ago! Manning will shortly double.

It utilises three databases: Afghanistan, the North Arabian Gulf, and America (for desert training). The first is being de-emphasised, for obvious reasons. It was clear that the UK derives much utility from the ABTC, of which Flt Lt Wisson was a passionate advocate “We are training brains not hands”. It is perhaps wise not to explore here just how great is its impact on the evolution of tactics.

After lunch in the Mess, when we were



Members in front of an E3, Flt Lt Watson at extreme left

joined again by Gp Capt Burke, we progressed to 8 Sqn, for the benefit of those members who were not on the 2018 visit. We were ably looked after by Flt Lt Kirsty Watson, a Nav, whilst her colleague, Flt Lt Ben Northwood gave us an overview of their air operations. As pilots we were intrigued by the E3 Sentry's low 13 knot cross-wind limitation on wet runways, due to the low ground clearance on the inboard engines. The few Sentries left have big reliability and compatibility issues: it was evident that the squadron is looking forward very much indeed to the introduction into service of its replacement, the E-7 Wedgetail. (The UK is only procuring five airframes, for entry into service early in the next decade). In the meantime our AWACS capability is ebbing away.

Gp Capt Burke, and all our hosts were most hospitable, and we learned much at this visit to one of the RAF's most important stations. Our grateful thanks to Gp Capt Burke and Sqn Ldr Feeley in particular, as well as our own Andy Richardson, for putting together a fascinating day.



Struggling to comprehend the Sentry's capabilities

James Alexander wondering whether to bid for an E3 when they come up for disposal



IBCC

The afternoon concluded with a visit to the International Bomber Command Memorial and Museum at Canwick Hill, just to the South of Lincoln. The IBCC opened eighteen months ago as a long overdue memorial to the 57,861 men of Bomber Command who lost their lives in WW2. The memorial is stunning, and the surrounding landscaping, which echoes all Bomber Command's operational bases, is already impressive. Speaking subjectively, I was less impressed with the museum itself. It makes heavy use of audio archives, which is no bad thing, but is short on artefacts and exhibition cases. It is clearly aimed, perhaps understandably, at younger generations and those with limited knowledge of WW2.

We dispersed after well-earned tea and buns. Thank goodness the weather was more clement for our return.

View of Lincoln Cathedral from the IBCC memorial



The Story Behind the Bomber Command Memorial or 'If Anyone Asks You To Build a Memorial In Central London - Say No!'

Assistant Elizabeth Walkinshaw

The 58th meeting of the Air Pilots Luncheon Club was another fantastic event organised by Past Master Chris Ford, and attended by 96 members and guests. Tom Eeles initiated the day with a reading of Noel Coward's 'Lie in the Dark and Listen'. A truly thought-provoking poem which led on beautifully to the post lunch presentations.

*'Lie in the dark and listen,
It's clear tonight so they're flying high
Hundreds of them, thousands perhaps,
Riding the icy, moonlight sky.
Men, materials, bombs and maps
Altimeters and guns and charts
Coffee, sandwiches, fleece-lined boots
Bones and muscles and minds and hearts
English saplings with English roots
Deep in the earth they've left below
Lie in the dark and let them go
Lie in the dark and listen.
Lie in the dark and listen*

*They're going over in waves and waves
High above villages, hills and streams
Country churches and little graves
And little citizen's worried dreams.
Very soon they'll have reached the sea
And far below them will lie the bays
And coves and sands where they used to be
Taken for summer holidays.
Lie in the dark and let them go
Lie in the dark and listen.
Lie in the dark and listen*

*City magnates and steel contractors,
Factory workers and politicians
Soft hysterical little actors, ballet dancers,
'reserved' musicians,
Safe in your warm civilian beds
Count your profits and count your sheep
Life is flying above your heads
Just turn over and try to sleep.
Lie in the dark and let them go
There is a world you'll never know
Lie in the dark and listen.'*

We were extremely privileged to have not only one, but three expert speakers, our Master, Malcolm White OBE, Dr Alastair Noble of the Air Historical Branch and Philip Jackson, the sculptor.

