AVIATION FEEDBACK

CHIRP

An independent and confidential reporting system for the Aviation industry

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Building a culture of continuous learning

Key Human Factors lessons from recent reports

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Steve Forward
Director Aviation

Key Human Factors lessons from recent reports

After 4½ years in the pilot's seat of the CHIRP Aviation Programme, the time has come to handover the controls to someone else and so this will be my last GA FEEDBACK editorial. Allowing for the extraordinary events and specific COVID-related issues during the 2020-2022 pandemic, there've been many great insights and some recurring themes during my tenure but, overall, it has been a genuine honour to have been involved in this humbling activity of receiving altruistic reports from those who simply want others to learn from situations and

events that might not have been their finest hour. There but for the grace of God...

In this edition of GA FEEDBACK, we explore some Human Factors lessons drawn from recent reports that reveal how habitual practices, task pressures, and lapses in situational awareness can lead to unintended risks, even among experienced aviators. These insights reinforce that even routine activities carry risks, especially when time constraints, complacency, or pressures alter our standard practices. By examining these experiences, we can perhaps better understand how minor oversights, ingrained habits, and communication gaps contribute to complex safety scenarios.

This edition's 'I Learned About Human Factors From That' article underscores the need for vigilance with routine components. In this case, a subtle oversight by a group of pilots meant that misplacement of fuel and oil filler caps had gone unnoticed for over eight hours of flight time. Fuel caps and oil caps are ordinary, often-overlooked components; yet in this case, their identical dimensions led to a dangerous mix-up. The misplaced fuel cap was unable to vent the tank properly, causing a vacuum to form that could have resulted in fuel starvation mid-flight. This illustrates the importance of methodical pre-flight checks, because even familiar parts can become hazards when assumptions and confirmation bias go unchecked.

When people are in familiar environments, muscle memory often supports critical tasks when under pressure. When we change things or conduct unusual activities we're not used to, we inadvertently increase cognitive load, making it harder to stay aware of critical elements. One of our reports in this edition emphasises the importance not only of planning ahead, but also locating and setting up equipment in familiar ways, both of which serve as stabilising anchors, particularly when complex multiple variables demand attention in flight.

Effective communication with ATC is another core theme in recent reports. In one case in this edition, a pilot approaching controlled airspace was given last-minute instructions to avoid entering and was downgraded to just a Basic Service when IMC at the time. In response, the pilot was forced to make an immediate turn and descend into controlled airspace to avoid nearby traffic. Notwithstanding the sub-optimal ATC handling of this situation, it underscores the critical nature of thinking ahead to anticipate potential changes to the plan and the need for clear communication, both ways, with ATC. Threat and Error Management (TEM) is the key to anticipating things that might come and bite you on the bum (threats) or result from your own vulnerabilities, weaknesses or mistakes (errors).

Even experienced pilots and engineers can face unintended consequences when minor deviations are made during maintenance. In this instance, a pilot experienced a rough-running engine after recently performing maintenance and replacing a fuel-pump gasket. During the investigation, it was found that using a thicker, self-made gasket instead of the manufacturer's recommended thinner gasket prevented the fuel pump's push rod from functioning correctly. Using original equipment manufacturer (OEM) parts is generally best practice because seemingly small deviations, such as using a gasket of slightly different thickness, can sometimes have profound unanticipated implications for equipment function and performance. Additionally, conducting systematic pre-flight checks after such maintenance activities, like ensuring fuel pressure readings before take-off in this case, can ensure that issues are identified before they become airborne challenges.

All these reports illustrate the depth and breadth of Human Factors in aviation and highlight the critical importance of a learning-focused culture. By understanding and addressing these factors – whether through maintaining rigorous pre-flight checklists, adhering to SOPs, engaging in clear communication with ATC, or utilising OEM parts – pilots and engineers can enhance safety and reduce the risk of avoidable incidents. Each of these scenarios demonstrates that whilst aviation may rely on precise systems, safety ultimately rests on the ability of humans to remain diligent, open to learning, and prepared to adapt.

By sharing these stories, we reinforce the importance of continual learning, not only from our experiences but from those of our peers. These insights encourage a proactive approach to safety, ensuring that every flight, maintenance task, and communication fosters a safer, more reliable aviation environment for all. Such narratives remind us that the path to safer skies is built on continuous learning from real-world experiences. By examining these common human factors issues, we reinforce the value of standardised checks, clear communication, and proactive awareness through TEM. Let's keep these lessons in mind as we work to strengthen our commitment to safety and vigilance in every flight.

Don't be afraid to get in contact and tell us what you think about FEEDBACK and the articles. We don't profess to have all the answers or good ideas and so an important part of our work is not just to receive reports and offer our help and advice when appropriate, but to encourage others to speak up and contribute – you might have a brilliant idea or nugget of information that we've missed! In doing so though, can I remind us all that we don't apportion blame or make judgements on the material we receive and publish: all we're trying to do is improve aviation safety by learning lessons; trying to help resolve issues where we can; and by offering advice and counsel when it's appropriate. Thoughts and comments can be sent to me at mail@chirp.co.uk for the attention of Director Aviation.

Steve Forward, Director Aviation

Report to CHIRP!

Our reporting process is simple and quick using either our website portal or our App (scan the appropriate QR code shown or search for 'CHIRP Aviation' – avoiding the birdsong apps that come up!). In our reporting portal you'll be presented with a series of fields to complete, of which you fill in as much as you feel is relevant – not every field is mandatory, but the more information you can give us the better. Although you'll need to enter your email address to get access to the portal so that we can screen out bots etc, none of your details are shared outside CHIRP, and we have our own independent secure database and IT systems to ensure confidentiality. That way you can help to improve safety by sharing important lessons without worrying about possible consequences. Anything that could identify a reporter is removed from our reports before progressing or publishing them, and we liaise with the reporter in every step of the process. Each report plays its part in raising awareness of important safety issues and wider trends and provides lessons for all to learn from. Report-by-report we can make aviation safer – as our strapline says, "you report it, we help sort it."

