

AUGUST 2021 ISSUE 46



AIR PILOT



INSIDE

FLYING-IN IS BACK!

REBUILDING A TYPHOON

THE WEATHER FROM SPACE



THE HONOURABLE COMPANY OF AIR PILOTS

incorporating Air Navigators

FORMER 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:

Sqn Ldr Nick Goodwyn MA Dip Psych CFS RAF (ret)

CLERK:

Paul J Tacon BA FCIS

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

PUBLISHED BY:

The Honourable Company of Air Pilots,
Air Pilots House, 52A Borough High Street,
London SE1 1XN
EMAIL: office@airpilots.org
www.airpilots.org

EDITOR:

Allan Winn EMAIL: editor@airpilots.org

DEPUTY EDITOR:

Stephen Bridgewater EMAIL: deputyeditor@airpilots.org

EDITORIAL CONTRIBUTIONS:

The copy deadline for the October 2021 edition of *Air Pilot*
is 1st September 2021.

FUNCTION PHOTOGRAPHY:

Gerald Sharp Photography
View images and order prints on-line.
TELEPHONE: 020 8599 5070
EMAIL: info@sharpphoto.co.uk
WEBSITE: www.sharpphoto.co.uk

PRINTED BY:

Printovation Ltd 01494 478870

Except where specifically stated, none of the material in this issue is
to be taken as expressing the opinion of the Court of the Company.

DIARY

With the gradual relaxing of lockdown restrictions the Company is hopeful that the following events will be able to take place 'in person' as opposed to 'virtually'. These are obviously subject to any subsequent change in regulations and members are advised to check before making travel plans.

AUGUST 2021

3 rd	Air Pilot Flying Club Fly-in	Lee on the Solent
10 th	Air Pilot Flying Club Fly-in	Popham
15 th	Air Pilot Flying Club Summer BBQ	White Waltham

SEPTEMBER 2021

15 th	APPL	APH
15 th	Air Pilot Flying Club Fly-in	Oaksey Park
16 th	GP&F	APH
16 th	Court	Cutlers' Hall
21 st	Luncheon Club	RAF Club
21 st	Tymms Lecture	RAF Club
30 th	Air Pilot Flying Club Fly-in	Compton Abbas

OCTOBER 2021

14 th	GP&F	APH
21 st	T&A Banquet	Guildhall

Applications for Visits and Events

Please kindly note that we are ceasing publication of printed 'flyers' and application forms for visits and events. From now, details and applications for all visits and events will only be available online - on the website and a via links in the e-news and events bulletins which are circulated by email to members.



Access the Company's
website via this QR code,
or follow us on
Twitter @AirPlotsCo



A MESSAGE FROM YOUR EDITOR...



For more than eight decades, civil aviation has been an exemplar of international co-operation and the acceptance of common (or at least compatible) standards, with the United Nations specialised agency the International Civil Aviation Organisation (ICAO) as its unifying sponsor. In recent months, however, the protocols which

have worked so well in facilitating largely restriction-free travel across borders have increasingly been sidelined under the various onslaughts of unilateral actions and inconsistent responses to the Covid-19 pandemic by governments around the world. Civil aviation will continue to be the loser unless many of those governments begin to pay more attention to the global good rather than their own selfish interests – and if civil aviation suffers, so does wider society.

The inconsistent response to Covid-19 and to the re-opening of international travel is having a terrible effect now, and for the future. Even after making allowances for the varying degrees to which individual national populations have benefitted from vaccination, there seems to be a lack of collective international government will to the re-opening of air services. There is no point in one country easing restrictions on travellers leaving its territory if the countries to which its citizens want to travel deny them admission, or opening its borders to citizens of countries who are not allowed to travel.

At the same time we have seen the Belarus government effectively hijacking a civil airliner, travelling through its airspace but not scheduled to land in its territory, in order to detain an individual who was not the subject of any recognised international arrest warrant. We have also seen the British government working in direct contradiction to the general trend of recent years towards greater standardisation and unification of regulation and practice, by willingly disengaging from EASA and its standards for no good reason other than dogma but with the end result of seriously impairing the ability of British pilots to exercise their profession in other European countries.

There is now a serious need for governments across the world to revisit the spirit of the Bermuda Agreement of 1946, under which they sought to make international air travel work better and more safely, and to ask themselves in whose interest it is to pursue their current apparent efforts to make it more difficult and, arguably, less safe. The quest should surely be how to quickly break down the barriers erected because of Covid, to rigorously enforce the right to safe travel across borders and through national airspaces, and to restore the reciprocity of recognition of legitimate licences. Only in that way can we see air services restored, and pilots returned to practising their profession.

Allan Winn - Editor

IN THIS ISSUE...

NEWS

- 4 News Round Up
- 6 Gazette

REPORTS

- 7 The Master's Message
- 9 Young Members Update
- 10 Regional Reports - Australia
- 11 Regional Reports - North America
- 13 Regional Reports - Hong Kong
- 15 From the desk of the DAA



FEATURES

- 14 Cranwell: A Century of "An Essential Foundation"
- 17 Company Flying Scholarships and the Pandemic
- 18 The Best in the World
- 19 Space Weather and Aviation
- 22 Raising a Storm
- 24 Don't Mention the Medical
- 26 My Encounter with a Harrier
- 28 Into the Overshoot



Cover photos: Guided tours of Catalina G-PBYA were a bonus of the APFC Duxford Fly-In, p4 (Steve Bridgewater/ *Awyr Aviation Communications*); Solar flares affect our weather, p19 (ESA)

Guidelines for submissions to Air Pilot

Please submit contributions as follows:

- Text in word document, including your name below the title of the piece;
- No embedded photos;
- All images to be sent as jpeg files with a file size of at least 2 MB;
- More than 2 images to be sent via a Dropbox file, rather than an e-mail attachment.

NEWS ROUNDUP



DUXFORD FLY-IN

By The Editor

The Air Pilots Flying Club held a highly successful fly-in to Duxford on Armed Forces Day, 26th June. Some 30 members attended, bringing with them a total of 14 aircraft. During their visit, the members visited the resident Hawker Siddeley Buccaneer Mk 2b XV865, arranged by Liveryman Tom Eeles, who had flown this aircraft. They also had guided tours of Consolidated PB5A Catalina G-PBYA operated by Plane Sailing Ltd, two of whose shareholder pilots are Warden Richie Piper and Freeman Jeff Boyling, and on which the Hon Editor had just enjoyed a fascinating flight across East Anglia courtesy of Jeff.

APFC Chairman Richie Piper reports: "Generally this year and last, the committee have met and reviewed events three times as often as in pre-Covid times. This year's events were planned to start later and fit in with the planned removal of restrictions. In the event, with the one month delay, the first fly-in planned at Duxford on 26th June was continued with but applying the strict limit of 30 attendees. To this end coordinator Malcolm Ward carefully managed the attendee and reserve list to ensure we complied fully with the regulations. This included replacing those who had to drop out and replace them with those on the reserve list even as late as the night before. Through this work the maximum of 30 attendees was achieved."



*APFC at lunch
(Mark Green)*



The Catalina awaits her visitors (Mark Green)

Duxford attendees:

Rob Owens/ Mark Green	PA-28 G-WWAL	White Waltham
John Towell/ Malcolm Ward	DH82a G-ANFM	White Waltham
Chris Reynolds/ Dacre Watson	PA-22 G-BUVA	Oaksey
Peter Dobson/ Richie Piper/ Rob Piper	PA-32 G-OJCW	Frensham
Mike/Mary Gush	Chipmunk G-BCEY	White Waltham
Cynthia Robinson	C-152 G-BSCZ	Halton
Tom Kinnaird	DH 82a G-ALJL	White Waltham
Chris Squire	Fuji 200	White Waltham
David Cockburn/ Jerry Neild	Beech 24 N39TA	Sherburn
Gerry Gerrard/ Bob Turner	PA-28 G-BEYL	Henstridge
Tom Eeles/ Paul Smiddy	Glaster G-SKUA	Tibenham
Roger Dunn	Mooney G-OJAC	Biggin Hill
Gareth / Viv Cunningham	RV6 G-BZXB	Tibenham

Also attended: Robin Keegan; Nick, Lenka & Benji Goodwyn; David Curgenvin; Tony Clinch; Roger Gault

(mostly) APFC aircraft line-up (Richie Piper)



*APFC Secretary
Malcolm Ward flies
home with PM John
Towell (Malcolm Ward)*

INTER-LIVERY CLAY SHOOT

By Liveryman Andy Bunn

This year's Inter-Livery Clay shoot was once again held at the prestigious Holland & Holland shooting ground near Ruislip in Middlesex on Wednesday 23rd June.

It was a lovely sunny day (after the previous few days of heavy rain) when I met up with the rest of this year's team comprising Liverymen Dr Ian McKenzie, Paul Smiddy and John Price for an early breakfast bacon and Cumberland sausage bun!!

The course is set out over the beautiful grounds and consisting of ten stands with four pairs of targets on each stand (except stand 10, which was the high tower for which the ground is famous, and had an extra pair of clays to give us more of a chance!) to give a total of 82 clays each and the "flush" of 80. The flush is where up to 8 clays at a time are thrown into the air, with all 4 of us standing in a line shooting as many of them as fast as we can!! (We hit a respectable 65 out of 80, but the Bowyers had the best score only missing 1).

Elevenes were brought round whilst we were out on the course, and the delicious sausage rolls were gratefully devoured. Lunch was served after we had finished shooting and was washed down with a thirst quenching beer!

As a team we came a very respectable joint 34th out of 120 teams with a score of 234 out of a possible 408, with an individual highest place being joint 18th, with a score of 54 out of 82.

The Gunmakers took nearly all the top prizes with a team total of 326 out of a maximum 408.

The highest Ladies score (of which we have had one in previous years, by Becky Gilbert!!) was 52 from Antonia Pusey.



The Air Pilots team, armed for action (Andy Bunn)

INTER LIVERY TEAM SCORE CARD											
TEAM NAME: Holland											
SHOOTERS	1	2	3	4	5	6	7	8	9	10	TOTAL
Andy Bunn	11	10	10	10	10	10	10	10	10	10	100
Dr Ian McKenzie	7	4	5	2	1	7	1	1	7	3	50
Paul Smiddy	6	7	7	4	4	1	1	1	1	1	34
John Price	5	4	7	6	5	1	1	1	1	1	44
FLUSH TOTAL	65										234
											408

The main reason for the day, however, is charity and £1,000 was donated to the Lord Mayor's charity and over £4,000 to the differing charities of the various winners.