Our Master, who was speaking as the Chair of the Bomber Command Association (BCA) (2010-2014), took the stage first and amazed us with the complications and intricacies of putting in place a lasting memorial to the Bomber Boys. This certainly explained why he told us his working title had been 'If anyone asks you to build a Memorial in Central London- then say No!'

The Bomber Memorial had been previously considered but Malcolm decided to reconsider it, believing that justice should be done to WW2 members of Bomber Command Story. It was, and remains, important to recognise the young lives taken, and the bravery and courage of the men and women involved. This would mean so much to the family, friends and relatives and there was also the connection to our Livery Company of the realities of that dreadful time. 55,573 members of Bomber Command died on duty. These included 38,500 British, 9,980 Canadians, 4,000 Australians, 1,700 New Zealanders, 2,000 Allied Airmen, 1,479 ground crew, and not forgetting 91 from the Women's Auxiliary Air Force. Not to mention, of course, civilian casualties on the ground. The inscription on the Memorial shows this in that it commemorates those of all nations who lost their lives in the bombing campaign from 1939 to 1945.

Malcolm then went on to say that the neglect of successive governments was a disgrace, and that the defining impact and effect of Bomber Command had never been really understood or acknowledged; he believed that the bombing campaign had helped to make D-Day possible. Malcolm's involvement started in 1992 with the Bomber Harris statue, then came the involvement of the Air Historical Branch which was fundamental in the process, and finally,

the BCA. The big step forwards was in 2009 when Baroness Taylor, speaking in the House of Lords, proposed:

"To ask Her Majesty's Government whether they will accord formal recognition to the men and women of Bomber Command during the Second World War. Their contribution was immense. Their treatment has been shabby and neglectful. It is time this is put right. The time is long overdue, and I hope the Government will recognize it."

The wheels were in motion. There were many problems, setbacks, and hurdles to overcome but at last the Memorial was complete. It had taken eighteen months from laying the first stone to the finish. On the way, there were negotiations with Westminster City Council, the Battle of Britain Memorial Flight, West One for the pavements, TFL for the kerbing and bus stop, BT Open Reach for the London Fibre HUB and BT for the phone box.

Huge sums of money were raised. The VAT bill, fortunately, was settled by the Government. A maintenance bond had to be raised, but, in the end, the opening date was set for 28th June 2012. This was the Queen's Jubilee year and the opening would fall between Her Majesty's visit to Northern Ireland and the Olympics. Her Majesty could and would unveil the Memorial. There were 8,000 guests and three times that number in the surrounding area. The event was attended by veterans from around the world.

A Lancaster left Coningsby for the poppy drop with the unusual and moving request: *"Memorial One Request Taxi.12 POB, 55,000 souls on board"*.

Due to a strong crosswind, a decision had to be made as to whether the aircraft flew overhead or whether the poppies should land in the area. The aircraft flew overhead. Malcolm said that he even found poppies in his garden on his return home.

The traffic needed to stop for the Last Post. Westminster Council would not do agree to this, but the Met Police did. It

was an incredibly hot day and the Air Cadets were praised for a great job of reordering and supplying extra water. One veteran went missing but was found in the Ritz drinking gin and tonic, and the Canadian contingent had a serious problem – they ran out of drink around Greenland!

Malcolm's finishing words were 'There for future generations. It is magnificent'. As one veteran said – "This isn't about us, it is about our friends and colleagues who have lost the last 65 years. I feel different".

Dr Alastair Noble of the Air Historical Branch (AHB) then gave us a further insight into the Memorial. He started by saying he would like to talk about some of the historical issues relating to the Memorial, and secondly talk about the relationship to the breadth of Bomber Command operations. He was not a member of AHB when the Memorial was unveiled in 2012, but explained that the Head of AHB, Sebastian Cox, played a significant role in the project. Seb could not be there but did give Dr Noble his comprehensive notes.

