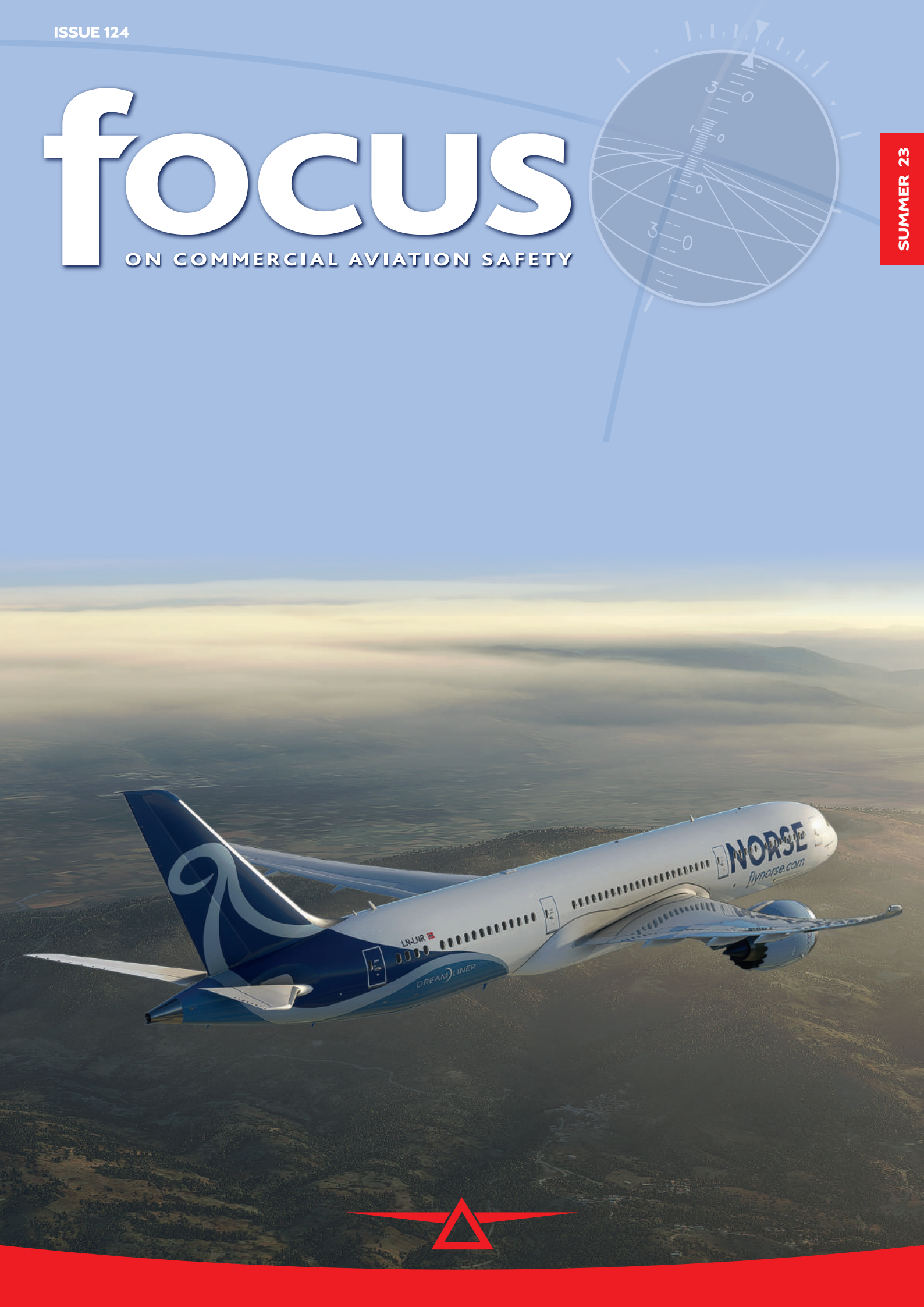
ISSUE 124

focus

ON COMMERCIAL AVIATION SAFETY

SUMMER 23



Contents

The Official Publication of THE UNITED KINGDOM FLIGHT SAFETY COMMITTEE ISSN: 1355-1523 SUMMER 2023

FOCUS is a triannual subscription journal devoted to the promotion of best practises in aviation safety. It includes articles, either original or reprinted from other sources, related to safety issues throughout all areas of air transport operations. Besides providing information on safety related matters, **FOCUS** aims to promote debate and improve networking within the industry. It must be emphasised that **FOCUS** is not intended as a substitute for regulatory information or company publications and procedures.

Editorial Office:
Unit C2b, Fairoaks Airport, Chobham, Woking, Surrey, GU24 8HU
Tel: 01276 855193
e-mail: admin@ukfsc.co.uk
Web Site: www.ukfsc.co.uk
Office Hours: 0900 - 1630 Monday - Friday

Advertisement Sales Office:
UKFSC
Unit C2b, Fairoaks Airport, Chobham, Woking, Surrey, GU24 8HU
Tel: 01276 855193
email: admin@ukfsc.co.uk
Web Site: www.ukfsc.co.uk
Office Hours: 0900 - 1630 Monday - Friday

Printed by:
Woking Print & Publicity Ltd
The Print Works, St. Johns Lye, St. Johns,
Woking, Surrey, GU21 1RS
Tel: 01483 884884
e-mail: sales@wokingprint.com
Web: www.wokingprint.com

Front Cover Picture: Norse Atlantic Airways is an airline that offers affordable fares on long-haul flights, primarily between Europe and the United States. The company was founded by CEO and major shareholder Bjørn Tore Larsen in March 2021. Norse has a fleet of 15 modern, fuel-efficient and more environmentally friendly Boeing 787 Dreamliners that serve destinations including New York, Los Angeles, Fort Lauderdale, Orlando, Washington, San Francisco, Boston, Oslo, London, Berlin, Rome and Paris. The company's first flight took off from Oslo to New York on June 14, 2022.

Notice to subscribers – General Data Protection Regulations

UKFSC retains contact details for individual FOCUS subscribers for the purposes of distributing the magazine; no other data is held. All personal data will be destroyed when we are notified that a subscription has ended.

focus
ON COMMERCIAL AVIATION SAFETY

Knowledge, Skills and Experience

by Dai Whittingham, Chief Executive UKFSC

The recent annual Safety Forum held in Brussels by the European arm of the Flight Safety Foundation focused on knowledge, skills and experience – or, rather, the lack of them - across the aviation industry at the moment. The theme had been identified last summer when it became evident that a shortage of trained staff remained one of the key factors handicapping the post-Covid recovery to normal operations.

The UK CAA had issued a Safety Notice in 2021 (SN–2021/011) entitled "Awareness of Skill Fade and Suggested Mitigations" which was reissued (Version 2) in April 2023. SN–2022/005, issued in July 2022, drew attention to "Commercial, Organisational and Client Pressure in Flight Operations". On pressures, it is self-evident that people who lack experience in the industry could inadvertently apply pressures without necessarily appreciating the potential impact on safe operations.

EASA also issued a Safety Information Bulletin (SIB 2023-05) in June 2023 which considered the risks to network operations from, amongst other factors:

- Shortage of operational and technical staff (not limited to flight and cabin crew)
- Loss of knowledge, expertise and transfer of experience following staff turnover
- Ground handling training programmes disruption
- Lack of time to properly train staff

Ground handling has been a source of concern for regulators as staff turnover was very high during and immediately after the pandemic, reaching as high as 100% in some cases. You should not be surprised that people in physically demanding technical roles responded to uncertain employment conditions by finding greater security, and often better work-life balance, in other industries. Those people are not especially likely to return.

For their replacements, there are plenty of pressures to face in an unforgiving environment. The hazards around an aircraft on arrival, turn-round and departure from a gate are well known at the organisational level, but will obviously be less familiar at the individual level until that person gains experience. Meanwhile, the pressure to reduce time on the ground (and hence fees) and get the aircraft airborne and earning revenue again are significant; this compresses the time for a ramp team – and flight crew - to complete their task. History is littered with examples of accidents where haste has combined with inexperience to release a hazard. It will be some time before the NTSB reports formally on a ground handling fatality at Montgomery, Alabama, in December 2022, but you can expect the investigators will have looked closely at training and experience.

The 'new hires' issue affects back-office staff too. For example, a 'compliant' roster could be issued by an inexperienced staff member when a more experienced colleague might have recognised potential problems from even a minor network disturbance. Or they might not have known the unwritten policy that Capt B was not to be rostered with FO C because they carried mutual emotional baggage that could affect conduct of the flight.

Beyond experience, poor resourcing levels generated by the inability to recruit can have very significant implications. IATA estimates that the industry has only 60-70% of the staff needed to meet customer demand over the next 12-18 months, and regional airlines have been particularly hard hit, some having to short-term park aircraft as there are no crews to operate them. And in Europe, Lufthansa announced plans in February to cancel 34,000 flights on its previously announced summer schedule, citing staff shortages.

Whilst levels of operator ambition can be scaled back, it does not alleviate all the pressure on remaining staff. It is entirely understandable that operators want to maximise revenue while minimising resource input, especially when margins are small; it is a management duty to the shareholders. However, the result is that the entire system runs at maximum capacity. There are implications here for workforce fatigue but also for organisational culture, the ability to retain trained staff, and the attractiveness of an organisation for potential recruits.

It is a vicious circle because the harder you work people to satisfy demand, the less likely others are to join you, which ultimately leads to your own company growth being limited. It is ever more important to retain your trained staff, because the measures you take to do this will lead to the company being seen as a good place to work. It is also worth remembering that, when people leave, they take with them intellectual capital in terms of their knowledge, skills and experience, all qualities the company must pay to replace. As an added benefit, if your company is seen as a good place to work, it probably has a workforce that is well-trained, resilient, well-rested and well-motivated, which in turn leads to better human performance and productivity, with lower costs from mistakes and inefficiencies.

So, what can we do about it? The human resource problem has short and long-term dimensions and there is no single solution to both. In the short term, there needs to be concentrated effort on improving the experience of existing staff – this is not an industrial (pay) issue, but it is about how staff are treated. The Safety Forum heard presentations on the need for support and wellbeing programmes to expand beyond those available to flight crew, recognising that all disciplines in the industry are under pressure. As part of this, operators need to be realistic about matching schedules and resource, because when their network is running at or near its capacity, it takes longer to recover from perturbations due to weather, strikes and technical failures, and the resulting delays also have impacts on the entire system.