I am always looking to increase our presence at the event and welcome anyone who would like to come. It is a very enjoyable day and a rare opportunity to shoot at what is arguably the premier shooting ground in the country. □

OBITUARY: FORMER LIVERYMAN GEORGE ENGLISH

By Liveryman John Tribe

The Company is saddened to hear of the death of Liveryman George English, long-time enthusiastic supporter of the Guild and Company, who passed away in Cocoa Beach, Florida on 6th June aged 92.

George was the Director of the NASA Executive Management Office at the Kennedy Space Center in Florida serving the first five Center Directors from Dr Kurt Debus through to former Shuttle astronaut Bob Crippen over a 30-year span. In 1996 he entertained and arranged a special KSC tour and launch viewing for the Master and other representatives of the-then Guild. Lasting friendships

from this encounter led to his continued association with the Guild and Honorable Company and his subsequent election to Liveryman in 2007. He was an enthusiastic attendee every year of both the Livery and the Trophies & Awards Banquets until health issues limited his travel. □



George English with Robert "Hoot" Gibson when the latter accepted the Award of Honour in 2016

THE COURT MEETS AGAIN – IN PERSON

The second meeting of the Court in the 2021-22 Session, on 15th July, was the first to be held “live”, in person, since February 2020. This physical meeting was held in Cutlers’ Hall, but because of the continuing Covid-19 pandemic, Court Members were also able to join by Zoom, making this also the first ever “hybrid” meeting of the Court.



The Court meets in person - and on Zoom (Robin Keegan)

GAZETTE

APPROVED BY THE COURT

15th JULY 2021

ADMISSIONS

As Upper Freeman

Stephen Joel BEATTIE

Philip John BIRD

Tony Mark August DE BRUYN (OS)

Wynand Pieter OOSTHUIZEN (HK)

Shane RYAN (OS)

As Freeman

Nicholas George Peter BIRD

David Owen HARRIS

Lord Julian MOUNTAIN

As Associate

Elton LEE (AUS)

Scott Alexander ROBINSON

Mack Graham RUTHERFORD (OS)

Daniel James TUCKWELL

ACKNOWLEDGED BY THE COURT

15th JULY 2021

REINSTATEMENT

Andrew COVERDALE (OS)

Mawgan GRACE (HK)

Mark RINDFLEISH (AUS)

Samuel WORTHINGTON-LEESE

DECEASED

John GRATY

Michael KILLINGSWORTH (AUS)

Dale REYNOLDS

RESIGNATIONS

Steven KIRUPAI

Thomas CHESTER (NA)

Vanessa JAGO (NA)

Michael PAUL (NA)





MASTER'S MESSAGE

Sqn Ldr Nick Goodwyn

RESILIENCE AND REGENERATION

We are, I believe, entering a new phase of this long and challenging pandemic in the UK, as the

government messaging moves to 'learning to live with Covid' and we see the gradual release from restrictions and the blossoming of a return to what will be a re-defined normality and a regeneration of activity both within our industry and in the Livery movement. I believe we will need great resilience as there is still much turbulent air to pass through and, like clear air turbulence, I suspect we cannot yet see what that fully looks like. And whilst I reflect on this situation in the UK, my thoughts are also with our members in our regions who will have an equally difficult path to navigate as was testified in a recent regional conference call with the chairs of the regions.

Learning to live with Covid beholds equally on authorities as well as on the population and so support to the aviation

industry and the need to explore all avenues in opening up air travel is absolutely essential. Forecasts suggest that short-haul flying will regenerate quicker than long-haul and most major airlines appear to be looking to next spring for a full ramp-up of operations. What is crucial is for support from governments, for example, to agree air corridors to the US and the like as soon as possible. Air travel is not just for holidays but is for business and for enabling dislocated families to be able to meet, which I know only too well personally having not been able to travel to see family abroad or for them to visit here for nearly 18 months. In all this regeneration, we will need great resilience as the aviation operational environment has changed, even in the sectors of the industry that have seen increased activity such as business aviation, cargo and both on-shore and off-shore rotary operations.

Resilience comes from mindset. Emergent evidence suggests that skill fade has not been the core issue for pilots furloughed or laid off for long periods on return to flying, but the ability to resist and adapt to external stressors, changes and change management forms an inherent part of personal resilience. In an operational environment where so much has changed, personal wellbeing and human performance remain core to safe regeneration in the aviation industry.

Activities within the livery movement are also regenerating. I have been able to attend events in person and represent the Air Pilots as Master as well as meeting 'live' other Masters of Livery Companies. I attended the Lord Mayor's Service of Reflection and Hope at St Pauls Cathedral and attended Common Hall and the election of the Sheriffs in Guildhall. Sadly, the summer supper, the Court lunch and the consorts-and-partners visit to the Gardens Museum fell victim to the extension of restrictions to mid-July. However, with some optimism (and fingers crossed) I am very much looking forward to our Livery dinner at Carpenters Hall and

With Lenka and Benji and the Catalina at Duxford



the opportunity for many of us to meet and dine together again.

Within the Air Pilots, again I am taken aback by the dedication and efforts of so many of you in participating in Company activities. Under Assistant Steve Durrell's watch, the promotions team have been supporting the Livery Schools Link showcase and a first live event at the Wallop Wheels and Wings at the Army Flying Museum AAC Middle Wallop. Meanwhile, the Air Pilots clay shooting team more than held their own in the Inter-Livery shooting championships.

The Air Pilots Flying Club organised its first fly-in this season to Duxford where my family and I were able to join and meet many of the members with some 14 aircraft attending. A big thank you to Malcolm Ward and the APFC executive for all the organisation and also to Warden Richie Piper and Liveryman Tom Eeles for arranging tours of the Catalina and Buccaneer. I hope the Club will be able to enjoy many more fly-ins over the summer (weather permitting).

As I mentioned, there is much ongoing activity and I apologise if I have missed out anybody. But whoever and whatever is happening please do drop me a line and tell me about it.

DAA RETIRES

Liveryman John Turner has been our Director of Aviation Affairs (DAA) for more than nine years and he has decided that it is time that he stood down. He will be sorely missed and a hard act to follow. Since taking on the DAA responsibilities, John has been instrumental in transforming the Company's technical activities. The Regions are now much more and better engaged and involved, with representatives firmly embedded in the International Technical Forum (ITF). He also established several active Technical Groups, now drawing members from within and outside the ITF and from the Regions to provide the wider perspective as well as their energy and enthusiasm to the tasks. In the UK, John has enabled regular and consistent engagement with the Department for Transport, the All-Party Parliamentary Group – General Aviation and the Civil Aviation Authority (including fora such as the National Air Traffic Management Advisory Committee (NATMAC) and GA Partnership) and others, and he has grown the Company's visibility and its standing amongst regulators, legislators and the wider aviation sector:

On behalf of all our members, I would like to offer my sincere thanks and gratitude for all that John has done in his tenure as DAA.

The Trophies and Awards Committee met recently to discuss and agree nominations for this year's awards. At this meeting Past Master Clive Elton announced that he would be retiring from the committee after an amazing 28 years first as Master, then Chair and then as a member. His wisdom, knowledge, intuition and judgement have been exemplary and he will leave big shoes to fill. Thank you for all that you have done serving the committee over all those years.

Lastly, I would also like to offer my congratulations to Liveryman Ben Griffiths for winning the award of Aerospace Communicator of the Year 2021 at the recent Aerospace Media Awards ceremony and also to Liveryman Cynthia Robinson who has been elected President of the Royal Institute of Navigation.

I hope that many of you are able to enjoy the summer months with blue skies and perhaps the chance to get away home or abroad. □

*Attending the Lord Mayor's Service of Reflection and Hope,
St Paul's Cathedral*





YOUNG MEMBERS UPDATE

*By Associate Toby Eden, Social Media & Comms Lead
(Young Members)*

As we now creep into the summer months I can't help but write this article with cautious optimism for a hope of returning to a new normality. With restrictions starting to ease, restarting our much-loved Events and Visits has been a key focus since our last update. As I'm sure you can all agree these types of events have been extremely missed over the last 18 months, so I hope you share our excitement at the opportunity of bringing them back.

Tom Handy, one of our newest Young Air Pilot committee members and Events & Visits Lead, has been working tirelessly planning a pipeline of events for this summer. We had worked in collaboration with the Air League to offer a subsidised reduced ticket price to our members for the Air League Networking Event on HQS Wellington on 15th July, though this event was unfortunately cancelled owing to continued restrictions.

Sometimes events are planned purely to enable members to socialise, share stories and connect with other aviators in a more relaxed fashion, and we are planning such a Young Air Pilot Summer Social event in mid-August. Unfortunately, the Young Aviator Dinner is to remain postponed until early 2022; however we are working on an Air League Mixer by the end of the year, so look out for more information to follow at a later edition.

Due to the engagement, value and ease of attendance they offer, we have received some incredible feedback from the Virtual Coffee Mornings. We are currently on a summer break for the series, but they will be a semi-regular fixture in the 'post-Covid era' with some incredible speakers already planned.

Since our last update we have successfully recruited and trained three more mentors, as well as receiving some extremely positive and constructive feedback surrounding both the formal and informal mentoring that we offer. We have a key focus on iterative improvements to be made throughout the course of the year and have recently publicised some interviews on the company website which you can view at your own leisure for an insight into mentoring.

We owe a special thanks to Rob Mackenzie for his continuing hard work and efforts in the progress of our Career Development and Training. It was incredible to host our first 'Star Panel' at the end of March, providing our



HQS Wellington, where we should have been in July

Young Members with an open platform and opportunity to ask any aviation related questions to a panel of highly experienced aviation experts. The second half of the year will see the return of our Interview and Aptitude training days which are invaluable to providing our Young Members with the knowledge and feedback they need to be able to excel in upcoming interviews and assessments. We also recognise the importance of knowing oneself and being able to build and develop on your own strengths and weaknesses, which is why we will be launching a number of personal development workshops in the coming months. It has been fantastic to assist in the launch and promotion of Scholarships once again this year, with a record number of applications, and we remain committed to being involved so that young people are aware and have access to the programme. A new liaison role, led by Dominic Registe, will enable us to support the Scholarship committee and contribute to this incredible programme. Hopefully you are reading this article with the same great sense of pride that I am feeling whilst writing it. Over the last couple of years, the Young Air Pilots has continued to improve and become more of a staple in the Company. We are continuously striving to provide Young Members with the opportunities they deserve, especially when times are as difficult in the industry as they are right now. A huge thanks goes to our Young Air Pilot Committee Chair, Will Wright, as he has been the driving force of getting the Young Air Pilots to the place that it is now. He is normally the one to write our quarterly updates but due to sickness, he has bestowed the task upon me. I'm sure you are all with me in wishing him a speedy recovery and looking forward to his article in the next edition. □

REGIONAL REPORTS

Australia Region

By Upper Freeman Rob Dicker, Chairman, Australia Region



Up until mid-June I would say that there was cautious optimism that, at least domestically, aviation in Australia was rebounding well with significant demand for internal travel, as well as the establishment of quarantine-free travel between Australia and New Zealand. Anecdotally, I was aware of

the increase in traffic, as my son, who lives under the approach to RWY16L at Sydney, was experiencing a dramatic rise in the number of aircraft flying over his apartment. RWY16L had been used to park aircraft up until earlier this year.