I am actually now going to let you read his notes as they say it all:

Seb's involvement as Historical Adviser arose from discussions between the RAF and the Bomber Command Association. It soon involved a variety of issues.

The Location. Due to Westminster Council's theoretical moratorium on new memorials in central London, initial thinking was to place it in Regent's Park. This was because many Bomber Command air crew were inducted into the RAF at the Air Crew Receiving Centre – known colloquially as the 'ACEY-ARSEY' with a marked emphasis on the latter. The ACRC was actually Lords Cricket Ground – many potential aircrew spent their first hours sitting in the stands waiting for their name to be called out. They were billeted in large blocks of flats around that part of Regent's Park and were marched daily to be fed at London Zoo's cafeteria – resulting in ribaldry that the animals were better treated and better fed. However, MRAF Sir Michael Beetham exerted his considerable influence to argue placing the Memorial more centrally, specifically in Green Park opposite the RAF Club. This proposal eventually won the day.

Aircraft Carvings. As Head of AHB, Seb advised ditching a proposal to put carved representations of all the aircraft flown by Bomber Command on the Memorial. While aircraft such as the Lancaster, Halifax and Mosquito are well known, it was thought confusing to depict aircraft such as the B17 Flying Fortress, Douglas Boston and B-25 Mitchell – although Bomber Command flew these types and men died flying them. It would also have confused people as to whether it was a purely British memorial. A further consideration was that Bomber Command had operated over a dozen aircraft types and the visual aesthetic of the Memorial would potentially be harmed by carvings of very many varied aircraft.

A similar aesthetic consideration surrounded the idea of putting the names of all those killed on the Memorial. Bomber Command lost over 55,500 air crew killed. There was also the question of ground crew – some 500 of whom died in accidents or when their airfields were attacked. Moreover, a memorial which listed names in tabular format is stylistically very different from one which incorporates Philip's splendid sculpted figures as its central focus. There were practical problems too. The logistics of carving so many names literally in stone was hugely challenging. Compiling an accurate list of the names was daunting in itself – only exacerbated by the very tight timescale. [Editor's Note: This problem was resolved by the creation of the IBCC – see the Waddington article on page 24].

Wording was also a concern. Some, like the Mayor of Dresden, expressed doubts about a Bomber Command Memorial. To address such concerns, and because it was more simply the right thing to do, the wording indicated that the memorial remembered victims of all nationalities who had died as a result of WW2 bombing campaigns. The Head of AHB produced the appropriate wording for the Memorial.

Bomber Command was a multi-national body, with thousands of volunteers drawn from the Empire, Dominions and Allied states bolstering the British core. Bravery and sacrifice were drawn from men who came together from all over the world. As the European war concluded – Bomber Command's final blow at Hitler involved obliterating his

Alpine retreat and headquarters at Berchtesgaden on 25 April 1945. Thereafter, came the remarkable phenomenon of Operation Manna of late April and early May 1945 – when starving Dutch civilians received relief supplies from Lancasters. Many of these same personnel performed similar heroics supplying impoverished Berliners during the Berlin Airlift of 1948–49.

In conclusion, the Memorial encapsulates the bravery and sacrifice of Bomber Command. It is a fitting and lasting tribute.

Attention then switched to the sculptor, Philip Jackson, who showed us amazing photos on screen so we could see so clearly how it all evolved. Philip had turned the commission down twice as he felt it was too short notice. There were so few photographs that it was difficult to research, but he was able to use the kit from the RAF Museum to ensure authenticity. He began with a model and invited veterans to look over it and make suggestions. They were at first suspicious and worried that it would not do justice to their memories, but, having viewed each figure once completed, they were won over and became friends with Philip. Philip also had the privilege of a flight in a Lancaster to help identify how it must have felt in the air. The architect for the surround was Liam O'Connor.