Once you have started to improve life for the individual, there are other steps managers can take to make it easier for staff to do the right thing. Policies and procedures are common to all organisations, but the philosophy on which they are based is not always clear. A shared understanding of that company philosophy - which requires communication from senior levels – can give staff the guidance they need when policies and procedures don't correspond with events. For example, understanding that the company considers on-time performance as a core element of its value proposition might enable a captain to come to a different decision on risk management when SOPs point them in another direction.

The other element of resourcing is existing policies on age-related retirement. Questions are being asked about a more condition-related approach where cognitive performance can be measured and taken properly into account, and risks weighed against those from medical conditions. There are industrial considerations with this argument that are out of scope, but there is no doubt that the age profile of the industry, especially the pilot community, is rapidly becoming a source of concern. A recent presentation in Norway indicated that Europe will require 6000 new pilots per year over the next 2 decades, but that the training capacity is only around 1500.

The Safety Forum also looked at the longer-term resource problem. One of the first steps needed to be proper Diversity, Equity and Inclusion policies which, beyond their immediate impact on the working environment, will be key to attracting diverse talent and widening the pool for recruitment. To put that in perspective, a policy of not recruiting women automatically means you only have half the working population available for selection. Interestingly, there is apparently academic evidence to show that diverse teams have better safety outcomes than homogenous teams. Regardless, aviation in all its forms needs to be seen as an attractive career option.

To that end, many organisations are engaged in outreach and STEM activities, with STEM having the potential to persuade young people that study in these areas opens numerous opportunities for them.

Selection of personnel was also discussed, along with the notion that the science applied to pilot and ATCO selection needed to be extended to a much greater proportion of the workforce. This 'round peg, round hole' principle would help to reduce resources wasted on failed training while at the same time contributing to improving staff retention.

Finally, we heard that industry needs to be prepared for new technologies, specifically its use of AI and Machine Learning. That implies new skills sets will be required. On AI, it will not be sufficient to allow amateurs to use (eg) ChatGPT to write manuals or SOPS; instead, we must recruit people who understand the advantages and limitations of AI, and who can help us to use it efficiently and safely. An industry move towards competency based training and assessment (CBTA) is under way, but there was also a view that only ~70% of the existing instructional staff would be able to make the transition successfully.

To conclude, we work in an industry where knowledge, skills and experience are central to safe and commercially viable operations. None of those operations can happen without the right people, who need to be recruited, selected, retained, led and managed.

Baro-VNAV and Circling Approach Risks

by Rob Holliday, Chairman UKFSC

The Baro-VNAV Approach

The vulnerability of Baro-VNAV approaches to altimeter setting error has been highlighted by the report published by the Bureau d'Enquêtes et d'Analyses into the serious incident of an A320 flying below the approach profile to runway 27R at Paris Charles De Gaulle airport in Instrument Meteorological Conditions (IMC).

Baro-VNAV uses barometric altitude information from the aircraft's pitot-static system and air data computer to compute vertical guidance for the pilot. If the wrong QNH is set the vertical profile will be too high or too low, but the Primary Flight Display will indicate that the aircraft is on the correct profile and the QNH based altitude cross checks on the approach will appear correct.

A UK CAA Safety Notice Risk of Controlled Flight into Terrain during 3D BARO-VNAV and 2D Approaches (Altimeter Setting Procedures) and an EASA Safety Information Bulletin 2023-03 : Incorrect Barometric Altimeter Setting followed the CDG incident with recommendations to mitigate the risk and to monitor the effectiveness of altimeter setting procedure using intelligence from flight data. The UK CAA followed up the safety notice with a video https://youtu.be/mW1QLgEg-gw in a simulator to highlight the key risks of Baro-VNAV approaches. The You Tuber, Mentour Pilot also posted an interesting analysis of the incident at Paris Charles De Gaulle https://www.youtube.com/watch?v=7LE98jp11js

The risk is that if the only source of QNH is from Air Traffic Control and that QNH is wrong, the vertical profile created by the system will be incorrect, with the risk of controlled flight into terrain. A single source of QNH, in this scenario, is a single point of failure to a potential catastrophic outcome, which is unacceptable. Furthermore, there is no safety net; TAWS will not provide a pull up warning because the terrain clearance floor adjusts to prevent nuisance warnings when the aircraft is on an approach to a runway.

Mitigating procedures cross check the QNH from Air Traffic Control with an independent source of information, require ATC to repeat the QNH prior to commencing descent on the approach and include the Radio Altimeter in the pilot scan during the approach.

The incident also highlighted misunderstanding of the significance of the ATC Minimum Safe Altitude Warning MSAW. Operators should review their pilot procedures in response to a MSAW warning from ATC including the requirement for an immediate go-around.

The Circling Approach?

According to the Flight Safety Foundation, straight-in approaches are twenty-five times safer than circling ones. Aero Safety World article – Circling Back.

The USA National Transportation Safety Board (NTSB) recently published a Safety Alert about the risks associated with a circling approach. Circling Approaches – Know the Risks.

The NTSB state that between 2008 and 2023, there have been 10 accidents involving Part 91 and Part 135 operators that occurred during a circling approach. These accidents involved 17 fatalities.

In the Safety Alert the NTSB describe three fatal accident cases where the aircraft is not aligned with the runway at low level and the combination of low speed and bank angle result in loss of control with insufficient height to recover.

Operators rarely conduct these approaches. Marginal Visual Flight Rules (VFR) conditions increase the challenge and the risk of the approach. As a result, some operators have applied higher weather minima to this type of approach as a mitigating intervention. With higher minima or a prohibition at night.

Flight data facilitates monitoring of the conduct of these approaches. High bank angle, low speed or deviation from runway track below 500' events viewed in conjunction with the weather report prevailing at the time of the approach provides some environmental context to the data.

The two-part article in Aviation Week Flying Circling Approaches in the Real World discusses the challenges of training for this type of approach with some interesting viewpoints.

The operations manual at one company operating a Global 6000 says, *"All circling approaches should be conducted using Category D weather minimums regardless of aircraft certification. Crews attempting a circling approach at night are prohibited from using this procedure in mountainous terrain or when the weather is less than basic VFR."* A Falcon 7X pilot highlighted an important aspect of the weather minimums discussions. *"If you're in VMC and not flying or transitioning from an instrument approach to a different runway, you're technically not even flying a circling approach." Most said they considered these approaches as visual circling maneuvers. (Flying Circling Approaches in the Real World – Part 2, Rob Mark. June 02 2023. Aviation Week)*

The Ops Group Blog 'Circling Why Is It So Dangerous' https://ops.group/blog/circling-why-is-it-so-dangerous/ includes a description of the difference between PANS-OPS and TERPS criteria in the design of circling approaches which is important to be aware of.

The message is clearly; if a straight in approach is available, take it.

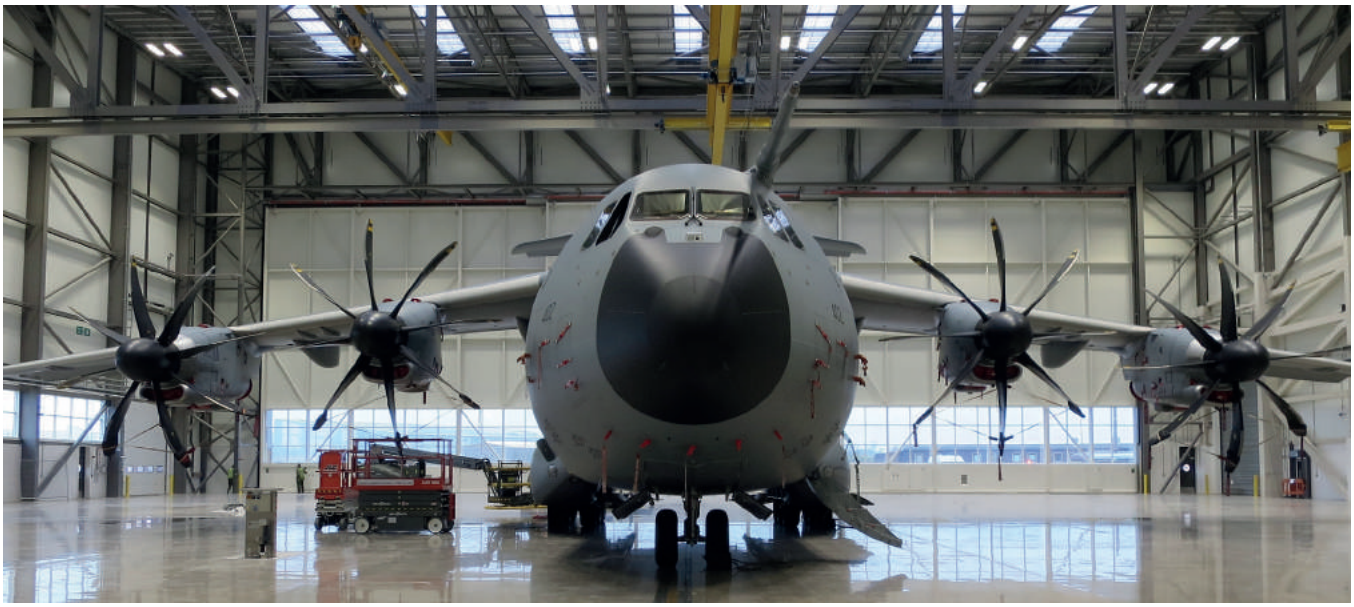
Flying a circling approach, the NTSB recommends -

- Fully understand the risks.
- Know yours and the aircrafts limitations in the context of the weather.
- Do not conduct an approach that you are not comfortable performing.
- Acquire recurring, scenario-based training in realistic environments that includes circling approaches.
- A comprehensive brief must include 'when the circling approach will begin, descent altitudes and locations, airspeeds, aircraft configuration, and go-around (or missed approach) criteria and procedures.'
- When conducting a circling approach, remain at or above the circling altitude until the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate using normal maneuvers.
- To ensure the stabilized approach criteria are met while conducting a circling approach, it is imperative that pilots continuously monitor the airplane's altitude even when flying in VMC.

Most importantly. Even if ATC clear you for a circling approach, you can express your concerns; request a more suitable runway or a diversion.

The cost benefit of human factors

Irene Ruiz-Gabernet MRAeS, Head of Safety & Compliance at Airbus Military UK, considers different methods in engaging senior management and stakeholders to invest in safety.