However, that optimism was given a serious reality check in late June when all but a few of the capital cities had breakdowns in hotel quarantine, the most significant in Sydney, putting most into a lockdown, of various durations, and the closing of state borders. As I write, I am myself under stay-at-home orders for the first time in over a year!

Closer examination reveals that there has been at least one breakdown in hotel quarantine every month since December 2020 and, in a number of cases, healthy people becoming infected while in hotel quarantine. Belatedly, the federal government has accepted that using hotels for quarantine may not be fit for purpose and is moving to establish several dedicated quarantine facilities in a number of states. The other factor is vaccination rates, which are still quite low with only 15% of the Australian population receiving at least one dose and only 5% with two doses thus far.

PLANNING REMAINS FRAUGHT

Until these two issues are properly addressed the knock-on effect is that planning for any sort of event that involves interstate travel can be very fraught. One of the larger events planned for later in the year is the Avalon Airshow, which will also be part of the RAAF Centenary celebrations. Additionally, the likelihood of our international borders opening before they are addressed is probably nil. In our recent discussions with the Master and Clerk there

appeared to be an acceptance that a tour of Australia was unlikely in 2021 and possibly not before the second quarter of 2022.

At the moment planning for annual dinners in various states towards the end of the year is going ahead. Last year we managed to hold three, avoiding lockdowns in some cases by days, with the Master attending each via video link. Hopefully we will be able to achieve the same this year.

Despite some of the setbacks to aviation it was pleasing to see that we still had a good response to our scholarship offerings this year. These are currently being assessed with winners being announced by the time you read this. We have also received nominations for all of our Australian awards, as well as a few others, and we hope that we will be able to recognise the award winners during the various annual dinners.

NEWS ROUND-UP

In other local aviation news Former Chief of the Defence Force and Upper Freeman ACM Mark Binskin AC will take over as Chairman of the Civil Aviation Safety Authority in August. Ms Pip Spence has been appointed as the new Director of Air Safety and CEO of CASA. Pip is a career civil servant but, having seen her at various aviation fora over the years, I am confident that she can successfully address the challenges of her new position and we wish her every success.

Jeff Trappett's F-100 Super Sabre and P-51 Mustang mark the RAAF's centenary



Back in March, Upper Freeman Jeff Trappett decided to celebrate the RAAF Centenary in his own inimitable style by flying his CAC CA-27 Sabre Mk.32 in formation with his CA-18 Mustang, flown by friend, Gerard Lappin from the LaTrobe Regional Airport at Traralgon, Victoria. Jeff had a distinguished 21-year career in the RAAF before leaving to fly for Qantas and has been an avid warbird collector since the 1970s. A great way to celebrate the RAAF's historic milestone!

At the end of June a small team from South Australia set a new world distance record for an electric aircraft by flying 1,350km in a Pipistrel Alpha Electro. That wasn't non-stop as the aircraft has a nominal endurance of 1h plus reserves and a cruise speed of 85kt but it was still quite a feat to achieve that distance given the constraints. □



Top: The record-breaking Pipistrel Electro team
Bottom: Upper Freeman Jeff and Freeman Barbara Trappett



North America Region

By North America Regional Chairman Liveryman Alistair Beaton

"Let the Summer begin" and in North America the traditional holiday season starts on 1st July. As I write on 4th July, our pilot members in the USA along with the whole Nation are celebrating the 245th anniversary of American Independence. We wish all of our American friends, especially those who are pilots, blue skies and good tailwinds over the summer months ahead.

No doubt another great cause for celebration below the 49th parallel, is that domestic airline passenger numbers during this national holiday weekend exceeded those of 2019! This will be a great relief to the many pilots and airline staff who have been furloughed over the past 18 months. Many pilots have taken early retirement as a result of the Covid pandemic and all of this will result in opening up opportunities for a new generation of aviation enthusiasts!

Western Canada and the USA have also been suffering from an unusual heat wave during this first week of July, resulting in over 700 deaths in British Columbia alone. While Covid restrictions are lifting and travel across Canada is permitted and public toilets are now open at parks and at tennis courts, thank goodness, I would still

very much appreciate, if someone would wake me up, when the real summer begins!

Pilots who are adventurous enough to fly in this heat wave with surface temperatures reaching up to 46°C in places, should certainly re-familiarize themselves with their particular aircraft's take-off performance data and also allow for reduced climb performance when planning to cross local mountain ranges etc. With aircraft constructed with composite materials, such as the Diamond, there are important structural temperature limits to be adhered to. North of the 49th parallel, (taking into account the Canada/USA border's meanderings through the Great Lakes area, the Province of Quebec, the Maritime Provinces and Alaska), 1st July is Canada's equivalent national celebration, known officially as Dominion Day, but more commonly as Canada Day. Confederation was the process by which three former British colonies of Canada, New Brunswick and Nova Scotia united on 1st July, 1867 and so the nucleus of present-day Canada was established. This year, our normally "sunny ways" Prime Minister, Justin Trudeau, asked Canadians not so much to celebrate Dominion Day, but to stay at home and reflect on



Gulf flying in 1978



Canada's treatment of our indigenous nations, especially the apparent despicable treatment of indigenous children.

FLYING ON DOMINION DAY

While the Prime Minister of Canada's admonition to reflect on long past injustices and heart wrenching situations involving children is admirable, as a relative newcomer to Canada, I have chosen to reflect on a happier note, on memories of flights that I have undertaken over the years on both American Independence Day and Canada Day.

My first flight in this category took place on Canada Day 1971 in a Cessna 150J (N51380). My flight departed from Freeport, Grand Bahama Island to Treasure Cay in the Abaco Islands. This was my first dual navigation exercise in a powered aircraft.

The Commonwealth of The Bahamas is truly a pilot's paradise; however, since most of the navigation exercises/pleasure flights are over water, it is important to fly at altitudes up to 12,000ft in order to be within gliding distance of land. The flight between Freeport and Treasure Cay is fairly straightforward, as the Track Required follows the South coastline of Grand Bahama Island in an easterly direction for about 45nm before crossing the Atlantic Ocean on a 28nm run into Treasure Key Airport. The FAA encouraged trainee pilots to learn and use the VOR network and since Freeport has a VOR, we used this navigation aid to check our track. The problem with this in my opinion is that pilots are trained as beacon hoppers, rather than real navigators!

Three days after that flight, on 4th July 1971, I completed a triangular dual cross-country exercise to Abaco, which included landings at Treasure Cay and Marsh Harbour Airports. Marsh Harbour is famous for its candy red and white striped lighthouse. On completion of this flight, my

instructor signed off my student medical (licence) for solo cross-country flight privileges, without the direct supervision of a flight instructor:

The following year I commenced flight training at Lucayan Beach Air Service, Freeport, towards my FAA CPL. On American Independence Day, 4th July 1972, I practiced some Chandelles and Lazy Eights. These are semi-aerobatic manoeuvres required for the CPL flight test. I never did see the point of doing these exercises, since as a Commercial Pilot, you would not subject passengers to this type of flying. Sadly, this was one of my last flights in the Bahamas before moving to Jamaica, where I learned a completely different kind of flying.

Having successfully completed 15 hours of FAA CPL/ME training at Meacham Airport, Fort Worth, Texas, on 1st July 1973, I visited a friend in Nacogdoches, Texas, the home to Stephen F Austin State University. Nacogdoches is located in the beautiful pine wood and lake country of east Texas, and has a small single runway airport. Here I rented a Cessna 150 and conducted a short round-robin cross-country to Lufkin, Texas. This was a brief stop on my way to Scotland and two days later I arrived in Aberdeen, Scotland. There I had the privilege of flying my uncle from Dyce Airport to the historic RFC/RAF airfield at Montrose. This was his first time in any aircraft since serving as RAF aircrew during WW2.

FLY BY NIGHT

On Canada Day 1976, I conducted five night circuits at Glasgow's Abbotsinch Airport in C150, G-AVVL! Amazingly this aircraft and the one I flew at Nacogdoches are still flying today, after almost a lifetime.

The next time I flew on Canada's Dominion Day was in Dubai, as a flight instructor for Aerogulf Services. On 1st July 1978 I conducted several training flights including a



The Tomahawk flown from Glasgow

Pre-GHFT in Pa28 and a cross country navigation exercise in a Pa28-140 to Ras-Al Khaimah.

Three days later, on American Independence Day, I conducted a navigation exercise to Abu Dhabi and Sharjah from Dubai. Thankfully our Piper aircraft were fitted with air conditioning as the temperature in Dubai in July could

reach above 40°C along with high humidity. Typically one had to carry 6 uniform shirts in one's flight bag each day, to cope with the intense heat and humidity.

On Canada Day 1980, I flew with three students at Glasgow Airport in a Pa38 Tomahawk. On 4th July 1980, I flew to Prestwick with a student, who happened to be a Royal Naval Officer on one of the UK's nuclear submarines at Faslane.

Fast forward to the year 2006 and to Boundary Bay Airport, British Columbia, Canada and this was to be the next time I flew on either of these public holidays.

Although I have flown several thousand hours since then, Canada has been kind to me and I have enjoyed spending my subsequent national holidays with friends and family!

Every summer has a story but I will end my reflections at this point and look forward to going aloft as often as possible! □

Hong Kong Region

By Regional Chairman, Assistant Captain Pat Voigt

As, I suspect, with all of our Honourable Regions, Hong Kong's usual hectic social scene has been seriously curtailed over the past year or so. However, the good news is that we have just held our first event of 2021 and have another in the offing, which will have happened by the time that you read this.

Our return to the fray was a 'Beer Call' at the Globe Bar &

Restaurant, one of our favourite haunts. Not only did members have time to relax and talk pilot stuff, but we also managed to recruit a couple of new members. In addition, we also found a worthy replacement to assume the mantle of Head of our Youth Development Programme, originally created, but sadly vacated last year, by Captain Peter Taylor. □





CRANWELL: A CENTURY OF “AN ESSENTIAL FOUNDATION”

*By Squadron Leader Tom Hammond**

RAF College Cranwell has recently completed celebrating the centenary of its foundation as the centre for officer training for the Royal Air Force.