Get 5% discount at Pooleys Flight Equipment

Pooleys have kindly agreed to support CHIRP's fund-raising activities by allocating us a discount code on their website shop. Enter the code 'Chirp' (case sensitive) at the appropriate point at the payment stage to get 5% discount and generate some commission for CHIRP. Sadly, this doesn't apply to the purchase of Bose headsets, but everything else qualifies! If you do use Pooleys for your purchases, or know other people who do, please do share the code. The more the code is circulated, the more it is used and the greater the commission generated to help CHIRP build its resources to do more.

POOLEY'S
FLIGHT EQUIPMENT

I Learnt About Human Factors From That

To cap it all...

Our syndicate aircraft had been in and out of action for a few months over the summer as a consequence of some engineering work, following permit expiry. On resuming flying, two members of the group observed that the fuel tank was not venting correctly and that a vacuum was forming during flights, leading to a pronounced 'whooshing' sound of the air rushing in once the fuel cap was opened. I was asked to investigate, with my assumption being that the filler cap vent had somehow become blocked, or got some debris in it.

The filler cap is one of those components that everyone handles on a regular basis – and knows roughly what it looks like – but when asked to recall the object in detail, chances are you haven't paid it sufficient attention to be able to recall all of its intricacies. On many permit-aircraft like ours it's round, relatively flat and unremarkable in feature: you couldn't get a more unexceptional part on many aircraft, I'm sure.

On inspecting the aircraft, I removed the filler cap and couldn't see any indication that it was capable of venting, leaving both myself and other group members perplexed as to whether there was an alternative vent for the tank. What were we missing?

It was only after further examination – and asking the distributor for the aircraft kit whether there is an alternative venting arrangement for the tank – that we found the issue was staring us in the face. Can you guess what it was?

On removal of the engine cowling came the proof: somehow, someone had managed to replace the oil filler cap with the vented fuel filler cap...and placed the (unvented) oil filler cap onto the fuel tank. In plain sight, it was so obvious: the oil filler cap has a symbol of an oil can on it. But it looks, feels and FITS exactly as the fuel tank filler cap does.

Not only did it catch us out, but further investigation – including going back through old photos – suggested it had been like that for over 8 previous hours of flight.

Had this not been picked up, any of our members might have experienced fuel starvation and an undesirable flight outcome, particularly had their flights been slightly longer and more fuel consumed.

There are lots of things to learn here as well as some old lessons that could be re-iterated.

First, the importance of conducting pre-flight checks sequentially. We cannot establish how it came to be that the oil filler cap AND the fuel filler cap were both off the aircraft at the same time. Had the fuel levels been checked and the cap replaced BEFORE moving on to check the oil, the first hole of the Swiss cheese wouldn't have existed.

Second, it's useful – albeit very difficult (as an 'unknown unknown') to pre-identify and highlight components that might be subject to confusion or mix-up. I would think it's highly unlikely that two components of an aircraft would be capable of fitting so perfectly in different locations – it is both a questionable design feature as well as a stroke of poor luck that both the oil filler cap and fuel filler cap are of identical dimensions. Then again, perhaps it is more common than we thought? It would be a useful exercise to query whether the same mix-up is possible in other aircraft types.

Third, it's amazing just how much confirmation bias came into the equation here. Even though we were looking directly at the oil filler cap, 5 different pilots failed to notice that it was the wrong cap. It is very easy with the benefit of hindsight to say that 'it has an oil can symbol on it', but it's quite faded, not very noticeable, and easily overlooked when you're focussing more on the underside of the cap to check it's the venting type. How many people lift off the oil filler cap without looking at it also?

Fourth, it would be prudent to improve the marking or labelling of the filler caps. One option in our case might have been to have a fuel filler cap of the same colour as the fuselage, which would then have looked completely incongruous against the oil reservoir had it been put there.

CHIRP Comments: Notwithstanding the author's comments about confirmation bias, habituation, assumption and perhaps complacency, this tale is a classic Human Factors trap where Murphy strikes again. These days, great efforts are made in aviation design and manufacturing to avoid situations where components can be installed in the wrong locations or the wrong way around, but sometimes things slip through.

During in-depth hangar maintenance there are a number of reasons where both the oil and fuel caps might be off at the same time if both systems are being worked on for some reason, but careful storage and labelling of disassembled parts is one way of preventing mix-ups. There's little reason for both to be off during routine line-maintenance or replenishment tasks, but it's easy to see how it might happen if people are trying to be organised in preparing the aircraft for top-ups.The idea of differing the colour of the 2 caps is a good one because that means that the caps are not being physically altered but can easily be differentiated from

each other – yellow for oil caps is a fairly common colour, and that would stand out if placed on the fuel filler pipe. Another option, if feasible, is to have one or both caps attached to their respective filler pipes by a suitable chain or lanyard of some description so that they can't be moved away from their intended location. Many such caps are secured this way, so perhaps there's scope for looking at doing that on at least one of the caps if appropriate, or fixing/replacing an existing chain if there's one intended to be there that's broken or missing.

We need your ILAHFFT stories!

The value of ILAHFFT is that it provides insights from those who have been there, done it, and have lessons for all of us to learn. If you have any anecdotes or amusing 'there I was…' stories then please do share them with us so that we can pass on the messages and inform others (ideally in a light-hearted and engaging manner). Send any interesting tales to mail@chirp.co.uk and put ILAHFFT in the subject header – we promise full confidentiality to protect the innocent (and not so innocent!).