One of the biggest challenges for quality and safety departments can be to balance positive safety outcomes with the cost of achieving them. Treating the root cause of specific safety events or deviation from regulatory requirements may be obvious places to invest. However, there are often repetitive underlying conditions which should be mitigated but may not be considered a priority for spending safety budgets. It can be difficult to represent these less urgent safety considerations in monetary terms to senior managers and, therefore challenging to find the funding to prioritise or mitigate them. However, the financial cost of mitigating some of these underlying 'human errors' at later rather than earlier stages of a project or process can multiply quickly.

Ideally, we would expect senior managers to understand that failing to adequately consider the impact of human factors issues can impact on measurable costs. The most visible of these costs may include loss of human life or injury and financial damage. Less visible costs may include impaired human performance, reputational damage and degraded organisational culture. It would be useful to consider measurable benefits alongside negative impacts. These might include absence of accidents/incidents, first time quality, increased productivity and an enhanced safety reporting culture. Less easily measured benefits might include improvement in human performance, enhanced reputation and improved organisational culture or workforce engagement.

Challenges to engage senior management to invest in safety

In spite of the above, far from reality, safety and quality departments face challenges to engage senior management to approve business cases to invest in safety. Organisations could be experiencing:

- Lack of a robust problem definition. If the organisation has experienced numerous occurrences or events of the same type which are a symptom of a problem which is not clearly documented and presented to senior management.
- Lack of a clear root cause statement to enforce the measures required to put in place.
- A reactive organisational culture, more focused on containing and firefighting.
- Lack of relevant performance indicators and historical data to present relevant trends and to reflect organisational risk and severity of the problems.
- The business case does not incorporate the quantitative implications after an event, such as rework, work-stop production, time invested in the investigation process, etc.
- Key performance indicators discussed in safety forums could differ from those discussed in finance or at board level.
- Costs of the investment are not indirectly paid by the customer.
- The 'old school' believe that safety and quality is a cost, instead of seen as the tool to become more efficient and achieve first time quality.
- Lack of understanding of level of accountability and responsibility if there is a bad outcome.
- Weak business ethics, as organisations are people and people make decisions. Ethics have an important part to play in the decision-making process.

It could be a good initiative that safety and quality departments develop a bespoke performance matrix or self-assessment questionnaire based on items such as the above. Results could reflect the level of maturity that influence the decision-making process during the approval of safety business cases. This activity could support in the roadmap design to fill any gaps to enhance the engagement of senior management.

The roadmap requires an 'influencer holistic approach'

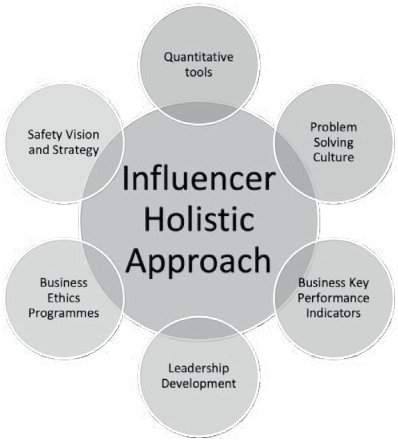
Although there is not a definitive recipe, the combination of the following approaches could support to enhance the engagement of senior management:

1. Safety Vision and Strategy

A Safety Vision is required to inspire the leadership team. It needs to be simple and accessible and should help in the daily decision-making process. The strategy needs:

- to be aligned with the organisation's strategy and safety and quality policy
- to have objectives defined and targets
- to be reviewed regularly
- to drive positive safety behaviours

There are different tools to document vision and strategy deployment plans, such as the Hoshin Matrix which is used in lean management.



2. Leadership Development

A more nuanced understanding should be gained through leadership development programmes that include systemic improvement approaches to:

- Emphasise moral and legal duty to safety. In approved organisations with nominated postholders, this should be achieved by enhancing their awareness of the level of accountability and responsibility
- Emphasise the value and need of leaders at every level actively making decisions in accordance with safety vision and strategy, referring to the safety vision regularly in public
- Emphasise the competitive value of being distinguishably better than others
- Emphasise the secondary benefits that safety has on business efficiency, product quality, employee morale and shop floor supervision/management.

3. Business Ethics Programmes

Business ethics' programmes are not always present in organisations, mainly in small to medium ones, or are not effective to detect ethics issues. In absence of ethics programmes and/or to reinforce existing ones, the proposed approach is to incorporate ethics in human factors programmes and/or continuation training.

The following elements should at least be covered:

- corporate ethics policy
- code of conduct, employee's accountabilities and responsibilities
- emphasise the importance of ethical decisionmaking and relationship with human factors, safety and business performance
- industry or workplace case studies
- reporting procedures

4. Use of Quantitative Tools

The challenge for safety and quality managers is finding quantitative tools or approaches to influence safety performance indicators (SPIs) and return of investment (ROI) calculations which add weight to safety report data, to create a compelling case for senior management to invest.

The following quantitative tools are required and best practices to present data:

Safety Performance Indicators (SPIs):
In accordance with ICAO (Safety Management Manual, doc. 9859)[1], safety performance indicators (SPIs) are data-based safety parameters used for monitoring and assessing safety performance, defined by specific targets.

The information provided by SPIs should aid senior management in answering questions, such as 'how safe is the operation' ('what worries you the most?'), 'What are the biggest business and safety risks?' or 'How do you know you are taking the right actions in managing your risks?'

SPI systems are strategic and fit comfortably within management systems, helping to improve their overall performance and continuous improvement initiatives. There is benefit in having SPIs embedded in safety dashboards, reported and escalated to management reviews, alongside indicators for cost and on-time delivery.

Robust safety objectives should be approved by the accountable manager responsible for the safety management system (SMS). Safety objectives should be: consistent with safety policy and aligned with safety requirements, able to promote conformity of products and services, measurable, monitored, regularly communicated and periodically updated.

To provide relevant measurement of safety objectives, target levels for continuous improvement should be agreed. Targets should be set with reference to trend information from organisational and / or industry data. There is benefit in including 'alert triggers' which identify unacceptable thresholds or abnormal occurrence rates during specific monitoring periods. Visual aids, such as the use of colour can be used to raise issues. SPIs should also reflect improvements after mitigations have been implemented, and provide more information if combined with the use of tools, such as Pareto Charts.

Pareto Analysis:
The Pareto chart is a type of bar chart or histogram used to view causes of a problem in order of severity or impact from largest to smallest. It graphically demonstrates the Pareto Principle (80-20 rule), which is a prioritisation method used for process improvement, to focus the limited resources on the problems with the most potential impact.

Pareto charts are easy to make, can assist with prioritising problems and are useful in comparing quantitative data. More than one Pareto chart may be required to indicate the biggest contributors to each safety problem and there is some risk that data will be misinterpreted if it is not carefully represented and consistent between charts.

Trending:
Creating classifications for safety issues identified by the maintenance organisation is another way to allocate priorities and focus the attention of senior management. One way to assist with prioritisation is to use the 'significant seven' framework publicised by the CAA (the CAA Paper 2011/03[2]). Although the initial focus of the seven items was on flight operations, their equivalent issues in maintenance organisations are easily identified.

Return of Investment (ROI):
The return of investment (ROI) method is an approach used to predict and measure the cost and safety return on safety interventions, developed by Dr Bill Johnson of the Federal Aviation Administration (FAA[3]). ROI calculations will help in decision-making and prioritisation around safety work.

$$\frac{Return\ (benefits) * Probability\ of\ Success) - Investment\ (cost)}{Investment\ (cost)}$$

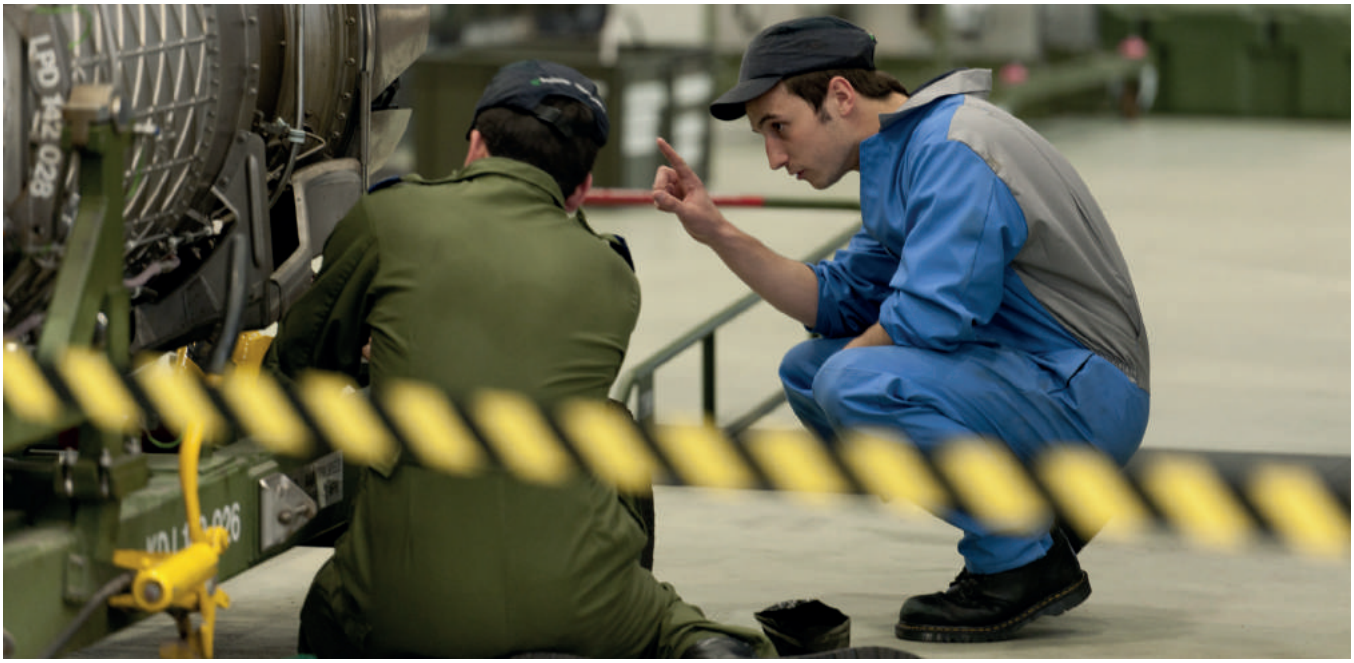
To implement an ROI methodology, the following assumptions need to be considered:

- A business case is required to help finance personnel to appreciate the correlation between safety and profit.
- Technical personnel need to be convinced of the value in recording and investigating ROI with regard to their work.
- An SMS is in place that will provide the framework (data and motivation to increase efforts to calculate ROI). Also, to help provide evidence about how interventions have impacted the number of subsequent events in terms of safety and cost.
- Safety, audit and human factors specialists available.
- Probability calculations will be an approximation rather than being exact. The more historical data available to use in calculations, the more accurate the predictions will be.