The formation of RAF in 1918 and the armistice eight months later saw Cranwell's future hanging in the balance (military flying had begun there in 1915 when the Admiralty requisitioned 2,500 acres of land which formally became Royal Naval Air Service Training Establishment Cranwell in April 1916 – Ed). Although personnel were recruited from June 1918 to become Flight Cadets to train as officers and pilots, it was not until 1919 that Sir Winston Churchill submitted the Trenchard Memorandum to Parliament as a White Paper. This document included proposals to form an RAF Officer's College to help strengthen the calibre, quality and spirit of the new Service.

The cabinet did not wish to retain the independent air force, but it reluctantly consented to the retention of the Air Ministry and the RAF in independent existence – albeit a much-reduced force. It had been generally considered that RAF Officers would be trained at the Royal Navy and Army academies, but Trenchard insisted that the RAF should be maintained as a separate entity. His most practical argument against joint training at Sandhurst or Dartmouth was that RAF Officers would not be able to be taught to fly during their training, owing to the absence of airfields and unsuitable surrounding countryside.

The case for the establishment of a cadet college at Cranwell was sent to the Treasury on 15 September 1919 and was given the green light for the scheme two weeks later. Lord Trenchard favoured the location because of its remoteness from large towns, while the flat countryside was ideally suited to the inevitable forced landings that would accompany solo student sorties.

Lord Trenchard spoke of his mission for the college: “It was decided to form this cadet college because it was realised from the first that such a college was the essential foundation of a separate air service. This College, in conjunction with the School of Technical Training at Halton, will have the making or marring of the future of this great Service, which was built up during the war by gallant pilots and observers and other ranks who fought through it, and



Cranwell's main building was completed in 1934

won a name in the air, second to none in the world. If it is to continue its great work, which I am convinced we all intend that it shall do, we all realise that it has to live up to its war reputation and we must ensure by every means in our power that it does so.”

The endeavours of these pioneers must not be underestimated, and we acknowledge the similarity in objectives that the RAF has with the Honourable Company of Air Pilots, chiefly the fostering through education of highly competent, self-reliant, dependable and respected personnel. This is especially true of the current RAF Cranwell, the Academy training the next generation of RAF Officers with a greater emphasis on coaching, mentoring and learning in a safe environment – with the ultimate aim of better understanding oneself. Simultaneously 3 Flying Training School develops the next generation of aircrew, using state of the art platforms that will enable trainee pilots to reach the front line in a far more efficient timeframe.

It should be remembered that your first Master, Air Vice Marshal Sir Sefton Brancker, played a major role in the founding of the RAF and his portrait hangs in the entrance hall of the Royal Air Force College, Cranwell. □



No3 Flying Training School operates Grob Prefects at Cranwell

* Staff Officer to the Commandant, RAF College Cranwell



FROM THE DESK OF THE DIRECTOR AVIATION AFFAIRS

By Liveryman John Turner

After more than nine years as Director of Aviation Affairs (DAA), I have decided it is time for a change. Interviews for my replacement should be complete in July, allowing a proper hand-over before I formally stand down at the end of August. All being well, my replacement will introduce themselves in the October issue, so this is the last 'From the desk of...' article from me.

REVIEW

My time as DAA has been a period of continuous change repeatedly punctuated by headline unexpected events. In 2012, we reviewed and reduced the Air Pilots' three original London-based technical committees to just the International Technical Forum (ITF) and the Aviation Careers and Education Committee. That apparent reduction belies a major expansion, in both number and location of members supporting our technical activities. Now, each of our Regions is represented at the ITF which conducts activity through Technical Groups (TG). We establish TG teams as and when a need arises, with TG members drawn from within and outside the ITF and United Kingdom. Ironically, having struggled for some time to engage better with the Regions on technical issues, Covid-19 provided the catalyst to do so. Zoom accommodates attendees regardless of location, though finding a time when everyone will be awake can be difficult! As we eventually return to 'normality,' sustaining sympathetic scheduling will be increasingly important. The more international we are in our activities the more leverage we command in a world of multiple aviation regulators and representatives.

Reflecting current times, having closed our Environment Committee in 2015 with concerns over lack of expertise, in 2020 we needed to form an Environment TG to advocate for aviation and balance the environmental debate. Partnering with other livery and aviation sector companies, we will lead a 'Green Aviation Showcase' that will bring together government, the City and aviation in London in October.

Collaboration with other aviation organisations has also proved effective. We supported and sponsored the British Air Display Association in running annual Pre- and Post-Season Air Display Symposia for several years, providing a platform to first to inform others about the Air Pilots then to defend the air display community following the deaths of secondary spectators at a UK airshow in

2015. More recently, our widely based membership, which covers all sectors of aviation, and independent preparatory work by our Airspace TG, positioned us as an informed and honest broker when working with the Association of UK Flight Information Service Officers, British Air Line Pilots' Association, General Aviation Alliance and Guild of Air Traffic Control Officers. Collaboration resulted in joint statements of concern over the United Kingdom's Airspace Modernisation Strategy. The regulator was unable to ignore statements emanating from such a breadth of aviation practitioners. More significantly, it established the Air Pilots as an important stakeholder, with a clear and consistent view that future airspace strategy will need;

- To integrate safely rather than rely on segregation so that Commercial Air Transport has the protection it needs (but currently lacks) when operating to UK regional airports outside controlled airspace and General and Unmanned Aviation can fully share the nation's airspace.
- Airspace that reflects and fully utilises the capabilities of today's aircraft technology and ground-based networking technologies.
- To recognise the global nature of aviation and be consistent with international standards, adopting the best aspects of other systems within compliance with ICAO.

Each collaborative engagement strengthens our network and influence and, aside from other aviation organisations and regulator, our links with UK Members of Parliament and government ministers have improved. This not least though members' involvement in All Party Parliamentary Groups and by responding to each government and parliamentary consultation on aviation matters.

On the up side, aviation had a full year with no commercial passenger jet fatal year accidents in 2017. Unfortunately, other years illustrated the unforgiving nature of our world with the tragedy of Malaysia Airlines 17 and 370, Germanwings 9525, Lion Air 610 and Ethiopian 302.

Then the unexpected Covid-19 pandemic brought, and continues to present, new challenges to everyone and heartache to many. Several countries now show signs of recovery (or at least successful containment) which puts a spotlight on international air travel's dependence on world-wide conditions. To plan a journey with confidence you need acceptable, complementary, and predictable conditions at both ends. This means solutions such as vaccination must be applied and coordinated at a global

level, rather than nationally. Failure to harmonise global effort and effect can only delay further international aviation's recovery.

RISK

Even birds can have take-off and landing mishaps so there is always be a level of risk in leaving the ground; flying, like the rest of life, is an exercise in managing risk. A global pandemic was long assessed as extremely unlikely but not impossible. There are other 'extremely unlikely' events, including solar storms and the loss of satellite-based navigation information. So, as we remove rather than replace ageing ground-based navigation aids, will our mitigations for an extremely unlikely event such as loss of GNSS be as robust as they were for the pandemic?

NATURAL EVOLUTION OR SCIENCE FICTION?

Aviation will always evolve according to demand and as technology allows but are currently disparate elements of aviation destined to merge?

First, there is the potential for unmanned vehicles to expand rapidly into a multitude of new roles. We see already unmanned air vehicles taking on roles in surveying, agriculture, food and medicine delivery, pipeline and pylon inspection and emergency response. Artificial Intelligence (AI) is already flying large military drones, albeit only in the cruise and under the supervision of a remote human pilot at present.

Second, reports suggest Cathay may introduce A350 single-pilot flights by 2025, though they will only be 'single pilot' for the cruise. Is that a natural next step, or a step beyond the assumptions that underpin A350 airworthiness? Some pilots feel the step to single pilot ops is inevitable longer term and on a longish flight an extended time on the bunk would be preferable to taking short naps in the seat. However, this assumes the flight deck will support single pilot normal and (until the resting pilot has a regained wakefulness) non-normal operation; since pilots can take comfort breaks is that already assumed in the engineering design or the pilots' training? System failures can and do occur in the cruise. The difference is in the time at risk - when a single pilot will need to respond correctly to a failure - between the other pilot taking a short break just beyond the flight deck door and a prolonged sleep on the bunk followed by a period of recovery from sleep. In design safety calculation, because each can catch the other's mistake, two pilots on the flight deck are credited with a safety factor 10 times higher than for a single pilot, whether that is making normal selections or actioning emergency drills.

That does not mean it is impossible to reduce to a single pilot for the cruise segment; that would be a natural first step for any trial. However, it would require a design safety review, and potential upgrade of equipment performance or design redundancy, to sustain the assumed level of

safety currently provided by the second flight deck member. I'm sure Airbus and Cathay are onto that already. The human factor issues are similarly complex. With fatigue an ever-present threat, pilot eye tracking, health or alertness monitoring may be needed to cover those periods of single pilot ops between the routine cabin crew checks. Also, we would need modified Standard Operating Procedures (SOPs) for single pilot operation and simulator time to train and assess single-seat competence (as well as covering two-seat SOPs for departure and arrival).

Logically, the next iteration will be to reduce to one pilot for the entire flight, with the second pilot replaced by either onboard AI or a ground pilot via data link in the same way many remotely piloted vehicles are already operated. That would present a new training challenge if the 'second seat' were removed because then every trainee pilot would become a 'zero hours Captain.'



Finally, with further-improved system reliability and redundancy, we could dispense with the pilot and rely on on-board AI, perhaps with a remote pilot on the ground. Airline rostering would be much easier if all 'pilots' lived at (and perhaps even worked from) home. Down-route hotel bills would also be reduced. In law, would the senior cabin staff or remote pilot be the aircraft captain?

The final challenge would be getting the general public to embark on an unpiloted airliner. Manufacturers of Urban Air Mobility vehicles will launch their products with a pilot in command, but they all intend to go pilot-less once the concept has been proved. If you are surrounded by unmanned air vehicles in all sorts of roles and arrived at the airport in a driverless car or pilot-less air vehicle, why not fly in a pilot-less airliner? Airliners and drones may become the same thing!

Fortunately, the challenges in designing complex air vehicles with reliability standards approaching infallible are considerable; they may not be insurmountable, but they will be extremely expensive. Also, we should not forget (nor allow others to forget) those occasions when pilots overcome apparently insurmountable odds. The Gimli Glider, Sullenberger's Hudson ditching, the British Airways Flight 38 double engine failure on approach to Heathrow and the Qantas uncontained engine failure all concluded safely because pilots had the skill, experience and imagination to make it so. □



COMPANY FLYING SCHOLARSHIPS AND THE PANDEMIC

By Liveryman Tricia Nelmes

Congratulations to all of our scholarship winners. Competition this year was fiercer than ever with a record number of applications for all of our scholarships - an extraordinary 800 in total, compared to around 500-550 in normal years. This must surely be an effect of the Coronavirus pandemic - a combination of having to abandon the scholarships in 2020 and of the Company people having more time to research ways to start or to advance their flying.