Reports

Report No1 - GA1370 – CAS clearance cancelled

Initial Report

I was given a clearance to transit through [Airspace] IFR at 3000ft. The IFR clearance was cancelled at the last minute with, "Stay clear of controlled airspace and Basic Service". This while in IMC. I could not avoid entering controlled airspace due to the late cancellation – a turn to the right was the only option because another aircraft was 1-2 miles behind, similar level. I turned right and commenced an immediate descent; this turn put me in controlled airspace at 1500ft. I raised this as an issue and was given a clearance to enter and track to [Reporting point]. In checking my track I did enter controlled airspace. I called the Radar unit on return and was advised the controller was under training and admitted that the situation could and should have been handled better. I said my issue was that I couldn't do a 180 degree turn because I was aware of an aircraft behind me and that I had very few options: I was IMC and rate 1 turns were my only option.

I was prepared to have had radar vectors but was not prepared for a 'remain clear' and dropped to a Basic Service whilst on the boundary of controlled airspace.

CHIRP Comment

The report referenced an unfortunate incident that, although we do not have all of the circumstances that pertained from the ATC perspective, appears sub-optimal in how they managed the situation. The pilot would most likely have been under a Traffic Service as they approached controlled airspace, and so there should have been ample opportunity for the controllers involved to plan ahead and ensure integration (or at least a location to orbit if they could not accept the aircraft at that point). But we don't know all of the factors that may have influenced the situation and so there could have been any number of reasons why the late call was made. That being said, a last-minute cancellation of clearance, coupled with a downgrade to Basic Service at the CAS boundary is certainly not best practice, and we commend the supervising controller for their acknowledgment of this when the reporter contacted them after the event.

Ultimately, it was the On the Job Training Instructor's (OJTI) responsibility to ensure that appropriate decisions were made and, although there are benefits to allowing students to make mistakes and then recover from difficult situations, the OJTI should always be able to step in and provide appropriate instructions at any time. Whilst the cancellation of the clearance at the last minute might well have been the OJTI salvaging the situation by trying to ensure that the aircraft did not enter busy airspace, simply cancelling IFR and applying a Basic Service with another aircraft following behind put the pilot in an unenviable situation. As part of that decision-making process, the fact that the pilot was IMC at the time might have been a piece of information that was missing in the controller's decision to downgrade to a Basic Service and so, whilst not suggesting that this was necessarily the case in this instance, this reinforces the importance of good two-way information transfer so that the controllers are able to take all factors into account.

What would you have done in similar circumstances? The pilot was clearly aware of the other traffic in their vicinity and so we commend them for weighing up all of the options and deciding that the least worse outcome was to penetrate controlled airspace for a short period as they manoeuvred. Although this call was very late and there were few options available, always have a Plan B in mind in case entry to controlled airspace is denied. In this respect, Threat and Error Management (TEM) is the key to anticipating external things that might potentially cause difficulties (threats) or come about as a result of your own vulnerabilities, weaknesses or mistakes (errors). We're not saying that every circumstance can be anticipated, but it certainly helps to have a bank of options available if things go pear-shaped.

No doubt the student controller received a thorough debriefing from the OJTI, but were any lessons promulgated more widely for the benefit of others to learn from? Given that the pilot had no choice but to effectively infringe the airspace as they reacted to the last-minute cancellation, and in the vein of promoting Just and Learning Cultures, they could have submitted an airspace infringement occurrence report or, perhaps more appropriate, a CAA Form FCS1522 (Airspace Access or Refusal of ATS, see QR code) which would have raised the issue with the CAA and provided an opportunity for other units to learn lessons. CAA Form FCS1522 is a simple way of reporting airspace access or service provision problems that we recommend all pilots consider

using when appropriate: without such data, improvements in ATC resourcing or service availability will be unlikely to be forthcoming (CluedUp GA Update April 2023 also refers).

Key Issues relating to this report

Dirty Dozen Human Factors

The following 'Dirty Dozen' Human Factors elements were a key part of the CHIRP discussions about this report and are intended to provide food for thought when considering aspects that might be pertinent in similar circumstances.

- **Awareness** – OJTI anticipation and situation management; have a Plan B when approaching controlled airspace in case your clearance is cancelled at the last minute.
- **Communication** – If IMC, ensure that ATC are aware of your flight conditions and circumstances.
- **Assertiveness** – Entry into controlled airspace was justifiable to ensure safety.

Report No2 - GA1372 – Too eager to fly

Initial Report

Having finished building my plane and having had the familiarisation training, I had a few figures to get for the Permit to Fly application. I hadn't got my tablet holder in place, so I securely strapped the tablet to the passenger seat with the screen visible. Preflight checks, take off, and transfer to [Airfield] Radar went smoothly.

The weather was generally clear, but with pockets of cloud and rain, just as the weather briefings predicted. I started various tests, recording the results of each with a photo as this was quicker and less head-down than noting sets of figures. Ahead, I saw a heavy shower, so I headed right to avoid it. [Airfield] Radar then called me to advise "[Parachuting DZ location] active parachuting". I acknowledged, looked down at my tablet, and realised that, although I was still about five miles away, I was heading straight for the DZ. I altered my heading and continued the flight uneventfully.

In my post-flight debrief to myself, I concluded the following:

1. If I'd had my tablet in its usual place, I would have seen the DZ sooner as part of my normal instrument scan.
2. If I had not been in touch with a radar service, I may not have seen the DZ until dangerously close.
3. Trying to convince myself that it wasn't really a problem because, due to the weather, they weren't actually parachuting, was foolhardy.

So a positive to take away is that I try to use a radar service if available, which helped. But the decision to fly with my navigation tablet in a non-standard place, whilst doing high-rate turns, variable-speed tests, and stalls etc with known weather pockets was not such a good idea; I'll not be doing that again.