5. Problem Solving Culture

Successful organisations and leadership teams must guide their employees and develop a problem-solving culture. This is about spending the necessary time defining the problem, which will allow asking the right questions to get the right answers. Hence, we should not spend so much time thinking about solutions. This is the basis of problem solving, whose implementation requires a structured approach for effective root cause identification.

Often, occurrences/events are repetitive and symptoms of a problem which is not properly identified. Providing senior management with a clear problem definition along the root cause statement and solutions will support the business case. CAP1760 is the document developed by the UK CAA for effective problem-solving and root cause identification. Meeting the requirements of ICAO, EASA, the EU and the UK CAA.



Any trending data and risk assessment provided by the safety and quality department can back up arguments to Senior Management to understand the severity of the problem.

6. Business Key Performance Indicators

Key Performance Indicators (KPIs) discussed in safety forums could differ from those discussed in finance and the board. However, the fact that just after an aircraft accident, customers stop buying tickets provides evidence that safety and profitability are linked. History suggests that some inexpensive interventions could have prevented some of the larger and more publicised aviation accidents. But what about day-to-day small events and error hazard reports? These are likely to negatively impact performance, productivity or incur financial losses.

Relevant safety and quality performance Indicators need to be designed to provide relevant data at the right organisational level. Safety and quality managers need to put effort to evidence how safety and quality are helping operations to be more effective and to achieve the business strategy.

Conclusions

This Influencer Holistic Approach should help safety and quality managers to develop a robust conversation and mindset shift in safety and quality spending with senior management and the finance department. Creating any climate for change takes time and the level of efforts allocated will depend as well on the organisational safety culture and maturity of the safety and quality systems.

To be successful, it is necessary to create a sense of urgency and understanding of implications of not choosing to invest or change by presenting a vision of a better future, where first time quality is achieved and reducing waste during processes, such as rework, will empower the arguments of Safety and Quality Departments.

In the end, we are looking for senior management understanding that it is not the 'cost of doing business', it is the cost of 'not doing business as well as possible' and how 'safety and profitability are inclusive.' In the current competitive climate and survival of businesses, in detriment of the old view of saving costs, Safety and Quality departments should be crucial in supporting organisations to increase business margins, as well as to stay compliant and operate safely.

(1) ICAO Safety Management Manual, Doc. 9859 AN/474
(2) CAA Paper 2011/03, CAA 'Significant Seven' Task Force Reports
(3) Return on Investment Tool for Assessing Safety Interventions, William B. Johnson, Ph.D.

Reprinted with kind permission of RAeS AEROSPACE - February 2023

The sun is about to set on EU law – is this a new dawn for UK aviation law?

by Ashleigh Ovland, Knowledge Counsel (Aerospace), Holman Fenwick Willan

Much has been said and written about the UK Government's proposed "Sunset Bill", which aimed to remove from the UK statute books in one fell swoop huge numbers of laws and regulations derived from EU law. The original concept was an "opt out" one, whereby all UK laws derived from EU law (currently known as "Retained EU law") would automatically lapse on 31 December 2023 unless the Government had decided specifically to preserve them. Understandably this caused concern in industries like aviation in which a significant amount of highly-effective and uncontroversial safety and operational legislation had been passed in the EU.

Thankfully, the scale of the cherry-picking exercise eventually became clear and the idea was flipped into a much more workable "opt in" approach. The new, improved version of the draft Retained EU Law (Revocation and Reform) Act **(R&R Act)** contains a schedule of all Retained EU laws that will be withdrawn. If a piece of legislation is not on the list, it will remain in force as fully-fledged UK legislation, re-named "Assimilated Law" from 1 January 2024.

The R&R Act is going through the final stages of debate in Parliament and should come into force this summer. The only piece of aviation-related legislation that appears on the revocation list is the *Civil Aviation (Safety of Third Country Aircraft) Regulations 2006 (S.I. 2006/1384).* The Department for Transport (DfT) have said that this will not have any impact on safety.

So, does that mean that there is nothing to see here? Not quite.

Against a backdrop of a whole raft of EU law becoming "Assimilated Law", it is worth looking more closely at the "Reform" part of "Revocation and Reform" to understand the impact of the Act. Many will be particularly interested in one notorious piece of EU aviation legislation which is frequently seen as ripe for reform - EU Regulation 261/2004, which provides the mechanism for compensating passengers for delays and cancellations, and which is sometimes feared to have had a negative impact on safety culture. EU 261 was reborn as "UK 261" in January 2021, after the end of the Brexit Transition Period, and continues to apply to claims against UK airlines or non-UK airlines flying into the UK.

Can UK 261 - or any other piece of Assimilated Law - be revoked or amended at a later date?

Yes, but not completely. Assimilated Law will have the same status as any other piece of UK legislation, which means that a Bill can be put forward to amend or revoke it and Parliament can debate this and pass a new Act. Given that many of the current laws are being assimilated not because they are a perfect fit for the post-Brexit UK, but simply because nobody had enough time to look at them properly before the guillotine fell, it is entirely possible that many will be replaced in future. However this will depend on the availability of time in the Parliamentary calendar, which is in turn driven by political priority. On 27 June the DfT published the results of its consultation on the reform of UK 261 for domestic flights and concluded that there was significant further analysis to be done before coming up with a workable legislative proposal. Changes are unlikely to see the light of day before a general election.

What is more, the UK committed in the Trade and Co-operation Agreement (aka the Brexit Deal) to co-operate and consult with the EU in the shared objective of maintaining *"a high level of consumer protection"* for air passengers. This will prevent any sweeping abolition of UK 261 or the principle of offering fixed compensation.

The R&R Act also contains a new provision which definitively abolishes the supremacy of EU law. Currently, when a Retained EU law statute and a domestic UK one are found to be in conflict, the EU law takes precedence if the UK one was passed before 2021. Going forward, any UK statute, no matter when it came into force, will prevail over Assimilated Law (except in the case of the GDPR, which has been carved out). Therefore we might see some lawyers digging around in the UK statute book to uncover conflicts which could be used to weaken Assimilated Law.

However, with UK 261 in particular, the real risk area is the seemingly relentless succession of case law which continually widens the liability of the airlines and narrows the scope of the available defences. The most infamous of these is the 2009 *Sturgeon* judgment, which introduced the concept of fixed financial compensation for delays, despite this not being specified in the text of Regulation 261.

The R&R Act contains some interesting provisions relating to EU case law which could enable the UK to begin to distance itself from some of the more problematic judgments. The current position is as follows:

- All courts up to the Court of Appeal level are bound by decisions of the Court of Justice of the European Union **(CJEU)** handed down before 2021. So a County Court judge hearing a delay case on 2 January 2024 will still have to apply *Sturgeon*, as will a High Court hearing the first appeal from the County Court.

BUT

- The Court of Appeal or the UK Supreme Court can depart from a CJEU decision, applying a set of strict legal tests for when this is appropriate.

However, in order to get to the Court of Appeal, the case first has to go through to final judgment in the County Court and the High Court, a drawn-out and potentially expensive process.

The R&R Act contains a procedure to shortcut this: it will enable any party, or the court itself, to pause lower court proceedings and refer a point of law directly to the Court of Appeal. As long as the Court of Appeal is satisfied that the point is one of *"general public importance"*, it will be heard.

The R&R Act also permits the Government to look at decided cases and make post-judgment referrals to the Court of Appeal.

All this creates a framework which has been described by Professor Catherine Barnard of the University of Cambridge as a "nudge" to the judiciary[1], who have been reluctant to depart from CJEU case law since the end of 2020. It is highly likely that an aviation case will be at the forefront of the development of the legal principles around Assimilated Law, because UK 261 is unusual amongst retained EU Regulations in that it provides a direct route to financial compensation and generates a high volume of cases brought by individuals.

The question is whether the right test case can be found. Bringing one would be a high-risk tactic - any party who tries to have an unhelpful point of law overturned must be prepared for the Court of Appeal to endorse the case and embed it further into UK law.

Appeal Court judges will also have to be certain that they are still complying with the Brexit Deal obligation - the *"high level of protection"* referred to above - if they decide to overrule a piece of EU case law. This will open up questions about what a *"high level of protection"* really means.

One final point worth noting is the continuing influence of new cases emerging from the EU. These are no longer binding, but UK Courts may *"have regard"* to them. What this means in practice is that if a claimant lawyer wants to use a CJEU decision to support their argument, the judges do have to listen and would be expected to explain if they chose to ignore the CJEU reasoning completely. Therefore it is still important to be aware of new EU decisions.

One recent one stands out. The case in question was a tragic one – the crew of an early-morning TAP Air Portugal flight from Stuttgart awoke to the news that the First Officer, a healthy father in his early forties, had been found dead in his hotel room. In shock, they all declared themselves unfit to fly. The flight was cancelled as no replacement crew were available.

The CJEU ruled categorically that the ensuing compensation claims could not be defended on the grounds that the cancellation was due to "extraordinary circumstances", holding that unexpected absences are something that airlines have to deal with, and it does not matter whether the reason for the absence was tragic or mundane. The reluctance to distinguish the case based on the knock-on psychological impact on the crew and other colleagues was striking, but entirely in keeping with the CJEU trend towards narrowing the scope of the defence.

(1) Monckton Chambers, Webinair on the Retained EU Law (etc.) Bill, 28 September 2022.

Lasers and the Law

by Dai Whittingham, Chief Executive, UK Flight Safety Committee

Aircraft operating in UK airspace are still being subject to laser attacks, and it seems not everyone is aware of the law as it now stands. This article explores how we achieved the change required to establish a new offence.