The sculpture depicts the seven air crew; the pilot, the wireless operator, the flight engineer, the rear gunner, the mid upper gunner, the bomb aimer and the navigator who is the only one holding a parachute. Philip wanted to capture the emotions of exhaustion, concern, anxiety, sadness, relief and strain and the thought of flying the next mission in 24/28 hours. He sculpted five crew looking upwards searching for the aircraft that would not return, the living looking for the dead, and two crew looking downwards at the ground giving a feeling of pathos and sadness. He wanted to show the link between the living and the dead. He also wanted to show that this was a band of brothers welded together in the heat of war. There were no badges of rank thus showing they were all equally important.

Each figure was cast in bronze in three or four pieces. The whole sculpture was lowered in through a hole in the roof. The inscription is from Pericles:

Freedom is the pure possession of those alone who have the courage to defend it

The plan after the talk was to visit the Memorial with all three speakers but, unfortunately, the heavens opened and Piccadilly turned into a river so this sortie was disappointedly abandoned.

There are some lovely videos on the internet relevant to all this and I would really recommend looking at them.

The key contributors to the project were: the BCA Secretary – Doug Radcliffe and Vivien Hammer; the Fundraisers – Robin Gibb and Jim Dooley; the architect – Liam O'Connor; the sculptor – Philip Jackson; the contractor – Gilbert Ash; the stonemasons – McConnell; the gate guardian (who lived on site throughout) – Sam; the German Ambassador to London, and Bild Zeitung in Dresden

(Malcolm describes how this meeting was held in his kitchen!

The supporting cast included: the lawyer (QS), the RAF Club, the RAF Ceremonial and the 'home team,' as the Master describes them : Seb Cox, Wing Commander Sophy Gardner, and, of course, Vanessa White, the Master's lady. The London Taxi Drivers Association was also a huge help.

The Evolution of Pilot Training

Upper Freeman Captain Mark McCullins RCAF, ret'd

Photos copyright 2018 Mark McCullins

Standing on the grounds of Malmesbury Abbey, it is easy to imagine a small crowd gathered on a crisp morning in the early 11th century to watch the monk, Eilmer, attempt to fly (Brady, 2000a). The medieval historian, William of Malmesbury (n.d.), recorded that Eilmer, inspired by the story of Daedalus, fastened wings to his hands and feet, and leapt from the abbey tower. The brief flight was reported to cover over 200 yards, but it left poor Eilmer with two broken legs and a limp for the rest of his life (Eilmer of Malmesbury, 2018). Clearly some further thought needed to be put into the design of the wings, and a good flight instructor may have helped! Unfortunately for Eilmer neither was

available to him; this was a problem which faced all of the pioneers of flight. The first pilots had no choice but to teach themselves to fly. Rather than follow the approach suggested by Douglas Adams (1979) in *The Hitchhikers Guide to the Galaxy*, of simply throwing themselves at the ground and missing (although this seems to be suspiciously close to Eilmer of Malmesbury's plan), they became the original test pilots as they learned the stability and handling characteristics of their aircraft. If successful in this endeavour, and finding themselves with a usable machine that they knew how to operate, many set off to capitalize on their investment. This required them to teach others how to operate their aircraft, and the field of flight training was born. This field has evolved considerably over the years; as the pace of technological advancement has accelerated, practitioners have struggled to incorporate the latest advancements in teaching and learning whilst remaining relevant to the population of pilots who depend upon their work.

I wish to examine the origins of flight instruction, and how flight training devices and instructional philosophies have evolved from the beginning of manned flight until today. I also look at the projected evolution of pilot training, and briefly discuss technologies and theories of learning that are beginning to be employed. The flight training systems of today have evolved deliberately over the years, and today's students are no

longer required to take a leap of faith to get airborne!

THE FIRST FLIGHT INSTRUCTOR

Human flight was the result of slow and uneven progress from the most basic of flying machines to the Wright Flyer (Brady, 2000b). Many inventors tried to build upon the work of those that had gone before them, but with no aeroplanes yet in existence it could be difficult to find other like-minded individuals who were willing to share their work and experience. One of those rare individuals who felt that progress towards human flight was more important than individual reward or accomplishment was Otto Lilienthal. Jakab writes that:

...the German glider pioneer had developed and published the most advanced conceptual understanding of flight to date, and he had compiled the most viable set of lift data for an actual, flight-tested wing shape. He had more time in the air as a pilot than anyone else, and he was publicly the most widely recognised figure in the pioneering aviation community (1997, p.601).