I suspect that the overall standard of application was much the same as usual, though it's hard to measure as there were so many more in all three categories. However, we had a higher number than before of really good candidates to select from.

The largest number of applications is always for our PPL scholarships and this year we received an extraordinary total of 646. So the first move was to increase the number of PPL sifters from last year's 16 to 24. Their hard work reduced the number of remaining candidates to 48.

At the next stage, we benefitted from having used our 'time off' in 2020 to further refine the PPL process. Firstly, to help us select the best 24 candidates for interview, we asked each of those who had got through sifting to produce an informal one-minute video introducing themselves. Not only was this enormously helpful to us, but watching the videos was also very enjoyable. Secondly, those selected for interview were then asked to prepare a course action plan. All three panels conducted their interviews via Zoom, and this proved easier and more satisfactory than I think most of us had anticipated.

Training is now underway at schools and clubs around the country and those attending residential gliding courses will do so over the summer holidays. Two further innovations dreamt up during our downtime have been put into practice: each of the PPL scholars has been given the new Scholarship Guide booklet to help them organise their summer flying; and each has also been paired up with a former scholarship winner as a 'buddy' for support during their course.

None of these scholarships would be possible without the generosity of our sponsors and the hard work of our now 40-strong team of hard-working sifters, interviewers, buddies and of course Angie in the office. Thank you to them all and happy flying to our scholars. □

2021 SCHOLARSHIP WINNERS

PPLs (Eight from 646 applications)

Charlie Gazzard	Cadogan
Max Ellison	Air BP Sterling
Tyler Audu-McGregor	Donaldson
Chris Barrott	Grayburn
Omar Mshihadani	Air Pilots Visit Team
David Hart	Wigley (BALPA BF)
Luke McConnell-Lane	Burslem (BAPLA BF)
Anne Soltow	Bob Dawson (BALPA BF)

Flight Instructors (Three from 79 applications)

George Coe	Cadogan
Joe Hadley	Swire
Gary Jackson	Norman Motley

Gliding Scholarships (24 from 87 applications)

Sophia Anderson	Tyler Oxley
Aamina Bhutta	Georgia Pescod
Shaan Johal	Mark Sheilds
Mitchell Chandler	Edward Smith
Fraser Clapham	Eleanor White
Scott Connolly	
William Cooper	
Alice Daghish	
Callum Doak	
Louis Hall	
Alexander Hook	
James Jarman	
Philip Kirunda	
Abbey Lamb	
Tinashe Masama	
Nathaniel McMurray	
Isabelle Murfit	
Thomas Needham	
Jacob Nelson	



“THE BEST IN THE WORLD”

By Assistant Steve Bridgewater

The Department for Transport wants the UK to be seen as the best place in the world for aviation. Sophie-Louise O’Sullivan, head of the CAA’s General Aviation & Remotely Piloted Aircraft Systems Unit reveals her priorities in turning this aspiration into reality.

The CAA recently integrated its General Aviation Unit (GAU) and Remotely Piloted Aircraft System (RPAS) Unit and appointed Sophie-Louise O’Sullivan, the former Head of RPAS and Interim Head of the GAU, as the permanent Head of the newly combined General Aviation & Remotely Piloted Aircraft Systems Unit.

Sophie feels it is important to treat RPAS and manned GA as a single unit, saying, “There are lots of parallels between GA and RPAS and many of the issues affect both parties. GA has a very impressive safety record and there are some great lessons in airmanship and best practices that newer and more innovative communities like RPAS can learn from.”

COVID RECOVERY

Sophie joined the GAU at the height of the pandemic and says a significant proportion of her and her colleagues’ time has been spent on ‘Covid Recovery’ strategies and trying to get the GA sector back to flying. This was a sector-wide stop of operations and subsequent restart, and she emphasises that this had to be the unit’s first priority. However, this ran concurrently with the CAA’s ‘UK General Aviation opportunities after leaving EASA’ consultation. “We received around 1,000 responses” reveals Sophie. “We looked at all of these in detail and they have helped guide and determine our priority projects for the 2021 GA Change Programme. These have been published in CAP 2146.”

FUTURE POTENTIAL

The DfT’s recently-issued General Aviation Roadmap stated a desire for: “...the UK to be seen as the best place in the world for aviation and this starts at the grassroots.” Sophie sees four key priorities in achieving this goal. “The first of these is a need to focus on the potential growth in the GA world. It’s huge, with PwC saying the sector has the potential to be worth £3 billion by 2030 and RPAS operations accounting for a further £42 billion. There is enormous potential benefits for UK PLC and this is why I feel we can no longer continue to segregate them. There are a finite amount of airspace and it’s a national resource that is supposed to be subject to fair access. Both the GA and RPAS communities are growing and we therefore need to integrate them to make best use of our resources.



Sophie-Louise O’Sullivan -
Head of the CAA’s GA &
RPAS Unit

“As an industry we need to recognise this potential growth and integrate. We need to move away from current segregation practices such as temporary danger areas and look at ways of better sharing the skies on a permanent basis. We (the CAA) might look at transponder mandated zones and, ultimately, look at ways to make everything electronically conspicuous. We are also looking at ways to give an unmanned aircraft a ‘detect and avoid’ standard that is the equivalent of ‘see and avoid’.

Sophie’s second priority is: “Simplification. I hear this from the community all the time,” she confirms, “and I recognise it myself from my own experiences within GA. It’s vastly complex and often unnecessarily so. In terms of licensing, we have obviously brought the EASA licencing scheme over into UK law and we also have a national license and the LAPL. That’s very complex, but we still need to define the correct way to move that forward.”

The unit’s third priority relates to the way it communicates with the GA sector. “One of the best bits of positive feedback I get from the GA community surrounds our Skyway Code,” Sophie continues.

“The Skyway Code ethos is to write about airmanship in the clearest possible way and we want to emulate that within the airworthiness side of things and look at how we can integrate the concept across all of our communications channels. As a regulator, a lot of what we have to write is in legal language, so how we simplify our communications is key to our future successes.”

The unit’s fourth priority is ‘modernisation.’ The unit is keen to embrace some of the innovation opportunities that are available to operators and aerodromes. These include biofuels, electrification and “...how technology can be used to improve things like MOR reporting.”

“Likewise, we know that some airfields are struggling from a revenue perspective and we are cognisant of this,” Sophie continues. “Yet, at the same time we have drone operators looking for locations from where they can test and ultimately operate their aircraft and we’ve got things like drone racing looking for venues – so we need to explore how we combine these things together and potentially modernise the UK’s airfield and airspace infrastructure.”

To read the full version of this interview you can visit aopa.co.uk/aopa-interview-with-caa □





SPACE WEATHER AND AVIATION

By Freeman Donagh McCullagh

Our local star does much more than provide us with heat & light - unfortunately...

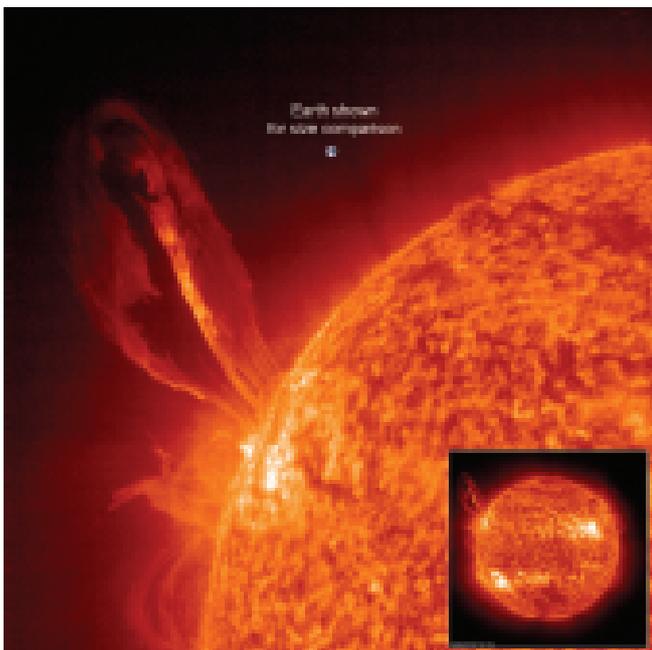
Of all terrestrial professions, pilots and sailors are arguably the closest to the mortal effects of meteorology. So when we hear solar events being described metaphorically as 'space weather', our training and experience give us greater insight into chaotic solar events than most others. We know weather can bite.

Insight and metaphor can only take us so far when we are dealing with real events triggered by energies completely beyond ordinary - or even extraordinary - human experience. 'Solar wind' is one such euphemism. The term might bring to mind the image of bright motes of gold flowing from the Sun like dandelion seeds. The reality is Earth and its near-space moving in a turbulent sleet of high energy photons and charged particles.

The astronomical effects can hit terrestrial pilots in two main ways with an additional tail-risk scenario of low probability but high impact:

- 1) Disruption to aeronautical navigation and communication systems;
- 2) Increased radiation exposure in high altitude commercial flight; and

A solar flare to scale with our home



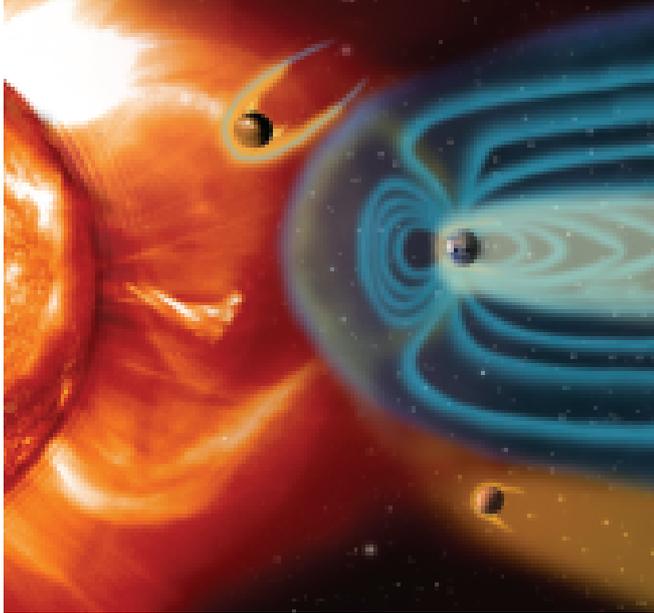
- 3) (From extremely rare conjunctions) effects on terrestrial power and communications systems – with greater, albeit shorter, economic impact than the Covid shutdowns.

The first domino is flicked 93 million miles away...