Until May 2018, the perpetrator of a laser attack on an aircraft – let us call him Joe Public for the purposes of this discussion – was effectively only subject to the provisions of the Air Navigation Order (2016) and its earlier iterations, and could only be prosecuted under two Articles:

> *Art.225: A person must not in the United Kingdom direct or shine any light at any aircraft in flight so as to dazzle or distract the pilot of the aircraft.*
>
> *Art.240: A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft.*

The problem was the extreme difficulty of proving the reckless endangerment element, which was the indictable offence that attracted a higher penalty. Most cases were therefore either rejected by the Crown Prosecution Service or were being heard summarily as Art.225 offences by magistrates who, unfortunately, did not always fully appreciate the significance of a laser attack. In turn, this meant Joe Public's reward for his idiocy could best be described as 'light and variable', depending on if and where he pitched up to a Court. The consequence of this approach was the absence of any real deterrent effect; attacks increased steadily from 2000 onwards.

The legal landscape changed with the entry into force of the Laser Misuse (Vehicles) Act 2018, which created a new offence of shining a laser at any form of transport, carrying a penalty of up to 5 years imprisonment and/or a significant fine. You no longer need to prove endangerment or distraction, simply **pointing a laser at you is an offence.** However, this does not absolve you of the requirement to report an attack – to the contrary, reporting is now more important because the offence is 'reportable'. That means police forces are obliged to treat reports seriously, the crime must be recorded, i.e. it will be given a crime number, and there is a requirement for offences to be notified to the Home Office. NB, white light attacks from high-power LED torches etc. can only be prosecuted under the Art 225 distract/dazzle provision and will therefore also need reporting.

So how did we get a new law on the statute books? It is not easy, and it takes time. The CAA had a Laser Working Group which had become moribund by late-2013 because of resources being diverted during a major transformation programme, so I approached the Department for Transport (DfT), explained the problem and offered to run a UK Laser WG on their behalf, on the understanding that success would be a DfT triumph and failure attributed to my own shortcomings! The offer was accepted and the UKLWG was rapidly established with me as Chair and a DfT official as the Vice-chair.

From the outset it was a multi-disciplinary team that included a CAA secretariat and representatives from the MAA, Met Police, the National Police Air Service, BALPA, Public Health England, QinetiQ, dstl, the Crown Prosecution Service, several UK-based airlines and of course the RAF. We also co-opted 2 consultant ophthalmologists, one with deep practical knowledge of laser eye surgery, the other having had his interest fired by treating several young patients with permanent damage from laser-induced retinal burns. These good people provided the three legs of the stool: aviation ops, regulation/enforcement and science. Unfortunately, the stool was a little wobbly to begin with.

One of our first tasks was to determine what we wanted to achieve and then what might be achievable. Not surprisingly, there were some very different views, with frequent collisions between intent and reality. For example, whilst "Ban all laser pointers" would address a large part of the problem, of more concern to the DfT policy staff was that this would criminalise a segment of the population overnight and therefore would not survive scrutiny, and it would be very hard to enforce.

There was also some pressure to get things done quickly, not least because some commercial pilots had started buying their own laser protection equipment (LPE) and airlines needed answers on whether they should allow their use or not. Clearly, LPE could not be introduced on an individual basis without a formal trial to ensure cockpit or flight-deck integration was safe, otherwise the formal airworthiness process would be compromised. We therefore needed to reassure crew members that the personal odds of an attack were slight and that unofficial LPE was not the way to go.

The biggest challenge we faced was to our own opinions when it came to the prospect of eye injuries from a (non-weapons grade) laser strike. It had been a long-held belief for many of us that injuries were a real possibility from the type of strikes being experienced at airports or by low-flying aircraft and that it was only a matter of time before someone was permanently damaged; this view under-pinned many of the assumptions that had been made about procedures and countermeasures. It took many hours of argument before the aircrew, who bear the personal risk, accepted the scientific advice that hand-held devices were unlikely to cause damage beyond temporary dazzling effects. This still holds true for the commonly available devices – the classroom-style pointers - because of aiming scatter, dispersion, attenuation from atmospheric conditions, cockpit transparencies, etc. and distance from the laser source.

That said, high power lasers still represent a threat. If you are so inclined, you can purchase an advertised 'burning' laser of up to 5W power output, which makes it a Class 4 device that should not be on sale to Joe Public under UK rules. That laser is distracting (FAA definition) at 50km, will cause temporary flash blindness at 1.2km, and will cause increasing levels of injury below 250m from source. If a laser is capable of bursting a balloon or setting fire to paper, what do you suppose that might do to your retina or, worse, the foveal area responsible for your central, accurate vision?

The UK power output limit is 1mW, though it is widely accepted that 5mW is eye-safe. One of our ophthalmologists cited a patient (age 10) with a self-inflicted disabling eye injury, the son of medical-professional parents who had bought him 3 laser pointers from the largest online retailer as a Christmas gift. All were labelled as 1mW devices but, when tested, clocked in at 20mW, 30mW and 70mW respectively. Bottom line: they are not toys.

The next problem we had was in finding a suitable means of bringing legislation before Parliament, which included finding time in the business calendar. Many Bills fail simply because there is insufficient time to deal with them, and it was clear we were not going to be given a bespoke Bill at the time; the Private Member's Bill route was also rapidly closed off as the ballot-winning MP had other plans in mind. Instead, we managed to have the issue included in the Vehicle Technology and Aviation Bill (VTAB), a catch-all piece of legislation sponsored by DfT which covered *inter alia* regulations for electric vehicles and some additional powers for the CAA. This Bill created the new offence and had reached the Committee Stage when a general election was called in 2017. That was the end of the Bill, along with all the other draft laws still in progress, and we were back to square 1.

Crucially, the opportunity of a new Bill in the next Parliament, which became the Laser Misuse (Vehicles) Act of 2018, allowed us to expand the scope of the legislation drafted for the VTAB. We were able to convince the policy teams that ATC facilities should also be covered, and the 'aircraft on a journey' language in the VTAB was amended to aircraft that were moving or were ready to move, i.e. had engines running. A further improvement was the extension from 'person controlling' to '...controlling or monitoring the control of...', so the offence covered an attack that was only experienced by the pilot monitoring and not the pilot flying.

Further, we were able to show the problem of laser attacks was not confined to aviation, although we only had a few reports of attacks on train drivers from trackside and bridges, plus anecdotal evidence of attacks against cars and lorries; for the latter case, we had to explain that anecdotal evidence was all we had, because there was no reporting system in place, nor any encouragement for drivers to report, nor any real awareness of the risks. (The closer proximity to a laser source raises the injury stakes when you consider that distances can be reduced to just a few metres from, say, a bridge.) There also were formal reports of attacks against maritime targets, such as against crews on the conning towers of submarines entering the Faslane facility, so the maritime world was added to the list, making the scope now all forms of transport.

The next stage was communication, an important part in the process of securing cross-party support. We provided briefing material ahead of the detailed Committee work and Parliamentary debates, which helped ensure that supporters were equipped with answers to likely questions, and there were some press releases and other articles to prepare the ground. In the event, there was little serious push-back against a new law that was seen by all as being straight common sense, and its passage through both Houses was very smooth. Royal Assent followed on 10 May 2018. We had changed the law of the land in just over 4 years, which I am told is very fast for a non-manifesto initiative.

There are some wider lessons that I drew from the process:

- You need to invest time in developing and maintaining working relationships if they are to be genuinely productive; it will not be wasted effort.
- In any complex scenario, collaboration is the key to success; as part of this, you need some diversity of thought and a willingness to accept other points of view.
- Challenging your own ideas is difficult, changing them is even harder.
- Communication matters: don't forget to talk to people and socialise new concepts.
- Compromise solutions are a political reality and are not always bad.
- Persistence pays off in the end...

Report No.1 – FC5209/FC5212 – Commander's discretion

CHIRP Comment: CHIRP has received increasing numbers of reports in recent months about the use of commander's discretion and the perception that it is being programmed in to some rosters in order to resolve crewing problems. The majority of these reports are not publishable in isolation because the associated details make the reporters identifiable. However, CHIRP has represented these reports to the CAA in aggregate and has asked that they consider both reviewing the specific companies' policies on discretion and the reality of actual current rosters. As a result, the CAA have focused some of their oversight activities for particular airlines in this area and have commented that there needs to be a better understanding of discretion within the industry overall. In recognising this, the CAA hope to publish an information note in the coming months to give more detailed guidance and advice to individuals on what discretion is and the rules for its use.

The use of commander's discretion is not a safety issue in itself provided it is managed properly. Importantly, it should not be used on a planned basis but is intended to be employed for those unplanned and unforeseen circumstances and delays that occur during a duty and which would take the crew beyond the normal FDP limit. Crews should not be arriving at the report point to find the operator relying on the Commander's use of discretion to conduct the duty - if unforeseen circumstances arise prior to 'report' then the reporting time should have been delayed instead when feasible. ORO.FTL.205 Flight Duty Period (FDP) (f) states the rules for the use of commander's discretion in relation to FDP (extract shown) but, in stating that its use is for unforeseen circumstances which start at or after the reporting time, the problem is that there's no real definition of what an unforeseen circumstance might be and so this is potentially a grey area.

ORO.FTL.205 Flight Duty Period (FDP)

(f) Unforeseen circumstances in flight operations — commander's discretion

(1) The conditions to modify the limits on flight duty, duty and rest periods by the commander in the case of unforeseen circumstances in flight operations, which start at or after the reporting time, shall comply with the following:

(i) the maximum daily FDP which results after applying points (b) and (e) of point ORO.FTL.205 or point ORO.FTL.220 may not be increased by more than 2 hours unless the flight crew has been augmented, in which case the maximum flight duty period may be increased by not more than 3 hours;

(ii) if on the final sector within an FDP the allowed increase is exceeded because of unforeseen circumstances after take-off, the flight may continue to the planned destination or alternate aerodrome; and

(iii) the rest period following the FDP may be reduced but can never be less than 10 hours.

(2) In case of unforeseen circumstances which could lead to severe fatigue, the commander shall reduce the actual flight duty period and/or increase the rest period in order to eliminate any detrimental effect on flight safety.

(3) The commander shall consult all crew members on their alertness levels before deciding the modifications under subparagraphs 1 and 2.

(4) The commander shall submit a report to the operator when an FDP is increased or a rest period is reduced at his or her discretion.

(5) Where the increase of an FDP or reduction of a rest period exceeds 1 hour, a copy of the report, to which the operator shall add its comments, shall be sent by the operator to the CAA not later than 28 days after the event.

(6) The operator shall implement a non-punitive process for the use of the discretion described under this provision and shall describe it in the operations manual.