In addition to publishing his work for others to examine, Lilienthal would demonstrate his gliders to others and share the flight experience that he had built; several other early pioneers had the opportunity to fly his gliders and this contributed to their own understanding and research (Rodriguez, 2000). The field of flight instruction had emerged, but learning was done in the actual aircraft and the methods of instruction used were rudimentary and relied largely on trial and error on the part of the student.

Present day Malmesbury Abbey. While the building has altered over the centuries, the tower is reportedly approximately the same height as in Eilmer's day.





Otto Lilienthal flying his standard model glider. Adapted from, "Otto Lilienthal: the greatest of the precursors" by Jakab, 1997, AIAA Journal, 35(4), p.604.

AERO CLUBS AND SOCIETIES

Another important way that knowledge was shared among flight enthusiasts in the late nineteenth century was through aeronautical clubs and societies. The Royal Aeronautical Society was formed in the United Kingdom in 1866, "...for the advancement of Aerial Navigation and for Observations in Aerology connected therewith" (RAeS, 2018, para 3). Similar clubs and societies were founded in France, the USA, and Germany, and through collaborations with universities and technical institutes the field of Aeronautical Engineering was born (Barata & Neves, 2017). Early pioneers could find both a repository of knowledge within these societies, but also like-minded individuals among their membership. They helped overcome limitations to communication in the late 19th century by providing this central repository of aviation knowledge, and access to others who were engaged in experimentation and development. Many of these bodies continue to exist today and contribute to the further advancement of aerospace and aviation education and training (RAeS, 2018).

EARLY SCHOOLS AND INSTRUCTION

Prior to World War One there was no large scale pilot training system; the United States entered the War with only sixty-five army pilots and a small number of training aircraft and facilities (Brady, 2000c). The Wright brothers established



An early attempt at flight simulation by using controls to balance on two half barrels. Adapted from, Brief history of flight simulation by Page, R. (n.d.).

the first civilian flying school in 1910 in Montgomery, Alabama, and for several months Orville taught students to fly (Ennels, 2002). Glenn Curtiss also established a school to compete with the Wrights, and the race was on to recruit and teach (Shulman, 2009). The Wright brothers' early effort was plagued by bad weather and mechanical unreliability, but several students successfully flew, and Ennels reports that the weather produced an interesting side effect:

...the strong winds proved to be a blessing in disguise. Unwilling to waste time waiting for the currents to die down, Orville innovatively decided to use them to simulate flight

conditions. With the biplane facing the winds and mounted on the tracks, the students learned how to use the levers to warp the wings and work the elevators. These rudimentary techniques proved beneficial to the students once they were actually in the air and would later lead to full-fledged flight simulation training back in Ohio (2002, para 39).

Orville instinctively realised the benefits of realistic ground training in both improving student performance and reducing risk; however, he was not the only one to reach this conclusion. Schools and training facilities worldwide were looking to reduce the costs



Modern full motion flight simulators at the Airbus Training Center in Miami, Florida. These simulators can be used to fully license pilots to fly the A320 without them ever having to fly the actual aircraft.

associated with training in actual airplanes, and to reduce their student's exposure to the risks of training before they had developed the requisite control skills.