Solar storms as we discuss here appear to be triggered in the wake of large solar flares and with an active solar surface. A large flare fires electromagnetic radiation, from radio through to gamma wavelengths, into the Solar System. The downside of a solar flare is that, with its radiation moving at the speed of light, we can never receive warning before the radiation hits us. The upside (-ish) is that the radiation even at the highest most harmful frequencies suffers from the power law, so effects rapidly diminish with distance. After the flare comes the main event, the Coronal Mass Ejection (CME). Effectively a substantial chunk of the Sun's surface erupts and follows the flare into the Solar System. This chunk is an agglomeration of protons, electrons and accompanying magnetic field, ejected at sub-light speeds into the System. This eruption is what is meant most often by 'solar storm.' During periods of high solar activity, we can have multiple CMEs in a day; when the Sun is quieter, the events are closer to a weekly frequency. The reason why the Earth doesn't get hit at this frequency is that the plumes of 'Sun stuff' need to be pointed in not only in the plane of planetary orbits but also where the Earth is going to be as the CME travels out towards the Earth's orbit. A lot of holes in the cheese need to line up...

...with things getting interesting as the storm rushes to our 'home harbour'

As the furious plume moves out, and assuming velocity meets the Earth's position in time, we have some protection. The Earth's magnetosphere, well beyond our atmosphere, is vastly more extensive than those of our near neighbours Venus and Mars – another fact about our planet we should give thanks for.



Earth's relatively strong magnetic field extends remarkably far into space

Navigation and communication satellite damage from radiation is our biggest risk

As a major CME overwhelms our magnetosphere, its waves of hard radiation can damage satellites in both fast and slow ways:

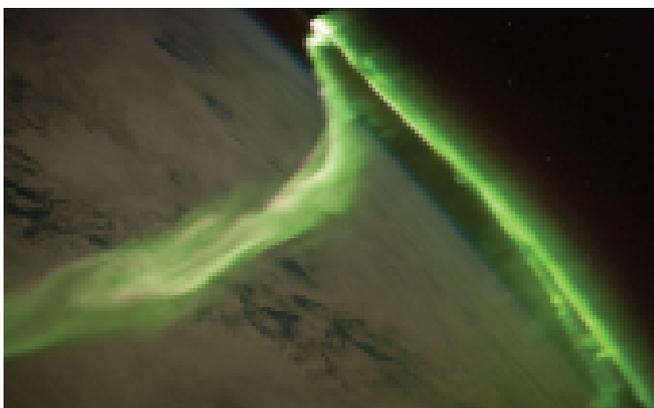
1. fast - a transient electric charge causes software glitches, memory and transistor gate alteration or even a burning out of an entire circuit;
2. slow – sustained radiation exposure causes defects in the semiconductor oxides or, related, a displacement of the atoms in the semiconductor crystal lattice.

The fingerprints of the fast events and their relation to (the lack of) magnetosphere protection can be seen clearly in the following two maps.

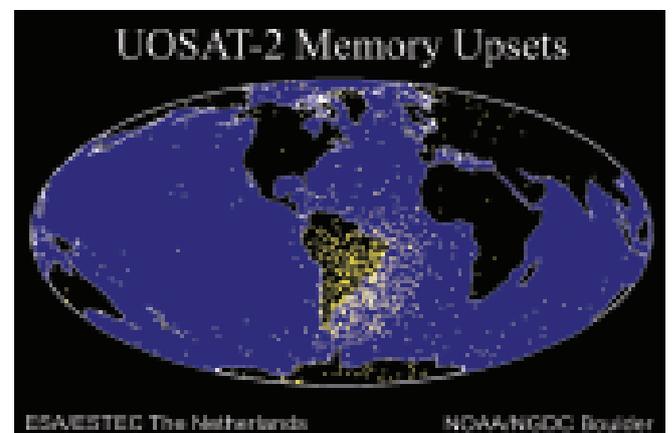


The Earth's magnetosphere in more detail

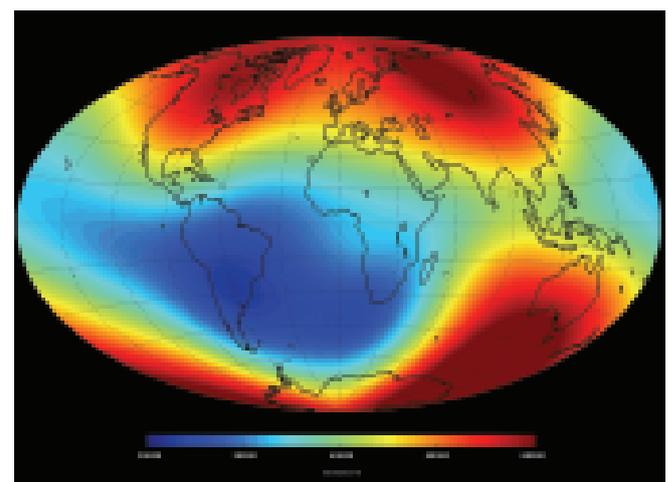
Rather like sea storm breakers hitting a harbour wall, the crash of a part of a CME against the protection of the Earth's magnetosphere means there can be some leakage through the defences. In this case, the highest energy particles become funnelled towards the poles and interact with the very top of the atmosphere. This causes the eerie and beautiful Aurora Borealis in the Northern polar region and its Southern counterpart, the Aurora Australis.



The Aurora Australis photographed from the International Space Station. Camera pointed towards Antarctica. The extent of the troposphere and stratosphere is shown by the thin blue band hugging the curvature of the Earth



Map 1 shows the long standing South Atlantic Anomaly – an area of relatively weaker magnetosphere protection over the South Atlantic



Map 2 shows memory upsets from the stalwart British satellite UOSAT-2 which broadcast telemetry for over thirty years, from 1984 to 2015

There is little we can do about stopping CMEs and we can't control the magnetosphere. Therefore, our only defence is radiation hardening and having significant

redundancy in satellite constellations. Economics means risk assessment always has to be undertaken between the likelihood of a once-in-a-lifetime solar storm and the likelihood of the storm hitting during the expected active lifetime of a satellite. Redundancy is the other strategy, with the example of the GPS constellation having 27 active satellites and 4 on standby.

Defence strategies such as this can only do so much. The UK Government's National Risk Register 2020 tells us that a space weather event knocked UK aviation GPS capability out for some hours. The same event hit the US much harder, impairing aviation navigation for some 30 hours. The risks are further elaborated in the Government's *Space Weather Preparedness Strategy*¹.

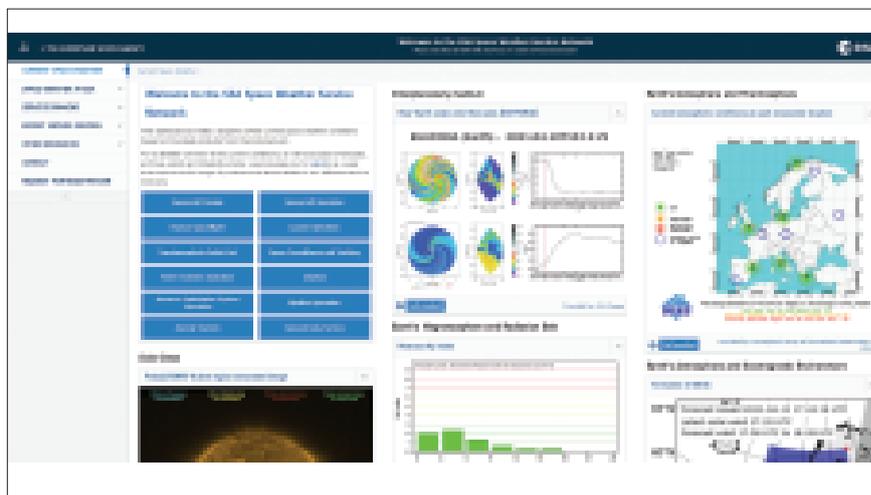
Health impacts on pilots are possible but can be managed.

Commercial pilots and crew are already alive to the risks of background galactic cosmic ray (GCR) radiation – radiation from other star systems and galaxies. The US National Council on Radiation Protection and Measurements has reported that aircrew have the largest average annual effective dose (3.07microSieverts) of all radiation-exposed US workers. Other estimates of annual aircrew cosmic radiation exposure range from 0.2 to 5 mSv per year². Operating with the bulk of the atmospheric protection below them, any pilots operating with a CME storm-type event coming towards the Earth would obviously be in a vulnerable position. The radiation doses from the CME event hitting Earth would be in addition to the background GCR radiation normally present.

Luckily, CME early warning systems are in place in the shape of space-borne solar physics missions such as SOHO and Solar Orbiter. With warning, the risks can be managed with flights either diverted around high radiation areas or delayed. For those interested, the European Space Agency (ESA) provides a fascinating open-source dashboard to monitor Earth's magnetospheric activity with monitoring tools available specifically for pilots.

<https://swe.ssa.esa.int/current-space-weather>

A screen grab of ESA's space weather dashboard resource. Scrolling down the home page brings you a live global map showing radiation dosage with altitude.



Beyond aviation, a 'super space storm' could affect our entire power and communications network.

Many will have heard of 'the Carrington event' of 1859, a super space storm which shorted out the nascent telegraph systems around the world and brought the Aurora Borealis, the Northern Lights, as far south as Mexico!

The UK National Risk Register lists further significant events in 1920, 1960 and 1967 hitting radio communications and railway signalling systems. One fact that could give us some comfort is that much of our communications network has moved to optic fibre from conducting copper. However, all open-access communication networks (fixed and mobile) rely on the GPS timing signal to keep signals synchronised. And our banking system...and our power systems...and our water systems...and...

Conclusion

Like many tail risks, the super space storm is a question of when, not if. But living with risk is living. For sure, there is widespread recognition by governments throughout the world of the importance of space-based position, navigation and timing (PNT) systems. The hope is that redundancy within and between systems will provide sufficient integrity before replacements are launched. Meanwhile, greater knowledge of this source of risk within the aviation community can only help our contingency planning of the different levels of risk. □

¹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/449593/BIS-15-457-space-weather-preparedness-strategy.pdf

²<https://www.cdc.gov/niosh/topics/aircrew/cosmicionizingradiation.html>



RAISING A STORM

By Upper Freeman Sam Worthington-Leese

The Hawker Typhoon Preservation Group' project to restore an ultra-rare World War Two combat aircraft to full flying condition is making real progress.

Of over 1,200 young men and women who flew the Hawker Typhoon during World War Two, 56% made the ultimate sacrifice. There is no national memorial to all these brave young men and women, the thousands of ground crew and support staff who kept the machines operating, or to those who designed, built, tested and delivered the aircraft. We strongly feel that they deserve one.

There were 3,317 Hawker Typhoons built, all bar a handful of them constructed by Gloster. Today there are no airworthy Typhoons and that is what the Hawker Typhoon Preservation Group is working hard to rectify. (Currently the only complete example, the RAF Museum's MN235, never saw combat as it was loaned to the United States for trials and then, effectively, forgotten about.)