AMC1 ORO.FTL.205(f) Flight Duty Period (FDP) gives some further guidance by recognising the shared responsibility of management, flight and cabin crew in managing 'unforeseen circumstances', and noting that the use of commander's discretion should be exceptional and should be avoided at home base and/or company hubs:

UNFORESEEN CIRCUMSTANCES IN ACTUAL FLIGHT OPERATIONS — COMMANDER'S DISCRETION

(a) As general guidance when developing a commander's discretion policy, the operator should take into consideration the shared responsibility of management, flight and cabin crew in the case of unforeseen circumstances. The exercise of commander's discretion should be considered exceptional and should be avoided at home base and/or company hubs where standby or reserve crew members should be available. Operators should asses on a regular basis the series of pairings where commander's discretion has been exercised in order to be aware of possible inconsistencies in their rostering.

Overall then, the management of unforeseen circumstances during flight operations is a shared responsibility between operations management, flight and cabin crew, with the Commander – exercising his/her overall responsibility for the safety of the flight – as the final arbiter of any decisions. Therefore, in the case of unforeseen circumstances, and at his/her sole discretion, the Commander may extend the Flight Duty Period providing he/she considers that the safety of the flight will not be adversely affected by that extension. The Commander may also use his/her discretion to reduce a rest period (the rest period following an FDP may be reduced, but never below 10 hours). In exercising discretion, the Commander must ensure that, at all times prior to take-off, there is a realistic plan to remain within the Maximum Allowable FDP (including commander's discretion). It is recognised that after take-off there may be unforeseen circumstances that could cause a minor exceedance of the Maximum Allowable FDP and, in such circumstances, the Commander must ensure that continued safe operation is prioritised over the need to stay within the Maximum Allowable FDP. Finally, although the crew must be consulted as to their alertness levels before commander's discretion is employed, discretion is the commander's to use or not and it is for them alone to decide on whether or not to invoke it rather than being a collective agreement by the entire crew.

Report No.2 – FC5222 – Extended FDP usage

Report Text: Compared to previous years, the latter half of this summer has seen a dramatic increase in [Airline] of the number of extended FDP sectors which are being rostered for destinations that have always been well within normal FDP range. Given the disruption experienced earlier in the summer, with a number of night stops and discretion reports, the cynic in me says that the use of extended FDP is simply to mask the real issues and prevent reporting of discretion to the CAA. Anecdotally, I've heard that the reason for the increased use of extended FDP is because the CAA has concerns of the number of discretion reports being produced over this summer by the company!

CHIRP comments: CHIRP passed on our concerns about the use of extended FDP in this way to the CAA and they engaged with the company. However, due to commercial considerations, the CAA do not pass on to CHIRP explicit details of follow-on associated discussions or data about specific concerns such as this other than to confirm that oversight activity has been conducted.

More generally, extended FDP allows the maximum basic Flight Duty Period for acclimatised crew members to be increased without the use of in-flight rest - this equates to an additional hour being applied to the basic FDP. Basic FDP may be extended not more than twice in any 7 consecutive days and must include either a pre- and post-flight rest extension of 2 hours, or a post-flight rest increase of 4 hours. Extended FDP must be planned in advance. If commander's discretion is then applied to an extended FDP, then the maximum FDP from the basic FDP table is used to calculate the limits of discretion as shown in **ORO.FTL.205 Flight Duty Period (FDP) (d) & (e)** shown below.

ORO.FTL.205 Flight Duty Period (FDP)

(d) Maximum daily FDP for acclimatised crew members with the use of extensions without in-flight rest.

(1) The maximum daily FDP may be extended by up to 1 hour not more than twice in any 7 consecutive days. In that case:

(i) the minimum pre-flight and post-flight rest periods shall be increased by 2 hours; or

(ii) the post-flight rest period shall be increased by 4 hours.

(2) When extensions are used for consecutive FDPs, the additional pre- and post-flight rest between the two extended FDPs required under subparagraph 1 shall be provided consecutively.

(3) The use of the extension shall be planned in advance, and shall be limited to a maximum of:

(i) 5 sectors when the WOCL is not encroached; or

(ii) 4 sectors, when the WOCL is encroached by 2 hours or less; or

(iii) 2 sectors, when the WOCL is encroached by more than 2 hours.

(4) Extension of the maximum basic daily FDP without in-flight rest shall not be combined with extensions due to in-flight rest or split duty in the same duty period.

(5) Flight time specification schemes shall specify the limits for extensions of the maximum basic daily FDP in accordance with the certification specifications applicable to the type of operation, taking into account:

(i) the number of sectors flown; and

(ii) WOCL encroachment.

(e) Maximum daily FDP with the use of extensions due to in-flight rest Flight time specification schemes shall specify the conditions for extensions of the maximum basic daily FDP with in-flight rest in accordance with the certification specifications applicable to the type of operation, taking into account:

(i) the number of sectors flown;

(ii) the minimum in-flight rest allocated to each crew member;

(iii) the type of in-flight rest facilities; and

(iv) the augmentation of the basic flight crew.

But there are penalties to a company for using extended FDP rather than commander's discretion due to the additional rest periods required. The reporter's comments that this particular company were using extended FDPs to avoid having to report discretion (which is a mandatory reporting requirement to the CAA for periods exceeding 1 hour) was therefore of interest. Asked what the CAA does with discretion reports, the CAA commented that if the actual operation of a route exceeds the maximum FTL for 33% of the times that a route is flown in a scheduled season then they require the operator to make changes to the route structure (ORO.FTL.110 (j) refers).

Report No.3 – ENG720 – Lack of stand capacity resulting in aircraft repositioning

Report Text: At [Airport] stand allocation constraints require the movement of aircraft from stands adjacent to the terminal to remote stands to facilitate a smooth operation. These capacity constraints regularly require the movement of 30 plus aircraft at some point during the night. The usual challenges faced by engineers and mechanics to achieve the workload with the typical late arrivals and early departure that typifies summer operations is exacerbated by these movements. Whilst everybody at [Airport] has their part to play to achieve the airport's smooth running, and I appreciate that the movements play a vital part in this, I would like to highlight the issues that this can cause on the line as an engineer.

This morning [Registration] landed at 0450, it was not on the pre-published tow-list that is sent ahead of time. As a consequence, we started a work-pack around 0500, with the intention to finish at 0700 when the shift ends. Our workload consisted of some routine tasks, a crew oxygen bottle change, and two small inbound defects. Our work was definitely achievable with the number of engineers assigned and the time available, so we began straight away. With the oxygen bottle removed, and CB's pulled in the flight deck, at around 0530, the [Handling Agent] tow-team arrived and informed us that they had to tow this aircraft. I spoke with the team leader and informed him that we were midway through maintenance and would be around 45 minutes, I asked if it would be possible to return in an hour when we were done. The tow-team said they would speak to the airport and advise if this was possible. Unfortunately, after the phone call the tow-team informed us that the airport required that stand immediately and that the aircraft had to be made towable immediately. The tow-team went onboard, fitted MLG locks and removed the airbridge without consultation and stood in position with the tug at the nose gear right next to us whilst we hurriedly fitted the new bottle. This action compounded the pressure we felt to complete maintenance quickly, and we opted to leave the O2 bottle secured with unions connected, but to leak-check, test and complete paperwork after the tow had been completed. We could not get onboard to test as the airbridge had already been removed.

This situation was far from ideal, as I am acutely aware that being pressurised to complete a job quickly coupled with the distraction of the aircraft being towed with maintenance incomplete makes maintenance errors more likely but it was my preferred option. The alternative was to have a visit from airside operations with a reprimand for rendering the stand unusable without first notifying the airport and with the threat of having my airside pass being taken away (which in the past invariably happens to engineers who insist that they finish maintenance before the aircraft is towed). This is equally distracting and I did not want such a confrontation to happen. I therefore stopped midway through maintenance to facilitate the capacity request tow.

Whilst I appreciate the airport are under pressure to run a smooth operation, and that aircraft moves need to happen to facilitate that, the scale of the movements required due to capacity constraints (some aircraft even being towed twice in one night), coupled with the short downtime and poor relationship between engineers and airside operations adds to the likelihood of maintenance errors. I appreciate everyone is just trying to do their jobs the best they can, and I do understand that it must be frustrating if engineers are preventing aircraft movements happening when the airport would like, but ultimately safety must come before smooth operations. I personally do not think asking to be left undistracted for an hour to complete maintenance to be an unreasonable request.

I know that these issues have been escalated to management level and discussed between [Operator] and [Airport Ops]. Unfortunately, I believe there is a bit of a disagreement, and the position of [Airport Ops] to be very unhelpful. In their view engineers should not be disabling any aircraft by doing maintenance before they are towed. Unfortunately, this does not work for engineers, because the tow-lists are provisional, may not include all the required tows, and times are very unreliable. I cannot justify waiting for a tow that could be in a few hours before commencing my work, aircraft downtime is too limited. The aircraft I reported was not on the tow-list, and as such there was no easy way of knowing if and when the aircraft would require a tow. I am aware that some of my colleagues have started maintenance on an aircraft, returned to the office to pick up tooling and a bite to eat and retuned to find a different aircraft on stand. Had they not been so observant it is quite feasible they could continue work on the wrong aircraft.

Operators Comment (Precis): There was an initial meeting with [Airport Authority] and [Handling Agent]. The [Airport Authority] made reference to the [Airport Authority Instruction] whereby, if there is maintenance scheduled that will take over 1 hour, then a courtesy call to [Airport Authority] stand planning, should be made. This will enable them to make better informed decisions regarding the stand plan. [Airport Authority] were very clear in that they do not approve of their staff putting pressure on teams performing maintenance, and understood that the work on the aircraft can take up to 2.5 hours. They understand that this work should not be disturbed and were very clear that staff could only request if it was possible to complete the work earlier, to enable the aircraft to be moved to protect the operation. If the request is denied the team should allow work to continue and the aircraft moved only when deemed serviceable. [Airport Authority] were keen to reiterate that requests were only to protect the operation. It was disappointing to them that there was the threat of pass removal. [Airport Authority] will ensure communication is put out to the [Airport Ops] team to advise that pressure must not be put on [Maintenance] teams by

either [Airport Authority] staff or the [Handling Agent] tow-team. [Handling Agent] who were also present, were in agreement that this is unacceptable behaviour. Both parties recommended that in any such instance a report is generated immediately and were hopeful that this event was an extreme exception. A follow-up call was later made by the [Operator] with [Airport Authority] the [Handling Agent] and the [Operator's] Engineering manager. There was a request to review the original [Airport Authority Instruction] and it was agreed that it is not fit for purpose as it stands. This will be discussed with the [Airport] Health and Safety Lead. To complete works, there is a minimum of 1.5 hours and it is not practical to make a call or be in receipt of those calls because this would be time consuming as it is very frequent. A request has been made that if there are any changes to the tow-list/programme, a check is to be made with Engineering to confirm the status of the aircraft. From a Human Factors and collaborative working perspective, Engineering will work closely with [Airport Authority] to encourage more face-to-face engagement. This will build and strengthen relationships. [Handling Agent] Ops Manager was also on the call and a brief has been sent to their team also.