THE BIRTH AND EVOLUTION OF THE FLIGHT SIMULATOR

The Airbus Training Centre in Toulouse, France, had a strange looking device in its entrance lobby for many years. Pictured in Figure 3, it consisted of two barrel halves on which a control system and mock cockpit were balanced. It was an early Antoinette training device, and could be made to move by the 'operators' who are seen surrounding it; the pilot would then attempt to rebalance the machine using the controls provided, and would align the reference bar pictured in front of him with the horizon (Page, n.d.). Much like Orville Wright's captive flights in Montgomery, this arrangement was made to simulate controlling an aircraft that was disturbed by currents of air, and the pilot could develop and reinforce control movements at no risk to himself. Flight simulation was born, and this quickly combined with an interest in long range navigation and blind flying. James Doolittle and

Lawrence Sperry were pioneers in this field, and their development and testing of the gyrocompass set the stage for the next major advance in simulation (Scheck, 2004). To replace the human operators of the Antoinette device, a system was needed that would provide stability and ability for movement to the simulator, and give the operator sufficient information with which he could 'fly' the device. In the 1920's technology had advanced to the point where motors could be used to provide the required movement for the device, and Sperry's gyrocompasses alongside Doolittle's instrumentation gave both the stability and information needed for the simulator pilot to 'fly' and navigate the device (Page, n.d.). Jeon (2015) writes that the Link Trainer that was developed in the period from 1927-1929 embodied all of these features, and trained a generation of pilots in the interwar years. As it had no visual systems, he explains that it, "...simulated not the conditions of the air, but rather the conditions of the cockpit within which all aerial experience occurred as far as the pilot was concerned" (p.30). Analogue and then electronic computers were incorporated to calculate aircraft motion and flight dynamics, and this was

followed by visual systems that allowed simulators to truly represent the flying and not just the cockpit environment (Page, n.d.). The twin barrels of the Antoinette training device have evolved over a period of eighty years into the full motion flight simulator systems shown in Figure 4. These marvels of technology allow one to experience flight without ever leaving the ground, and allow the pilots to learn from all manner of systems faults and failures without exposing themselves to actual risk. They have become the bedrock of the modern airline training system, and it is difficult to imagine flight crew education without them.

THE EVOLUTION OF THE FLIGHT SCHOOL

While the simulators and training devices began evolving prior to World War 1, it was the war itself that provided a massive shock to the pilot training system. Suddenly there was a massive demand for skilled pilots, and no real system in place to train them (Barata & Neves, 2017). All sides rushed to meet the demand for trained aircrew and a number of innovative approaches were developed. The Royal Flying Corps in the United Kingdom developed the Gosport system that provided both standardized training and an effective way for the flight instructor to communicate with the student (Brady, 2000c). The United States adopted many of the elements of the Gosport System, but turned to the universities to establish Schools of Military Aeronautics that would provide ground training and aeronautical knowledge to prospective pilots (Craft, 1999). Standardization of instruction was emphasized, and ground, primary, and advanced flying courses were completed in a period of approximately six months (Brady, 2000c). Over 15,000 cadets entered this system, and approximately 8,700 graduated, marking an incredible ramping up in pilot production to address the needs of the US Army Air Corps (Brady, 2000c).

Following the war many of these cadets looked to continue their careers in aviation, and despite the drawdown in

military aviation a number of schools were established to support an anticipated increase in demand for flying. One such school was the Embry-Riddle School of Aviation that was opened in Cincinnati, Ohio, in 1925 (Barata & Neves, 2017). The school aimed to train aeroplane pilots in an efficient manner, and drew on many of the principles and best practices of the military training systems of the preceding decade. When the United States Army Air Corps (USAAC) was confronted with the need rapidly to expand its training capacity on the eve of World War 2, these civilian schools and associated universities would prove vital in producing the number of pilots required to satisfy the war effort. Major General Henry 'Hap' Arnold overruled his Air Staff when confronted with their solutions on how to train military pilots, and insisted on using civilian flight schools and contractors (Craft, 2012). This close association between the aeronautical universities and the United States military persists today, and during World War 2 it was responsible for ensuring a steady supply of trained pilots. The standardized system that they followed, combined with the use of innovative devices such as the Link trainer, produced an environment that would still be recognizable in a flight school today. After World War 2 the jet age began, as did the era of long range passenger transport and the rise of the modern air transportation system. This would place new demands on pilots and the education system that trained them, and the industry would need to recognize this and adapt to it (Davies, 1971).