CHIRP Comment

We commend the reporter for their frank and honest report; they didn't need to tell anyone about what happened but their altruistic decision to do so provides us with the opportunity again to remind others about the need to make sure we don't become task-focused at the expense of routine flying tasks.

Their report is also a good advert for talking to ATC, who were able to assist in avoiding the DZ. This is good practice whenever possible anyway, but especially if conducting activities such as getting test data when, despite being aware of the extra heads-in time, there is inevitably a degradation of capacity, situational awareness, and potentially lookout. In this respect, if you're conducting such recording tasks in a multi-seat aircraft then also consider taking someone else in the cockpit to either record the information and/or assist with lookout whilst you concentrate on achieving the data points.

The reporter has identified many of the lessons themselves, and we concur that the issue of the tablet's location was a part of the problem. We've commented before about fixing such devices securely in the cockpit in a suitable and appropriate location to be viewed easily, and CAA Safety Sense Leaflet 29 'VFR Moving Map Devices' gives some additional thoughts on the positioning of devices and their prioritisation when using them as moving map displays.

The reporter's lesson about assuming that the weather was too bad for parachutists should also be heeded because, as they comment themselves, this was a perilous assumption. Parachutists often jump in what some aviators would consider poor weather conditions but which are in fact suitable for parachuting. As a matter of good practice, conduct thorough pre-flight planning to note DZ locations and always route around them to avoid conflicts whenever possible, but especially if heads-in and recording information as in this case.

Key Issues relating to this report

Dirty Dozen Human Factors

The following 'Dirty Dozen' Human Factors elements were a key part of the CHIRP discussions about this report and are intended to provide food for thought when considering aspects that might be pertinent in similar circumstances.

- **Pressure** – Self-imposed pressure to get the task done.
- **Distraction** – task-focus in recording test points and avoiding weather at the expense of overall navigational Situational Awareness.
- **Complacency** – Assumption that parachutists would not be operating.

Report No3 - DISP20 – Parachute display NOTAM penetrated

Initial Report

This event occurred during a Parachute Display at [Location] at 0959L in Class G airspace. The pilot of the parachute aircraft was in receipt of a Traffic Service from the closest ATSU. After dropping the parachutes, the pilot descended, orbiting the highest canopy. This was so as to provide a radar trace for ATC and other pilots. At around 6000ft AMSL, the pilot of the parachute aircraft was notified of an incoming aircraft by ATC, also at 6000ft. The pilot copied the traffic and maintained a good lookout.

At around 5000ft AMSL, the pilot of the parachute aircraft called visual with the traffic. There was 1000ft separation between the aircraft, and safe, but a NOTAM had been issued for the parachute display up to 10,900ft AMSL between 0945L and 1015L. Had the penetrating aircraft been 1min earlier, or 1000ft lower, it would have been level with the highest canopy, and potentially caused an Airprox or worse with the parachutists.

A phone-call with the penetrating aircraft's pilot revealed that the pilot:

- Was not aware of the NOTAM.
- Had a flight plan, but deviated from it because the flight-plan gave a longer routing around some danger areas.
- Was visual with canopies, display smoke and then the parachute aircraft.
- Was on a Traffic Service with a different ATSU, this ATSU had apparently given a traffic call of the parachute aircraft, but not of the parachute display.

I do not want to get the pilot in trouble for this because I believe the lesson has been learnt by them and nothing will come from any punitive action. I would like to remind others to check NOTAMs though. I'm not sure what more we can do as the pilot/display team. NOTAMs, and all appropriate notice was given to the CAA etc. Traffic Service from the closest ATSU, and a good visual lookout by DZ control, jumpers and pilot. I would love ideas on how to improve.

CHIRP Comment

It's disappointing that the other pilot was not aware of the NOTAM, and this may suggest sub-optimal pre-flight planning. Associated with this, our first thought is to wonder what information ATC gave them as they approached the area of the parachute display NOTAM? The controller would usually have briefed themselves on NOTAMs during their start-work procedures and, although it's not a mandatory requirement, it would be considered good practice for them to have reminded the pilot about it. The para-drop aircraft would also likely have been squawking 0033 (the parachuting conspicuity code). But perhaps the controller felt they had given sufficient information as part of their Traffic Information about the parachute aircraft itself rather than specifically reference the NOTAM.

Even if a para-drop NOTAM has been raised, parachutists will often be dropped outside of the NOTAM area (perhaps even more than 4-5nm away from the DZ) depending on weather conditions pertaining at the time. For practical reasons (to avoid promulgating huge NOTAM areas to take account of all potential factors), parachuting NOTAMs will probably not encompass the whole activity, just the landing area and its immediate environs. Care should therefore always be taken when approaching para-drop NOTAMs (especially from upwind) because it is possible that parachutists may be in the air outside of the NOTAM as they transit towards their DZ.

Ultimately, Class G airspace is a sharing environment and, even though NOTAMs do not necessarily have to be avoided (depending on their classification), there is still a requirement 'not to endanger' others, and so that is why it is good practice to avoid most NOTAM areas. In this respect, if the display was being conducted within an H-series NOTAM, then others were not specifically required to avoid (although common sense would dictate avoidance if they were aware of it, which it seems they were not). If a J-series NOTAM, then others were required to avoid or be in contact with the controlling authority to gain permission before entering that volume of airspace. Similarly, those publishing NOTAMs to highlight their activities (such as paradropping) should understand that they do not necessarily provide segregated airspace unless they are of the appropriate type (J-series). Some useful links (see QR codes) for understanding NOTAMs are within the CAA Infringement Tutorial and UK AIP Gen 3.1 (Aeronautical Services) (see Table 3.6.3.4 reproduced) which explains what each of the 18 NOTAM series types are.