CHIRP Comment: It's a fine balance between the prioritisation of stand use versus maintenance activities, and there are undesirable consequences from both disrupted maintenance activities and stands backing up for aircraft landing. We are all very aware of the hazards involved with interruptions to the continuity of work in progress, and the prospect of returning to a stand and not realising a different registration had replaced your task aircraft could unleash a catalogue of perilous safety issues for both aircraft.

The operator carried out a comprehensive internal investigation and met with (and conference-called) both the Airport and Handling Agents who were also proactive and sympathetic to the problems reported and the dangers of interruptions to aircraft maintenance. It is disappointing that the operator's Safety Management System had not identified this problem previously, and perhaps there is a case for mitigation within Maintenance Planning. Improved communications will hopefully correct this situation, and continued reporting by engineering staff will hopefully assist the operator in ensuring this issue will improve.

It is all too easy to commence a shift and enter into battle with any party that stands in one's way but if this becomes commonplace then the big picture of Human Factors issues can fall by the wayside; an interruption that could have been mitigated against becomes a stressor increasing the chances of further error. Ultimately, the solution revolves around planning and communication between teams. This can be made more difficult depending on how many agencies are involved in an activity and so effective communications at the seams between organisations needs to be consciously addressed as part of task planning and execution in such situations.

Report No.4 – FC5223/FC5229 – Punitive and unsafe sickness policy

CHIRP Comment: An airline recently changed its sickness policy for both flight and cabin crew such that if they reported sick even for one day their salary was reduced by salary/260 for each day of sickness (there being 260 days reckoned available for work in any 12 month period). This was compounded by the fact that the salary represented approximately 50% of their pay for the lost day with the other element (variable pay) also being lost completely. As a result, crews were being induced to fly when they were unfit to do so due to financial pressures despite legally being required not to operate. For periods of sickness up to 3 days, no pay was received; Statutory Sick Pay (£19.87 per day) was then being paid from the 4th day onwards.

CHIRP received a number of reports about this issue which we could not publish due to problems disidentifying the reporters. As a result, we engaged with the CAA to ask them to review the company's absence policies and their suitability in respect of sickness payments. We're pleased to report that, following this engagement with the company, the Airline have since changed these financial arrangements within their absence management policy. The safety implications of the previous financial measures were obvious and we are grateful to the CAA for taking up the case on our behalf, and for the company in subsequently understanding the dilemma to which it was placing its workforce. This absolutely highlights the value of reporting; without having done so it is unlikely that anything would have changed until circumstances conspired to bring about a serious incident involving someone who was unfit to operate.

Report No.5 – FC5221/FC5227/FC5228/FC5235/FC5236/FC5238 – Rostering and Duty Periods

CHIRP Comment: In a similar manner to the reporting of absence management and use of discretion, reports that CHIRP receives about rostering and duty periods necessarily contain route and personal information that mean we are unable to approach companies directly about specifics due to the fact that reporters would be easily identifiable. Our only recourse is to engage with companies where possible with aggregated information from a number of reports, and to ask the CAA for their perspective on a company's operations. Post-COVID resourcing pressures have resulted in a number of changes to rostering practices wherein it is clear to CHIRP that some companies are approaching FTL maximums much more frequently than hitherto. CHIRP's view on FTL maxima has consistently been that they should be approached only infrequently and in a managed manner – as with any system, running resources at the red line for prolonged periods is a sure way of increasing risks that should not be contemplated without considerable caution; the response of 'it's legal' is not a mature way of managing fatigue and FTLs.

Although we cannot claim any specific successes ourselves in resolving these issues, CHIRP regularly engages with the CAA and they have conducted specific oversight activities based at least partially on our inputs in association with their own intelligence about what is going on. There have been changes made to some rostering practices as a

result, but we continue to engage about other aspects of rostering that appear to be 'legal' in pure FTL terms but not sensible from a Human Factors perspective as far as we are concerned. Part of CHIRP's concerns lie within the sometimes black-and-white outcomes and temptations to rely on the certitudes of 'sleep science'. There has to be some structured and systematic basis for constructing rosters but, whereas concepts such as WOCL and circadian rhythms provide a good basis for understanding the background factors affecting sleep, we're not yet convinced that 'sleep science' is robustly able to deal with the multiple idiosyncrasies of individual people, circumstances or route structures to predict specific outcomes.

Example comments received by CHIRP are:

"Pre-covid as a pilot I rarely felt the need to nap whilst at the controls. Now I feel it's a necessity to do it on every night sector to minimise micro-napping and falling asleep at the controls at critical stages of flight."

"No matter what studies these so proclaimed sleep specialists and scientists claim to have done and what monitoring devices they use in their studies, they have not done the job first hand. And if they have, it has not been for a prolonged period of months, or years. Yet airlines seem to think it's ok to roster to the limits. There is a complete lack of understanding. They are called Flight Time Limitations. They are not called Flight Time Targets."

"Fatiguing flight outbound. More time spent in the aircraft than resting down route. When I arrived at the hotel I needed to rest for a few hours as already exhausted. This then impacts quality of sleep before 5am body clock wakeup for return sector."

"High levels of fatigue experienced in cruise needing attempts at multiple periods of controlled recovery rest. Too fatigued on landing to travel away from the airport without a proper full rest so booked hotel, at my own expense, as a self-imposed fatigue mitigation."

"Fatigue is clearly an issue at [Airline], but the company discourage fatigue forms, penalise absence and crewing are clearly manipulating rest periods/duty times to make things legal. There is definitely a safety issue here. Last night I had to get the First Officer to fly both sectors because I was so drunk on tiredness."

It's vital that crews continue to submit fatigue reports when appropriate, even if they suspect they are not being sufficiently acted upon, so that actual data can be used to modify theoretical scientific assumptions. Thankfully, many companies are receptive to such reports as they evolve their rosters, and the development of associated fatigue risk management regimes hinges on an understanding gained from these about the stresses and rest opportunities pertaining to each duty and individual. Regulations for rostering/scheduling are many and complex, not least in respect of FTL requirements. Overarching requirements for operators to *"...allocate duty patterns which avoid practices that cause a serious disruption of an established sleep/work pattern, such as alternating day/night duties"* are stated within **ORO.FTL.110(e) Operator responsibilities**, whilst the associated **AMC1 ORO.FTL.110 Operator responsibilities** defines the underpinning scheduling requirements that state:

SCHEDULING

(a) Scheduling has an important impact on a crew member's ability to sleep and to maintain a proper level of alertness. When developing a workable roster, the operator should strike a fair balance between the commercial needs and the capacity of individual crew members to work effectively. Rosters should be developed in such a way that they distribute the amount of work evenly among those that are involved.

(b) Schedules should allow for flights to be completed within the maximum permitted flight duty period and flight rosters should take into account the time needed for pre-flight duties, taxiing, the flight- and turnaround times. Other factors to be considered when planning duty periods should include:

(1) the allocation of work patterns which avoid undesirable practices such as alternating day/night duties, alternating eastward-westward or westward-eastward time zone transitions, positioning of crew members so that a serious disruption of established sleep/work patterns occurs;

(2) scheduling sufficient rest periods especially after long flights crossing many time zones; and

(3) preparation of duty rosters sufficiently in advance with planning of recurrent extended recovery rest periods and notification of the crew members well in advance to plan adequate pre-duty rest.

Alternating day/night duties, alternating eastward-westward or westward-eastward time zone transitions and the scheduling of sufficient rest periods especially after long flights crossing many time zones get specific mentions in ORO.FTL.110, but there are many more other factors that affect the quality of in-flight rest and the ability to sleep both down route and when home. Humans are not machines that can be turned off at the flick of a switch, the ability to fall asleep is something that varies from individual to individual, and even for a specific individual depending on the context of their duties, pressures and stresses, personal circumstances and activity profile in the hours immediately prior to attempting to fall asleep. In our discussions with the CAA, they have indicated that they also recognise the limitations of some of the current fatigue management regulations. Now that UK is no longer tied to EU requirements, and subject to resources being allocated, they have a medium-term aspiration to look again at the fatigue regulations inherited from EASA and to tailor the UK FTL//FRMS document set to reflect better our specific perspectives and circumstances.

From Just Culture to trust culture

James Hayton from the RAeS Human Factors Group: Engineering subgroup examines lessons learned applying Just Culture in the aerospace workplace.

With my background working in a safety consultancy with its roots embedded in the aviation sector, it is very easy to forget that a lot of the processes and practices we help organisations implement and develop are just as applicable to many other safety-critical industries.

So, with that in mind, I have written this paper in an industry agnostic manner while looking back at some of the lessons we have learned over the last twenty years (and more) striving to operationalise Just Culture in the aviation sector. It must be stressed that this is not an academic or systematic analysis of the state of Just Culture within the sector, merely a collection of observations and lessons learned.

Defining Just Culture

Perhaps a useful place to start is to define the term 'Just Culture', because for some organisations this is where their problems start, despite all their wellmeaning intentions. Professor James Reason defined Just Culture as '...an atmosphere of trust, where people are encouraged, even rewarded, for providing essential safety-related information – but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour.'

We frequently encounter organisations early in their Just Culture journey who have only really considered the first half of the definition and confuse a 'Just Culture' with a 'no-blame' or 'blameless' culture. Indeed, many use the terms interchangeably but they are not the same thing at all. A blame culture is unhelpful because indiscriminate blame hampers an organisation's ability to find out and therefore, learn from, what is going on in the organisation. So, a no-blame culture is sometimes seen as the antidote, but a no-blame culture is in itself flawed.

Many observers assume that the problem with a no-blame culture is that there will be anarchy, staff will do as they please, but the reality is more nuanced than that for three reasons. First, what we think others will do is based more on our emotional response than observed behaviours. In reality, most staff continue to act in a responsible manner because they are professionals and have pride in their work. However, when they see one or two of their colleagues acting inappropriately or unprofessionally they are quite understandably aggrieved when that member of staff is 'allowed to get away with it' or continue with the behaviour without appropriate disciplinary action. Consequently, no-blame cultures can become extremely corrosive to staff morale.