THE RISE OF COCKPIT RESOURCE MANAGEMENT AND ADULT LEARNING THEORIES

According to Cook (1995):

With the advent of the jet age in 1958, commercial air travel accident rates began a precipitous decline, but by the early 1970s the decline levelled off and has remained low but nearly constant. Because of jet aircraft systems' reliability and redundancy, accidents due primarily to mechanical failure are rare (p.26).

It was recognized that human factors were weaving an increasingly common thread through commercial aircraft accidents, and that the stereotypical military captain's approach to crew management was too common and not serving the airlines and their passengers well. Following several well-publicized accidents it was obvious that something had to be done, and in 1981 United Airlines launched its first Cockpit Resource Management (CRM) programme (Helmreich, Merritt & Wilhelm, 1999). This programme aimed to increase effective communication on the flight deck, and to reduce accidents through improved crew functioning. Programmes such as this have been a fixture at all major North American and European air carriers since then, and have been credited with the further progressive reduction of airline accident rates (Cook, 1995). The European Aviation Safety Agency (EASA) has introduced a Multi-Crew Pilot Licence (MPL), with CRM heavily integrated into its curriculum, for new pilots whose primary goal is to begin their careers as a co-pilot with an air carrier (ECA, 2014). MPL holders have no privileges to command aircraft for commercial flights until they reach the required hours for Captaincy and an Airline Transport Pilot Licence (ATPL), but they begin their careers with a skill set that was specifically targeted towards their role as a co-pilot and a corresponding effectiveness as part of a multi-crew flight deck (ECA, 2014).

The push towards integrated CRM training in the pilot community was accompanied by a steady push towards the professionalization of the piloting trade, and the integration of a more structured and rigid academic approach for those who would be professional pilots (Bravenboer & Lester, 2016). Bravenboer and Lester write that, "...for the first time aspects of the early career professional practice of licensed professional pilots would be formalised (sic) and used to construct the final stage of the degree through work-based learning" (2016, p.415). As a university degree is often associated with professional status, it was seen as

necessary to deliver pilot training and qualification in the context of a degree programme. The education of pilots was then more closely examined in an increasingly academic setting, and the early Nineties saw research into the application of adult learning theories to the field of aviation education (Brady, Stolzer, Muller & Schaum, 2001). The uniqueness of both aviation students and the environment in which they learn was becoming apparent, and was causing researchers to question whether the past methods used for instruction were actually the best. Brady et al's (2001) article entitled, "*A Comparison of the Learning Styles of Aviation and Non-aviation College Students*," concludes that, "...aviation educators should further explore and adopt adult-learning strategies and methodologies." Aviation education continues to develop, and as systems and technologies continue to advance a continued and persistent effort must be made to ensure that pilots receive the most effective and reliable instruction possible. The optimal delivery of training will ensure that safety margins continue to improve, and that pilots are equipped to deal with even more complicated scenarios.

EVIDENCE BASED TRAINING

In order to provide a more structured approach to pilot training, and to incorporate observed events from the real world, the International Civil Aviation Organization (ICAO) has developed a training concept known as Evidence Based Training (EBT). According to ICAO (2013) Evidence Based Training is, "*Training and assessment based on operational data that is characterized by developing and assessing the overall capability of a trainee across a range of core competencies rather than by measuring the performance in individual events or manoeuvres*" (p. xi). It is viewed by its developer, the EBT Foundation, as:

...a new approach, developed on behalf of the International Civil Aviation Organisation (ICAO), led by a large group of airline industry experts with the goal to increase the effectiveness of pilot training and meet the challenges of airline operations in the 21st

Century (2018, para 1).

ICAO intends for EBT to be the direction that aviation training takes in the near future, and it is pushing both manufacturers and national authorities to adopt its principles (*Competency-based training: The future of the aviation industry?*, 2017). Franks, Hay, and Mavin (2014) express concern that while EBT provides a convenient means for codifying skills for instructional and evaluation purposes, it provokes a tendency to train to a minimum level of competence. They also state that, *“There is a tendency for this training to deemphasize the development of cognitive skills required for complex decision making during flight”* (p.133). Preston (2013) takes this assertion further, claiming that it ignores fundamental tenets of human learning, and that it destroys the development of metacognitive skills such as those required for effective CRM. Further assessment of this approach is needed, and its implementation and effectiveness is a vital area for further study and research.