Our late-model Mk1b Typhoon RB396 had a short but illustrious flying career. Produced in late 1944 she was test flown by the renowned wartime pilot, Flt Lt "Pinkie" Stark, on 16th November. It would not be until the new year that RB396 made her way to the Continent where, assigned the letter "W", RB396 XP*W, was taken on strength by 174 Sqn on 4th January 1945.

Although it was not common for junior pilots to have 'their own' aircraft, this particular one was adopted by the young Canadian, the late Flt Lt Frank Johnson, who had his then girlfriend's name Sheila painted on the cowling. They would go on to marry after the war. We know that the aircraft flew at least 36 combat sorties in its short career, plus many non-combat trips. In the short period from coming on to the squadron on 4th January to ultimately force-

The RB396 crash site in Holland



RB396's pilots: Johnson, Smith and House



RB396 in action, painting by Neil Hipkiss

landing on 1st April she was repaired from flak damage no fewer than 18 times, which just goes to illustrate the dangers of the Close Air Support role where the Typhoon found its niche.

On the morning of 28th March, Frank flew RB396 for what would be the last time. That same afternoon, the aircraft was flown by Flt Lt Sidney 'Junior' Russell-Smith (who survives to this day) on an armed reconnaissance mission in which he picked up flak damage in the starboard fuel tank. That grounded the aircraft and two days later on 30th March, Frank was shot down in a different aircraft (SW495), force landing and spending the rest of the war as a PoW. Two days later, RB396 had been repaired and undertook her final flight in the hands of Flt Lt Chris House. On an offensive sweep setting out from B.100, Goch (later RAF Laarbruck), he was hit by flak after releasing his salvo of rockets. He force-landed to the north east of Denekamp in Holland, which was still occupied territory at the time. However, to the surprise of his comrades he arrived back at the squadron on 5th April having, in his words, "...done a runner".

RB396 then lay on the battlefield, one of the thousands of Typhoons shot down. She was recovered for scrap at the end of the war and by chance, the rear fuselage monocoque was eventually sold to a local chemical company which intended to convert the structure into a chemical wash. Thankfully, that plan never materialised and

the section ended up in a Dutch museum.

In 2014 I had not long been made redundant from the RAF as a low-hour trainee. I had completed my commercial pilot's licence and was instructing at a small flying school on the south coast. I was researching my own grandfather's wartime history: he was my reason for joining the RAF, and I had discovered that he flew the Hurricane, Spitfire and also the Typhoon. His final flight had been in Typhoon MN252, from what was then RAF Westhampnett, force landing in Holland on 21st May 1944, evading capture for a few days before being incarcerated in Stalag Luft III, just as the 'Great Escapers' were being rounded up. My research led me to a gentleman in Holland who had some parts, incredibly, from the aircraft my grandfather was flying that day. Those small parts are now in my possession.

My efforts to track down those parts led my path to cross with that of a UK collector who had been gathering Typhoon parts for some time and had amassed an impressive collection. He even had a complete rear fuselage from RB396, which he had purchased from the Dutch museum in 2012. We got to talking, and he believed he had everything required to rebuild a Typhoon, and make it airworthy, apart from the money. Asking him how much he thought it would take, he said: "About £5 million". "Well," I said, "if that's all it needs then why don't we raise it?" And so, the idea of returning a Typhoon to the skies was born. He had the parts, and I had the drive to raise the funds.

Approximately 18 months later, the Hawker Typhoon Preservation Group was formed as a charity with the aim of raising the funds required to rebuild RB396 to act as the living, breathing, working and flying memorial that the crews deserved. Over the years, the project has gone from strength to strength with an ever-growing following and base of supporters. It has been incredibly hard work. My co-founders have left the project because of this, although the team has attracted some excellent members – we are all volunteers – who are working as hard as possible to raise the funds required.

The project originally started small, on social media, at air shows, and articles in the aviation press. On Day One the bank account was at zero; today, we are approaching £1 million raised or pledged with no single 'major' backer. Shortly after the project's official launch event in October 2016 a complete and inhibited Napier Sabre engine was acquired, gifted by Cranfield University. Napier Sabres are incredibly rare, and this acquisition was a huge boost to the credibility of the fledgling charity.

In October 2018, after establishing a base of operations and slowly growing the funds available, as well as acquiring many Typhoon and Tempest parts and sections, the project was in a position to commence the rebuild. Following

extensive research, Liveryman John Romain MBE and the Aircraft Restoration Company were announced as the Restoration Support Partners, with the first section to be rebuilt heading off to Airframe Assemblies the following spring. It was fitting that the first section to be worked on was the rear fuselage, the very section that gives the aircraft its identity. That work is now nearing completion, with approximately 80% of the original structure having been reused. RB396 has been registered with the CAA as G-TIFY as a nod to the aircraft's wartime nickname.

In April 2020 to coincide with the 75th anniversary of RB396's final flight the project announced a number of higher profile additions to the team. PM Air Marshal Cliff Spink joined as Patron, whilst three-time Red Bull Air Race Champion Paul Bonhomme and historian James Holland joined as ambassadors. At the same time the focus of the project's fundraising changed, to trying to attract larger contributions. The existing Supporters' Club was re-branded into five tiers, from Bronze through to Diamond, with the Platinum and Diamond tiers allowing an individual or company to contribute towards one of 1,000 name spaces on the aircraft, to have their name, that of a family member, company, or a veteran, etched into the aircraft.

This new focus has been a success and has seen the fundraising results increase significantly over the last year, in spite of the pandemic. So much so, that attention is turning towards the next section to be restored, the centre fuselage, or cockpit. This section is now at Duxford, for John and his ARCo team to painstakingly return to airworthy condition. Depending on the rate at which funds can be raised, this could take 18 months to two or more years. Then, it will be on to the tail section, wings including undercarriage etc, engine, front end and then the final fit-out and assembly. The initial target for completion was 2024, the 80th anniversary of D-Day: that date is, however, entirely dependent on funding and will be adjusted accordingly. What is certain, is that one day in the not-too-distant future, with the right support, a seemingly insignificant Hawker Typhoon that force-landed on 1st April 1945 and could have easily been forgotten to the history books will fly again. Featuring parts from my own grandfather's aircraft, it will take to the skies in memory of all those who designed, built, maintained, flew and fought in the type during World War Two. □

The rear fuselage and cockpit section at ARCo





DON'T MENTION THE MEDICAL!

By Freeman Robert Cocks

I owe my very existence to Royal Air Force Bomber Command - my parents met as safety equipment fitters stationed at RAF Spilsby during World War Two. This base opened late in the war as the home of Nos 207 and 44 Lancaster squadrons, and in common with other bomber stations in England, it was a dangerous place to be in 1944.

I was born in Boston, Lincolnshire. "Bomber County" was still home to many RAF bases during my childhood, with the common sight of Vulcan bombers flying overhead from Waddington and Scampton. Unsurprisingly, I joined the RAF section of the Combined Cadet Force at Boston Grammar School at 13. I enjoyed flying in Chipmunk trainers and annual camps in both the UK and West Germany. None of this ever cost more than 55p per day, full board!

At 16, I was old enough to attend a gliding course at RAF South Cerney, and after several supervised lessons with my instructor, I was let loose to go solo three times to gain my gliding wings. It is difficult to define exactly who deserves to be called a pilot but, to me, anyone who gambles their life against the new-found skill of operating an aircraft in solo flight should probably qualify (the Guild of Air Pilots and Air Navigators seemed to agree when I became a Freeman in 2004!).

My log-book shows something odd about my second solo, which lasted twice as long the other two. The brief was to take off, turn 90° left, 270° right, continue downwind and then two 90° left turns into wind and land. We were taught what altitudes to expect at each stage, but not what to do if those numbers didn't match...

Robert's father Ronald, 1940



leg, I found myself 200ft too high, and was faced with the choice of pushing the nose down to lose height, which would have made my airspeed too high for the final two turns, or "winging it" with unauthorised improvisation. I opted for the latter and added an extra leg to my flight, turning back for a while to lose some height



RAF Benson 1972, Robert top left (All photos, author)

before resuming my downwind leg.

So far so good - I landed without a hitch but looking backwards saw a number of red-faced adults running towards my Sedbergh glider as the left wing settled to the ground. I quickly explained what had happened, and received no telling-off for my airmanship, but I was told that I had been in mortal danger of being knocked out of the sky by Concorde while aloft. In 1973, the big delta was still being trialled, and on that particular day it was about to take off from RAF Fairford for a short trip to Filton. The flight path lay right overhead the South Cerney airfield, and the control hut was informed just as I was taking off...

While still at school, I decided that I wanted to be a doctor. That autumn, I received an unconditional offer of a place at the Royal Free Hospital School of Medicine in London for the following October. In the meantime, I worked as an operating theatre orderly at the local hospital.

Medical school was a fantastic experience. By 1976, the profession of Medicine was already complex and it was impossible to learn everything in depth, so undergraduate training covered a vast range of knowledge in a relatively shallow way, with depth being reserved for later post-graduate specialist training. In my final year, I had an "elective period" and chose to go to Kota Kinabalu in Sabah, Malaysia (formerly British North Borneo) to work in surgery and orthopaedics at Queen Elizabeth Hospital. That visit laid the foundations for my career in Accident and Emergency, and I was captivated by how much could be achieved in austere conditions.

After returning to London, I passed my finals in 1981 and began training as a specialist in Accident and Emergency Medicine. After specialty training, I started my first



consultant post at the Hammersmith Hospital in 1990. By then, I had passed through clinical academic posts as Lecturer and Senior Lecturer and was actively engaged in injury research, writing my MD thesis on the immune response to trauma. In 1995, I was invited to go to Hong Kong as the founding Professor and Director of a new clinical academic unit at Prince of Wales Hospital, the teaching hospital of the Chinese University of Hong Kong. My bridge into Aviation Medicine came after joining the new Auxiliary Medical Section established by the Government Flying Service, flying Search and Rescue and Casevac operations in the back of S70 Black Hawk helicopters.

The helicopter work rekindled my love of aviation, and in 2002 I embarked on a 6-month full-time course leading to the Diploma in Aviation Medicine. This course originated in the Royal Air Force to train military medical officers in aviation medicine, but was later opened to civilian airline doctors, with King's College London running it jointly with the RAF. The military flavour persisted, and we students had to endure all manner of stresses faced by military pilots so we could understand first-hand what hardships were involved. These included 4G and 8G runs in the human centrifuge, sudden decompression to 25,000ft altitude in a chamber, and other fiendish assaults on the human body. On the Combat Survival Course at RAF St. Mawgan, we were thankfully spared the full interrogation phase but still had to spend a tent-less night on the moors after skinning and cooking a rabbit, and were thrown into 8°C seas off Fowey for a couple of hours with tiny dinghies.