Unfortunately, some pilots don't understand the connection between a para-drop aircraft and the parachutists. There sometimes seems to be a belief that simply avoiding the aircraft and the airspace below is all that is required. In fact, it is not usual for para-drop aircraft to follow the parachutists down in day-to-day practice, this is only done during displays (and then not always) and so it is not a reliable way of avoiding parachutists: most para-drop aircraft actually descend below the parachutists in an attempt to land before the parachutists reach the ground.

The fact that the pilot in this case saw the canopies (or at least some of them) may have given them a false sense of security that they were clear of danger. It's practically impossible to see fast-moving, free-falling parachutists approaching from above, and the difficulties of even sighting canopies when they have been deployed should also not be underestimated.

3.6.3.4

Table – UK NOTAM Series

Series	Content
A	Licensed Aerodromes: Aberdeen/Dyce, Belfast Aldergrove, Belfast/City, Cambridge, Cardiff, Edinburgh, Glasgow, Inverness, Liverpool, London Gatwick, London Heathrow, London Luton, London Stansted, Manchester International, Norwich, Prestwick, Southend and Sumburgh.
B	En-route Airspace London FIR/UIR & Scottish FIR/UIR and the Channel Islands Airspace: Regulations & Procedures, En-route Navigation Aids described in ENR 4.1 (Inc. facilities used as Approach Aids), ATS and Air/Ground Communications.
C	Licensed Aerodromes: Alderney, Biggin Hill, Birmingham, Blackpool, Bournemouth, Bristol, Coventry, East Midlands, Exeter, Farnborough, Guernsey, Humberside, Isle of Man, Jersey, Leeds Bradford, London City, Lydd, Newcastle, Newquay, Shoreham, Southampton and Teesside International.
D	Special Use Airspace within ENR 5.1 and ENR 5.2 not described in Series F, G or M.
E	Unlicensed Aerodromes within the London FIR and Scottish FIR for the notification of safety related subjects relating to facilities and services.
F	Special Use Airspace within ENR 5.1 and ENR 5.2 originated by Flag Officer Sea Training (FOST) and Royal Navy.
G	En-route Airspace Shanwick Oceanic FIR: Regulations & Procedures, ATS, Air/Ground Communications, Special Use Airspace within ENR 5.1 and ENR 5.2, and Navigation Warnings.
H	Navigation Warnings (except those catered for in Series G).
I	Licensed Aerodromes within the Scottish FIR not covered in Series A or C.
J	Temporary Danger Areas (TDA), Restricted Areas (Temporary).
K	En-route Obstacles within the UK Military Low Flying System less than 100 M (328 FT) AGL, incl LGT.
L	Licensed Aerodromes within the London FIR, not covered in Series A or C.
M	AMC Managed Special Use Airspace within ENR 5.1 and ENR 5.2 including relevant Military Exercises.
N	En-route Obstacles 100 M (328 FT) AGL and above, incl LGT.
Q	UK Sovereign Bases and Overseas Territories: Gibraltar, Mount Pleasant, and Port Stanley. British Antarctica airstrips Rothera, Halley and Sky Blu.
U	UK Military Aerodromes.
V	Notification of Security Advice to UK Air Operators by Government to provide guidance/instructions on Airspace Security Risks. Volcanic Ash related information within En-Route Airspace London FIR/UIR, Scottish FIR/UIR, Shannon FIR/UIR and Shanwick Oceanic FIR.
X	Contingency: Series applied in event of unplanned, long-term outage of normal NOTAM production system. Only time critical NOTAM shall be issued during period of outage. Distribution as per all of the above Series.

Key Issues relating to this report

Dirty Dozen Human Factors

The following 'Dirty Dozen' Human Factors elements were a key part of the CHIRP discussions about this report and are intended to provide food for thought when considering aspects that might be pertinent in similar circumstances.

- **Awareness** – Other pilot was not aware of the NOTAM.
- **Knowledge** – Other pilot did not obtain the NOTAM information.
- **Communication** – ATC may not have effectively communicated the NOTAM to the other pilot.
- **Complacency** – false assumption that sighting canopies or drop aircraft means that parachutists have been avoided.

Report No4 - GA1373 – Instructor induction

Initial Report

I was in communication with an organisation regarding engagement as a Flight Instructor. Previous contact with the organisation when I went for a preliminary discussion/interview with the responsible person and attended an SMS brief had given me a good impression. The day came for an 'induction' brief and standardisation flight with the CFI. The weather forecast was poor for the day, and I offered to defer to another date, but on arrival I met the CFI and we sat and discussed the 'plan', which was to, "*Go up and hopefully find a hole to do some stalling, if not and we can't do that we'll stay close and do some circuits*".

The flight was to be in a C150 so I asked about Weight/Balance/Performance and Airfield Data. The response was, *"We don't usually do these – you don't look like a big bloke*" (I have no ego, so it wasn't an insult, but individual physiology differs, as does mass depending on muscle density versus fat density). "*We can get the data if you wish*" so I waited whilst the Weight/Balance/Performance data was 'looked for' but it was not readily available.

I decided there and then to terminate the appointment and departed. The C150 is notorious for limited payload capacity and fuel issues, and there are several C150 safety reviews and other items with titles such as 'Why are we crashing the Cessnas'? Irrespective of the weather on the day (it was not suitable) pre-flight planning is essential, and if flying students are not coached by setting an example of due diligence and standard operating procedures – especially with a low performance aircraft – then safety is compromised.

I think that with the advent of less regulated DTOs in the UK, a cultural gradient is still to be climbed because PROFIT/VIABILITY sometimes appears to be the paramount motivation. I was disappointed with the outcome at this DTO because my preliminary meetings had been positive – all the 'right' SMS noises were made, but I was utterly taken aback to be confronted on the day as I was. I felt under stress to be advised 'we will fly and we'll try and find a hole to do stalling' when clearly the weather was not suitable (it was BKN/OVC 1800ft with rain and reduced visibility).