FUTURE TRENDS

Neither technology nor aviation is a stagnant field of endeavour, and progress in one of these fields can have a profound effect on the other. This leaves educators with a myriad of challenges to overcome if they are effectively to deliver training to the newest generations of learners. A common complaint heard about today's students is that they no longer read, and seem to be constantly looking for more varied stimulation. An article on Learning Styles points out that:

“The problem is not that today's learners are illiterate. They are writing more (emails) and sending more (text) messages, just in ways different to previous generations. As we have seen, they are the most educated generation in our history. The issue is that the literate forms of communication alone just won't connect in today's visual world. Today's learners are a multi-modal generation and therefore demand communication styles that engage multiple learning channels...” (2017).

This places exceptional demands on both the courseware designers and the educators, who must find increasingly

varied ways to connect with students and deliver material in a meaningful fashion. The latest Virtual Reality (VR) and Augmented Reality (AR) devices and applications give instructors the opportunity to engage with students in exciting and meaningful ways, and have the potential truly to revolutionize the field of aviation education.

Airbus has successfully employed both AR and VR in its flight training program for the Airbus A350 XWB range of aircraft. It has developed the A350 Airbus Cockpit Environment (ACE) trainer, which uses both a VR environment and an EBT learning approach. This fundamentally changes the way that Type Rating training is approached on the A350 fleet (Robinson, 2017). As opposed to days or weeks of book learning followed by a procedures trainer, students now interact with the aircraft from lesson one, thereby building important visual and muscle memory while simultaneously learning system function. The ACE has also allowed the FFS portion of the training to be more closely integrated with the systems portion of the course, with students alternating between the ACE, the flat panel cockpit trainer, and the FFS as the course progresses. The end result is students who are better prepared for the actual FFS lessons, and who are more able to learn and benefit from the higher fidelity, and more expensive, flight training devices (Sheppard, 2017). Future applications of this technology go well beyond simply learning a new aircraft, and one day it may be possible to operate a real aircraft remotely from the same environment in which one acquired the type rating. Most importantly, leveraging these new methods of learning allows material to be delivered in a fashion that best suits the student, which enhances learning and retention. Students are more engaged, more involved in their learning, and more fully display the characteristics of aviation learners that were identified by Brady et al (2001). This is a benefit to the student personally, and the field of aviation as a whole.

CONCLUSION

Aviation is a rapidly evolving field, and the same can be said for aviation education and pilot training. It has been only 115 years since the Wright Brothers' first flight, and only 80 years separate the simulators in Figures 3 and 4. As the pace of technological advancement has accelerated, practitioners have struggled to incorporate the latest advancements in teaching and learning while remaining relevant to the population of pilots who depend upon their work. This paper has traced the origins of flight instruction from the early pioneers and societies, to the post-war schools that led the movement to professionalize the pilot trade. New approaches to teaching and learning are being tested, and it remains to be seen if EBT is truly the best way to proceed to teach the next generation of pilots. The tools of flight instruction have also evolved in parallel with these techniques and approaches, and the physical simulators of today may be replaced by tomorrow's virtual reality environments. These tools will allow students to access information and learning in a way that best suits them, delivering a truly personalized education. It is an incredible set of circumstances to ponder, perhaps best aided by a pint of one of the excellent beers shown in Figure 5, served at the Flying Monk Tavern close to Malmesbury! Eilmer the Monk was a pioneer and a dreamer; I wonder if he could have possibly have conceived of the actual events that took place as both flight and flight instruction evolved, and what he would have thought of them?



An unforeseen legacy from one of the earliest attempts at human flight: the beer selection at the Flying Monk Tavern located close to Malmesbury.

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