Since 2003, I have worked in Aviation Medicine full-time, both as an AME covering six different licensing authorities and as a medical assessor for routine and complex cases. Seeing around 2,000 pilots each year, the range of medical problems has covered practically the entire medical textbook – except that the book does not cover how to judge the incapacitating potential of those problems. My two decades working in Accident & Emergency have helped bridge that gap, witnessing first-hand how each emergency condition affects a person, and how this might affect performance in the cockpit. I think time spent in A&E would not be wasted on any AME during their training.

So, what do I believe are the necessary values of aviation medicine? A medical can be career-ending for an aviator with a medical problem, and understandably this creates issues of trust in doctors. The only way that doctors can gain that trust, and encourage the honesty required to help steer pilots through a serious illness and regain their

medical certificate, is to develop good relationships in times of health and go the extra mile in times of trouble.

Importantly, no pilot should lose their licence simply because of a "one size fits all" regulatory policy. The International Civil Aviation Organization provides a mechanism for individual assessment of any licence holder who does not meet the standards, known as Accredited Medical Conclusion (AMC, box 1). However this is under-used worldwide, because the process is time-consuming and involves considerable literature research in many cases. For example, only the common cancers in pilots have written protocols, yet there are hundreds of types, stages and grades. We need to know the survival rates year-on-year after treatment, the rates of local recurrence and remote spread, and to calculate the risk of incapacitation based on this knowledge.

The time has now come for me to retire from practice in Hong Kong, but I'll never get bored with Aviation Medicine! □

Winching from catamaran and Combat survival course, 2002



ICAO - ACCREDITED MEDICAL CONCLUSION

Flexibility

1.2.4.9 If the medical Standards prescribed in ICAO Annex 1 Chapter 6 for a particular licence are not met, the appropriate Medical Assessment shall not be issued or renewed unless the following conditions are fulfilled:

- a) accredited medical conclusion indicates that in special circumstances the applicant's failure to meet any requirement, whether numerical or otherwise, is such that exercise of the privileges of the licence applied for is not likely to jeopardize flight safety.
- b) relevant ability, skill and experience of the applicant and operational conditions have been given due consideration; and
- c) the licence is endorsed with any special limitation or limitations when the safe performance of the licence holder's duties is dependent on compliance with such limitation or limitations.

MY ENCOUNTER WITH A HARRIER

By Past Master Ian Perry



We paid a Company visit to Dunsfold, and most enjoyable it was. This was the place where they took a Harrier, cut it in half, and then put it back together again, but made it 18in longer. The work ethic was exceptionally good. The team that took it in did all the work on that

aircraft, right the way through to completion, until the pilot came and flew it away.

They also had a Harrier Simulator, which I was destined for. We all assembled in the Simulator Hall, and I was invited to get in and strap in. The Instructor told me that I was to be set up at 10,000ft, at a speed of 350mph, and then he expected me to land it. "Please familiarise yourself with the cockpit, tell me when you are ready, and off we will go," he instructed.

This was a fairly basic simulator with little visual detail. The sky was blue. The ground was varying shades of brown, with a few features, namely a few lines indicating a runway and dispersal. I said I was ready, so off we went. I quickly got the idea of where to go and how to keep myself in the air, so flew a few circuits to get the feel of it - power on, power off, left turn, nose up, etc. I went, as taught, through all the basics of flying training. After 10 minutes or so I was beginning to feel I might enjoy this. I also had to remember that I was being closely observed by some 30 people, who were watching every move I made.

I decided after another few circuits (the instructor did say it was up to me) that sadly the time had come to land. This had been a very enjoyable experience. I began to reduce power and descend. All was going very nicely, and I even managed to get myself into a stable hover. I began to delicately move to the landing spot and decided this was it. I applied more power as I descended to cushion the actual landing.

Unfortunately, this was not the thing to do, and I ended up on my back. I had blown the whole aircraft right over. "Typical helicopter pilot" came the comment from the Instructor, who had been tuned in all the way, but had said very little. The audience were convulsed with laughter as I climbed out. One or two of the more experienced helicopter pilots amongst us said they would have done

the same thing. "Why did you not tell me," I asked?

"Because we train helicopter pilots to fly Harriers, and this is a lesson I hope you will never forget," came the answer. It was a bit like the lesson I had learnt with that Merlin engine, and torque, on the Spitfire.

FLYING THE REAL THING

We then went on a Company visit to RAF Wittering. This was another very enjoyable day out for everyone, especially PM John Hutchison and myself. We told the rest of the assembled people that we had been selected to go fly. We then went to the aircrew clothing dept and were issued with all the right clothes and equipment to go and fly a real Harrier. The photograph shows us properly clothed and ready to go. The briefing said that I was to be callsign *Jedi 1*, and John was to be *Jedi 2*.

This was to be a low-level 500ft mission. There were to be two attack points, at which you will climb up to 1500ft, attack, deliver weapons, then go back to 500ft, then fly back low level to base. This was a 45-minute mission. I was to lead, and John was instructed to follow me. We got in, strapped in, and took off. When we got to 500ft, my very young instructor, who knew I had been in the simulator, said those magic words: "You have control". So here I was at 500ft on a beautiful clear day, hurtling over the English countryside at 350mph. As I was admiring the view, my senior driver barked: "I have control, look below us to the right." He rolled the aircraft about 15 degrees right and I looked below us. What a shock - there was John's head about a foot away, or so it seemed. A thumbs up from John, returned by me. I have never been that close to another moving aircraft in my life. Even Chipmunk formation flying did not get that close, and certainly as a helicopter pilot, in formation meant about 25yd apart.

We returned to our mission. "Stop looking out and concentrate on the head up display," my pilot said. That is not easy when I had spent about 2,000h looking out, with very few hours on instruments. So, I settled down to maintaining the correct heading and maintaining the correct height. It is very difficult to keep your eyes in, when all that countryside is going past. I had been part of the original Army Air Corps "Nap of the Earth" flying team, and the phrase "speed of ground passing" was familiar. 100kt at





PMs Hutchinson and Perry flanked by their instructor pilots

5ft can be quite terrifying the first few times you do it as a student, but with some hours of practice it soon becomes an everyday event. You do, however remember, your first time, when you get to demonstrate it and terrify others, which I have to admit I have done quite a few times. MPs who I flew as a VIP pilot, and the odd General, will never forget the ride I gave them along a mile-long narrow track, in a dense wood, between a lot of very tall trees.

Therefore, 350mph at 500ft visually across the trees, and the ground, was not quite as visually quick for me as flying at 100mph, much lower down at 4-5ft. In my enthusiasm and enjoyment of the flight, I did manage to wander off course by a degree or two. "You are looking out too much," I was told again. To correct this error, necessitated the engine being cut back, as we were hurtling across a village with real people in it. "Keep the nose just up, and get it back on track, when the engine is throttled back up. Are you all right?" my man said. "Not really," I replied. What was the matter? This incredible flight is getting shorter by the minute, but it is wonderful otherwise.

FIRST ATTACK POINT

On reaching the first attack point, we climbed up to 1500ft, dived and delivered our imaginary ordnance. Then we had to quickly get back on track, back to 350ft. We got to a turning point around some woods, which I began to lean into and saw my shadow in the sunlight as I turned. "Pull it round harder, get that pressure suit inflated. Feel the G, this is a fighter not a helicopter," he said again. I wonder all

these years later whether he has ever been in an Apache, or a Cobra. I then followed the mission plan to the letter, correctly attacked the second target, then back to 500ft. We eventually, and very sadly, arrived back at base. As we had used up a lot of fuel, there was not a lot left for hovering about. But I did manage to land it, without blowing it over. I am sure the instructor's hands were not far away from the controls, just in case.

What an experience, what a privilege. *Jedi 2* did not speak for hours afterwards; he was completely blown away by the whole event. What I did not know, was that *Jedi 2* was up close behind me all the time, for the whole trip. He was told not just to follow me, but to stay as close as he could. The shadow I saw going round those woods, was not me, but John. When I went off track, so did he. There were two silent missiles that went over that village, not one. Fortunately, no one complained, that we know of.

It was a day for which the Company will always be grateful to the RAF, for giving two of us the chance to have the ride of our lives, in an iconic aircraft. It was something you never forget.

We hope that our instructors for the day went on and had enjoyable careers in the RAF and wherever else. It was totally different experience from when, some years earlier, I had flown an Lightning T.5 at 50,000ft plus, at Mach 2, doing flick rolls on the trim switch. That is another story. If you want to know about a pilot's workload or anyone else for that matter, you have to get up close, and do it yourself. □

INTO THE OVERSHOOT

A round-up of less-formal items which have caught the Editor's eye

BOEING'S TANKER LOSES THE PILOT

Forget single-pilot operations (pp 15-16): Boeing has gone one step further by conducting the first-ever air-to-air refuelling by an unmanned aircraft. On 4th June its MQ-25 T1 Stingray drone autonomously deployed its hose and drogue, and passed fuel to a US Navy Boeing F/A-18 Super Hornet. The T1 will undertake deck handling trials aboard a US Navy carrier in Norfolk, Virginia, later this year. Boeing will build seven more test aircraft under a contract which foresees the MQ-25 replacing F/A-18s in their current tanking role.

Crown copyright/MoD



RAF PUMA AT 50

To commemorate 50 years of RAF service, Westland Puma HC.2 XW224 has been repainted into a unique scheme. The aircraft now carries two-tone camouflage similar to that which the first Puma HC.1s were painted in when they were delivered in 1971 but with several notable differences. The engine housing boasts the badges of all the squadrons which have flown the Puma, the standard RAF logo has been replaced with the bespoke Puma 50 logo and – most obviously – the tail fin is emblazoned with the union flag. On 7th July XW224 led a formation of eight Pumas on a training sortie around the UK, overflying sites that hold historical significance for the Puma Force as well as those that provide support to delivering current Puma operational capability.

Virgin Galactic

VIRGIN GALACTIC DEBUTS

Richard Branson floats in zero gravity on board Virgin Galactic's VSS Unity after reaching the edge of space on 11th July. This was the company's first fully crewed test flight and Branson was one of six Virgin Galactic employees who strapped in for the mission, which was touted as "...a precursor to a new era of space tourism". Unity was carried aloft from Spaceport America near Truth or Consequences, New Mexico below the VMS Eve mothership (named after Branson's late mother) and released at 46,000 feet before pilots Dave Mackay and Michael Masucci ignited its rocket, sending it some 53 miles high. "We're here to make space more accessible to all," proclaimed Branson following the flight. Virgin Galactic will have competition from Jeff Bezos' Blue Origin, which was due to launch its first flight on 20th September, and Elon Musk's SpaceX, which hopes to send its first all-civilian crew into orbit in September.