CHIRP Comment

This is a very concerning report. The C150 has known performance issues that require it to be treated with caution and should certainly be the subject of an extensive pre-flight briefing, especially with a prospective new instructor of which the CFI would have had no prior knowledge. Although it was recognised that pilots do not have to conduct Weight & Balance calculations for every flight, we strongly recommend that they do if any parameters have changed or additions been made since the last calculation. But the situation is different in the instructional

context, and instructors should expect the student to do the calculation as a matter of course. In this respect, and as also stated in Safety Sense Leaflet 9 'Weight, Balance & Performance', UK Regulation NCO.GEN.105 'Pilot-in-command responsibilities and authority' requires that the pilot in command of Part 21 aircraft be satisfied that a flight can be safely made, and that the weight and centre of gravity location remains within the prescribed limitations for the aircraft. Article 69 of the Air Navigation Order 2016 applies the same requirement for flights involving non-Part 21 aircraft. In short, pilots must at least always satisfy themselves that the aircraft is being operated within CG, AUW and performance limits. It is CHIRP's opinion that any check of a new instructor should certainly include their capability to do such calculations as a formal part of the assessment.

The CFI's approach to the assessment seemed substantially lacking, and the poor impression that that created reflected on the culture likely to be present within the organisation. As a result, the reporter's subsequent decision not to have anything to do with the organisation was understandable. If a CFI is checking out a new instructor then we'd certainly expect them to want to see and do everything required to confirm the instructor's instructional and flying ability, not just for their professional satisfaction, but also to make sure that the potential new instructor was the sort of person who does things properly when it comes to students. Perhaps it's understandable that the CFI was trying to make the most of an opportunity, but this was not really the time and place to act in such a manner.

We wondered when the last time the organisation was scrutinised by the CAA, and it seems that at the time they had not yet been audited in their current guise within the new DTO regime (although they may have been audited in a different incarnation previously). When an organisation initially declares themselves as a DTO, they are able to commence operations immediately, prior to an audit taking place. The CAA states that, in general, DTO inspection frequency depends on the level of safety risk based on previous inspections, with the maximum oversight planning cycle not exceeding 6 years (see CAP1637 Para 6.7). This particular organisation was on a 36 month inspection cycle and has since been audited for the first time after this report was submitted. In addition to CAA inspections, DTOs are required to conduct their own annual reviews and submit their results to their allocated Licensing Standards Inspector. CAP1637 Chapter 6 (DTO.GEN.270) details the required content of such annual self-assessments.

The issue of ensuring proper assessment of new instructors was previously the subject of '*AIC P 022/2001 – Newly Qualified Flight Instructors*' (recently revoked) that had been issued in response to an AAIB investigation into a fatal accident involving a newly-qualified flight instructor conducting a trial lesson in a Piper PA-28-140 at Bournemouth (G-OSOW 18 December 1999). This accident had attracted an AAIB comment within their report that: "*Whilst the pilot did receive briefings on various club matters, no formal check flight or assessment of his instructional or flying ability was required or carried out. The accident flight was the first occasion that the pilot had flown the PA28 Cherokee, all his previous flying was on the PA28 Warrior.*"

AIC P022/2001 had referred to the need for thorough checks on new instructors to be carried out and "*if the [training facility] operated a class or type of aeroplane not covered by the experience of the newly appointed instructor, specific differences should be identified to the instructor and the differences training recorded in his/her logbook.*" Unfortunately, this particular AIC, which had conveyed a very useful flight safety message about new instructors, is now no longer available but the CAA state that the associated responsibilities for instructional staff are now captured in CAP1637 Chapter 3 (DTO.GEN.210) Para 3.2 under the responsibilities of the Head of Training. However, whilst this articulates responsibilities, it does not provide specific guidance as to content for the induction and ongoing assessment of instructors; there appears to be a gap in available guidance in this respect.

Key Issues relating to this report

Dirty Dozen Human Factors

The following 'Dirty Dozen' Human Factors elements were a key part of the CHIRP discussions about this report and are intended to provide food for thought when considering aspects that might be pertinent in similar circumstances.

- **Stress** – uncertainty as to organisational competence and safety culture.
- **Pressure** – compulsion to operate in unsuitable weather and without aircraft performance data.
- **Resources** – aircraft data not immediately available.
- **Knowledge** – lack of rigour by CFI.
- **Complacency** – assumptions as to aircraft performance and candidate instructor capabilities.

Report No5 - GA1375 – Fuel pump gasket

Initial Report

I had recently carried out a 75-hour maintenance cycle on my Jabiru 2200 engine. Whilst doing so, I noticed that the fuel pump was leaking oil from around it, the pump itself is driven by a pushrod from the engine, lubricated by the sump oil. I sourced some 1mm gasket paper, 2x pieces being required, also RTV (Room Temperature Vulcanising) gasket sealer.

The pump was removed, very simple, and new gasket paper cut out to match the shape of the old gaskets which were in poor condition. The new gaskets were cut out and made using a wad-

cutter tool to make perfect holes, gaskets fitted, and screw/bolts torqued up. Having waited 24 hours for the gasket sealer to cure, the engine was run up, no problems were encountered, no oil leaks were found.

The following day all normal checks were run prior to take off, power checks etc to 2000rpm, including a long taxi over grass to the in-use runway. Having called taking-off and applied power, I was passing through 200ft when the engine started running rough. I put the nose down and pulled the power back, intending to land back on, which I did. However, I was surprised when having put the nose down the engine ran smoothly again and was fine all the way back to the hanger. Whilst taxying, I saw that the fuel pressure gauge was reading ZERO, which was surprising as the engine was running fine.

I did note however that the last thing I had touched was the fuel pump. I realised that my fuel is overhead in wing tanks, and that some pressure is gained from gravity. Further inspection of the fuel pump revealed that the push rod only moves 1-2 mm, and that, with thick gasket paper, I suspect that the pushrod was not making contact with the fuel pump, therefore no pressure. New thin gasket paper was used, 1/2 mm, and fuel pressure was restored in the gauge, and of course now no rough-running engine. Looking at the fuel pressure was not part of my take-off checks, (it is now) with the gauge being on the far-right passenger side.

I do not believe I could have foreseen this issue, perhaps someone will say different? There was no indication of a fuel-flow problem from sound and power checks. I have, as stated, now included a visual check of the fuel pressure gauge in my checklist but perhaps someone out there without a pressure gauge may well change the gasket on their engine and not be aware of the pitfall. I have now received some manufacturer's gaskets, which look to the human eye to be a bit thinner. I have not fitted them as 1/2 mm gasket paper seems fine.

CHIRP Comment

Making such things to pattern should only be done as a last resort (such practice is completely prohibited in the commercial world) because of the uncertainty in ensuring correct tolerances. Even if the reporter had chosen to use a micrometer to establish gasket thickness, the old gasket will have been crushed on initial installation and so any measurement would have given an inaccurate result (below thickness in this case).

Fundamentally, the lesson is to use manufacturer-approved materials whenever possible, but there ought to be some guidance as to what thickness gasket is required for those who have the skills to manufacture such materials themselves because it's quite common for people to do so. We understand that Maintenance Manuals for GA aircraft can sometimes be rather lightweight in detail, and often allow the use of standard engineering practices, but this particular item should be in the manual due to the obvious close tolerances.

Whilst we understand that the self-manufactured thinner gasket seems to work fine, we'd recommend that the reporter replaces the gasket with the manufacturer's official versions; you just don't know how close you might be to the tolerance limit with the self-made version. More importantly, it would also be apposite to check the fuel pump push-rod at the same time to ensure it is not worn or deformed because this could also be a problem rather than just the thickness of the gasket paper alone; the pump itself may well be at the limit of tolerances. We recommended that the reporter contact the LAA/BMAA as applicable to their aircraft type for advice, and it may well be worth them engaging an engineer to check the fuel pump for such wear, or just get a new pump if there's any doubt.

On a handling note, well done to the reporter for reacting appropriately when encountering the rough-running engine, and for not subsequently assuming all was ok and trying to resume the climb once the rough-running had stopped in the descent. Reduced-power emergencies on climb-out can be real killers because, instead of making a decision to land and enacting that decision, people sometimes try to nurse the aircraft along and can end up in situations that they might not be able to recover. The reporter's comments about checking fuel pressure before take-off speak for themselves; Ts & Ps don't just apply to oil pressure; if you have a gauge, check the fuel pressure too.

Key Issues relating to this report

Dirty Dozen Human Factors

The following 'Dirty Dozen' Human Factors elements were a key part of the CHIRP discussions about this report and are intended to provide food for thought when considering aspects that might be pertinent in similar circumstances.

- **Resources** – self-manufactured gasket vs OEM version.
- **Knowledge** – did not check what the required gasket thickness was.
- **Complacency** – did not check fuel pressure before take-off.

Report No6 - GA1371 – Use of CANP for short-notice activities

Initial Report

Until such time as EC provides a practical solution, we [the paragliding/ hang-gliding community] rely on CANP (UK AIP ENR 1.10 Ch 5) to deconflict between military low-flying aircraft and paragliders/ hang-gliders around busy sites. The Military Airspace Management Cell (MAMC) provides this service, which

gives us short-notice access to the NOTAM system: generally, the best compromise between an accurate weather forecast and sufficient notification to military crews (by 8pm the night before). A few years ago, the system was expanded, and CANPs now appear as warning NOTAMs, which means they can be seen by civilian pilots as well. By way of background, the BHPA recommended that our sites are not marked on charts because they are inactive most of the time, which can encourage complacency, hence favouring CANP instead.

Some enthusiastic paragliding pilots have developed an online CANP notification tool (CANP for free fliers at https://canp.logans.me.uk/) which makes it very easy to submit a CANP. It's not compulsory, and there are limitations, but it seems to work pretty well (particularly on a smartphone). The key point is that the tool isn't essential, it just makes things easy for lazy pilots. CANPs are still pretty easy to submit by old fashioned email; however, we have found that, by making it simple, the tool has encouraged our members to use something that isn't compulsory. Three clicks, phone number and email, and SUBMIT. The MAMC then provides an acknowledgement email to the initiator. It works really well.

I notice that the British Model Flying Association (BMFA) tend to make block NOTAM bookings for each location – often extending to the maximum 3-month period allowed. I suspect that they have similar weather constraints to ourselves and, that being the case, I suggest that this leads to NOTAM 'clutter'; arguably one of the reasons for NOTAM incursions. BMFA members are perfectly entitled to use CANP, but use block NOTAMs instead. I suggest that we could promote the use of CANP by the model aircraft community (both the BMFA and the Large Model Aircraft Association (LMAA)) using the paragliding CANP tool in an attempt to minimise block NOTAMs.

One bonus is that the utility publishes existing notifications and filters out duplication, thus reducing the workload for MAMC. We've also found the historical usage by site, club and month to be really useful. The one fly in the ointment is that neither MAMC nor CAA AR Ops is open over the weekend, so notifications for a Monday have to be submitted several days in advance, without access to an accurate weather forecast.

The tool's author has offered the code (and probably some advice) for free. If the BMFA or LMAA choose to use it for their own purposes, then there would be work involved in loading the database with all their clubs and sites.

Military Airspace Management Cell (MAMC) Comment

We currently receive CANP requests via email; the tool used by users inputs their data on their application and generates the request to us in the form of an email. We then promulgate an H-series NOTAM for the request. But we would only do this for drones/models etc operating visual line of sight and up to a max altitude of 400ft AGL. Anything beyond 400ft AGL is processed by AR Ops at the CAA. Their procedure for Airspace Co-ordination and Obstacle Management (of drones above 400ft and other activity categories) is at link https://applications.caa.co.uk/CAAPortal/servlet/SmartForm.html?formCode=BAL).

British Model Flying Association (BMFA) Comment

We do refer members to use CANP and include some guidance in our Members' Handbook at https://handbook.bmfa.uk/9-the-bmfa-guidelines-and-safety-codes-for-model-flying (see section 9.5). It is also set out within UK Regulation (EU) 2019/947 'UAS Regulation' (https://regulatorylibrary.caa.co.uk/2019-947-pdf/PDF.pdf). We could very easily create a portal (similar to the BHPA's) which would fire off a notification to MAMC (we created a similar system for Occurrence Reports which automatically sends them to AAIB, CAA and CHIRP). We'd like to make these additional points though:

1. We have 800+ clubs who are all permitted to operate model aircraft <7.5Kg within VLOS at altitudes > 400ft agl.
2. We have no permissions to operate multi-rotor drones above 400ft or any mechanism to permit them in any circumstances.
3. It is only those clubs operating aircraft >7.5Kg at altitudes >400ft agl that require a BMFA Site Permit which, to be enabled, requires an airspace notification. UK Regulation (EU) 2019/947 states that the 'primary means of notification is via a NOTAM', so at present that's what we're stuck with.
4. We do have some sites with a permanent listing in the AIP, but in practical terms this does not give the same level of visibility as a NOTAM.

We agree that NOTAMs are less than ideal for our purposes, but at present it seems to be what we're stuck with as it's something that all airspace communities utilise. A system similar to the BHPA CANP process but which notifies all airspace users would certainly be of interest to us.

CHIRP Comment

The reporter's suggestion of using the BHPA's CANP app (or similar) for model aircraft flying would appear at first thought to have considerable merit. Although many such flights may not require formal notification, if the system was sufficiently easy to use and undemanding in application, then the increased awareness of model aircraft flying at BMFA and LMAA sites would potentially be of benefit to all. However, there are practical limitations in the potential numbers of such flights and the

resources required to translate the CANP notifications into H-series NOTAMs. If the suggestion was taken up then it will probably be important at least initially to limit the associated CANPs to those activities above 400ft so as not to flood the CANP/NOTAM system with numerous entries for relatively frequent below-400ft activities that would not be so relevant to GA generally flying above 500ft.

Ultimately, using the new CANP/NOTAM approach would make any such NOTAMs more time-relevant, specific and hopefully encourage better NOTAMs to be submitted through a more user-friendly application. As the reporter states, in order to use the new app, the BMFA would have to upload their flying sites, but this was not thought to be an insurmountable issue.

Finally, rather than involve MAMC in translating CANP into H-series NOTAMs, an automated system would have great utility that could also extend beyond weekday-only NOTAM generation. Constraining the CANP app to defined outputs would probably be required in order to prevent spurious CANP entries being input in error and then being rejected by the automated NOTAM generator. There would also need to be some form of validation of user to ensure cyber security and prevent attacks.

UK Regulation (EU) 2019/947 'UAS Regulation' (https://regulatorylibrary.caa.co.uk/2019-947-pdf/PDF.pdf), Appendix A – Article 16, GM1 Article 16(1) UAS Operations in the Framework of Model Aircraft Clubs and Associations, states:

NOTIFICATION OF MODEL AIRCRAFT ACTIVITY TO OTHER AIRSPACE USERS

Consideration should be given to the need to notify other airspace users of model aircraft activity, when operating within the terms of an Article 16 authorisation. This should be identified at the time of application, during the risk assessment process.

Generally, this includes when operating above 400ft AGL as part of a display, or when operating a large model aircraft above 400ft.

Model aircraft operating within an aerodrome FRZ may be notified to other airspace users, via a NOTAM. This is at the discretion of the aerodrome ATS unit, and the recommendations set out in AIP section ENR 1.1 – 4.1.8.13.

Generally, a VLOS [Visual Line of Sight] operation of a model aircraft does not require notification when above 400ft, when stated within the terms of the Article 16 authorisation and when outside controlled airspace.

The primary means of notification is via a NOTAM. A NOTAM highlights important operational information to pilots, which is checked as part of the brief before departure. NOTAMs are issued by the NOTAM office at NATS, and can be arranged by the CAA, individual operators, aerodromes or other agencies as necessary.

A NOTAM should be used to highlight unusual model aircraft activity to other pilots for awareness. This includes displays above 400ft, large model aircraft operating above 400ft and in some cases, when operating within an aerodrome FRZ. A NOTAM may be requested via the online form, available from the CAA website, or, for an aerodrome ATZ, by the aerodrome contacting the NOTAM office.

In general, a NOTAM should not be raised for an activity which is also notified within the AIP (section 5.5 (aerial sporting and recreational activities). However, it is acknowledged that some sites in some instances (large display events for example) may need additional notification, in order to improve their visibility to airspace users, particularly the VFR GA community. In this case, a NOTAM in addition to the AIP entry may be requested for 'an intense area of model aircraft activity'. These should be requested when necessary via the online form, available here.

Key Issues relating to this report

Dirty Dozen Human Factors

The following 'Dirty Dozen' Human Factors elements were a key part of the CHIRP discussions about this report and are intended to provide food for thought when considering aspects that might be pertinent in similar circumstances.

- **Resources** – a suggestion for the use of a simple app for notification of model aircraft flights.
- **Awareness** – provision of time-relevant, specific model aircraft flight information.
- **Communication** – better awareness of model aircraft flights by the GA/military community.