Second, the managers are perceived to be doing nothing about this 'unprofessional' behaviour and, therefore, the managers' credibility is undermined in the eyes of the workforce.

Third, the rules and procedures within an organisation are, in part, developed to protect the workforce, as well as the customers' safety, and are usually written with an implicit assumption that they will be followed. Furthermore, the managers within the organisation have a duty of care to the other staff and customers and therefore simply cannot allow such potentially dangerous behaviour to go unaddressed. Therefore, deviations from process and policy put both the staff and the business at risk. So, a no-blame culture is not what we want.

A Just Culture is a balance between the two extremes, it is neither an indiscriminate blame culture nor is it a no-blame culture. The trick is knowing how to balance the two, or to paraphrase Professor Reason... 'where to draw the line'. This is where we hit another sticking point, where do we draw the line between punishable and non-punishable behaviours. Many managers will say that we should punish all violations, ie when somebody intentionally breaks the rules or procedures but not all violations are the same. Some staff may break the rules because they do not like them and think they know better, so punishment here may be an entirely appropriate response, but there are countless other reasons why people may be breaking the rules.

Maybe the rules could not be complied with because the staff were not given sufficient time to complete the task properly, or the correct tools and equipment were unavailable, or the process is simply unworkable in the real world. Perhaps they broke the rules simply because everybody else in the organisation does (psychology tells us that social compliance is one of the strongest influencers of human behaviour), etc.

In each case, we need to seek to understand why staff did not follow the rules, not simply punish them for not doing so. Effective, just investigations do not simply establish what happened and to who. That is the easy bit – they establish why it happened and how to prevent a reoccurrence to somebody else at a later date. Martin Luther King once said: "We should not ask who is to blame, but what is to blame?" This is a great premise on which to build a Just Culture.

David Marx in his book, *Whack-a-Mole*, described a Just Culture thus: *'We are all fallible human beings, susceptible to human error and behavioural drift. As your employer, we must design systems around you in recognition of that fallibility. When errors do occur, you must raise your hand to allow the organisation to learn. When you drift into a risky place, believing that you are still safe, we will coach you. When you knowingly put others in harm's way, we will take appropriate disciplinary action.'* If more managers thought this way, then Just Culture would be flourishing.

Policy and ownership

So, we now have a clear idea of what we are trying to achieve, so the senior leadership writes a Just Culture policy, or more usually gets the Safety Manager to write it for CEO signature. Then we make the Safety Manager own the policy going forward. If we put the issue of ownership to one side for a moment, we frequently find many organisations have written a clear Just Culture policy, but their 'shopfloor' staff have had no training in Just Culture nor understand how it may be applied to them in practice. Furthermore, many staff have very little understanding of what is acceptable and unacceptable behaviour. So, the central reason for building the Just Culture is lost. Staff are afraid to report their errors, deviations and misdemeanours because they are unsure how they will be treated or, more likely assume they will be punished.

Let us briefly return to the issue of ownership. When the development and management of a Just Culture are not owned at a senior level (often abdicated to the Safety Manager) we frequently see a lack of co-ordination and engagement between the safety department and other elements of the business during the development of the Just Culture policy – for example the Human Resources Department and the inevitable links with the company's disciplinary policy. This is not always because of a lack of forethought by the Safety Manager, but more often the lack of clout to bring the right people together in a timely manner and to prioritise the work properly.

As a result, the Just Culture is only really applied to safety investigations but for all other matters (eg those handled by HR) Just Culture is non-existent or, at best, intermittent. If the principles of a Just Culture are not consistently applied across the organisation then you cannot say you have a Just Culture at all. For instance, if we treat one individual fairly in one circumstance but another individual differently for an identical behaviour elsewhere in the organisation then we are not really being very just. In other words, a Just Culture needs to be baked into the organisation and how it does business as a whole. HR need to be involved from the outset and must be trained in Just Culture principles and aims. They need to ensure Just Culture is applied across the whole organisation at all levels and ensure that it aligns with standard disciplinary policy. HR also needs to be involved in any discussions about who will manage the process for assessing behaviours and deciding disciplinary actions. Of course, there are other areas of the business that need to be involved beyond HR.

Just Culture and trust

A Just Culture could be titled a 'Trust Culture'; staff have to trust management to treat them fairly in the event of errors and violations. However, similarly, management has to trust staff to raise their hands and own up to errors and violations when they occur, so trust is a two-way thing. Furthermore, trust is something we develop through behaviour, not through words. When your manager says, 'trust me,' would you implicitly believe them? Even when previous experience has resulted in unfair punishment? Even if your career depended on it? Probably not and this is why cultures often take time to change. Trust has to be earned through demonstrable behaviours. So that leaves us with a quandary: who is going to take the leap of faith first ...the staff or the managers?

The reality we often see is that leadership publicly espouse a Just Culture and issue a policy, but the 'verbal leakage' in their every day, unguarded language demonstrates a disjoint in their underlying beliefs... "Who did that?", "Which idiot cocked up this time," "Why won't they just follow the bloody procedures?", etc. These managerial responses are often exacerbated when the outcomes are high (usually financial) or there is a significant impact on operational output. "This has cost us a fortune," or "This has damaged our reputation in the eyes of our customers/public/regulator," "So heads must roll!"

Of course, this is outcome bias in action, our human tendency to link the size of an outcome to the magnitude of the error that led to it. But often situational factors beyond the actor's control dictate the size of the outcome, so the behaviours and outcome do not directly equate. This is doubly true in complex environments like aviation, where, due to the innumerable moving parts, actions can have unforeseen and unpredictable consequences because of the numerous moving parts beyond the control or even awareness of the actor.

Identifying behaviours and culpability

To focus on the issue of 'culpability models', algorithms and behavioural analysis models like Baines Simmons' FAiR3™ System for a moment. It is worth pointing out that the focus of these models can vary, some are focused on establishing culpability/accountability of staff while others, eg FAiR3™ are focused on identifying staff behaviours and couple the behaviours with areas on which to focus more appropriate and effective interventions. Some say all of these types of flowchart should be thrown away and that management should just treat staff 'fairly' and stop talking about lines in the sand. This seems very honourable and plausible on the face of it, but the problem with this approach for any organisation with more than a handful of staff is that different managers get to decide what is 'fair' and that position is far from consistent. So, behavioural flowcharts can be helpful to provide consistency of approach across the organisation. In addition, they force managers to answer questions that they cannot without first conducting a proper investigation. However, we must remember models present a simplification of reality, not reality itself. Therefore, we must remain mindful of context whenever we use them.

This nicely brings us to the reality of 'the line in the sand'. Professor Reason's definition of Just Culture ended by stating '...but in which they (the staff) are also clear about where the line must be drawn between acceptable and unacceptable behaviours.' This seems like a nice straightforward explanation, but the real world throws up some challenges. There may be behaviours that, as an organisation, you do not want to punish nor do you want to encourage staff to do, so are these behaviours acceptable or unacceptable? For example, a member of staff has not followed a procedure properly and has shortcut some steps because the business did not give them sufficient time to complete the task in accordance with the process. For an enlightened organisation, they would see this as a learning opportunity to understand why they are not giving their staff sufficient time to complete their tasks and, since they want staff to tell them about these situations in the future, they do not punish them. So, does they and their colleagues assume that shortcutting procedures is acceptable now? These kinds of situations are exacerbated by organisations who use culpability models with definite red lines drawn on them showing all their staff the 'line in the sand'...step over it and we will punish you, stay on the right side and you're safe!

However, non-punishable behaviour is not the same as acceptable behaviour. We do not want to encourage that kind of behaviour by saying it is acceptable, but we do want you to tell us about future occurrences so that we can learn. These situations offer the organisation the opportunity to explain to staff (all of them not just a few involved) why they have been punished (or not), helping to breed a better understanding of the behaviours you are trying to cultivate. If the organisation does not grip these situations and clearly explain to staff the facts of the case and the reason for the punishment decision, rumours will fill the void. Unfortunately, rumours are rarely accurate and do not consider all the facts of the case. Consequently, they can be very damaging to a Just Culture. So it can be really helpful to engage with your internal communications department to help manage the messaging. Oh, and that is another department that needs to be involved in building your Just Culture.

Reprinted with kind permission of RAeS AEROSPACE - October 2022

Members List

Members of The United Kingdom Flight Safety Committee

Acropolis Aviation	CityJet	McLarens Aviation	Titan Airways
A|D|S	Cranfield Safety & Accident Investigation Centre	Maleth Aero/Flight Service	TUI Airways
Aegean Airlines	Devon Air Ambulance Trading Company	Manchester Airport	UK Meteorological Office
Aer Lingus	DHL Air Ltd	Marshall Aerospace & Defence Group	Virgin Atlantic Airways
Airbus SAS	Draken Europe	Military Aviation Authority	Vistair
Air Tanker Services	Dubai Air Wing	National Police Air Service	West Atlantic UK
Airtask Group	Eastern Airways UK	NHV Group	Wiltshire Air Ambulance Charitable Trust
Air Mauritius	easyJet	Norse Atlantic UK	Wizz Air UK
Ascent Flight Training	Emirates Airline	Offshore Helicopter Services UK	
ASL Airlines Ireland	European Cargo	Pen Avia	
BA CityFlyer	Flight Calibration Services	Prospect	
BAE SYSTEMS (Corporate Air Travel)	FlightDataPeople	QinetiQ	
BAE SYSTEMS Marine	GATCO	RAeS	
Baines Simmons	Gatwick Airport Ltd	Royal Air Force	
BALPA	Gulf Air Company	Royal Navy	
Belfast International Airport	Heathrow Airport	RVL Group	
Bristow Helicopters	Independent Pilots Association	Ryanair	
British Airways	Irish Aviation Authority	SAS Ireland	
British Antarctic Survey	Jet2.com	Shell Aircraft International	
British International Helicopter Services Ltd	Joint Helicopter Command	Specsavers Aviation	
CargoLux Airlines	L3 Harris - Flight Data Services	STS Aviation Services UK	
CHC Helicopter	Loganair	TAG Aviation (UK)	
Charles Taylor Adjusting	London's Air Ambulance	The Honourable Company of Air Pilots	

CO-OPTED ADVISERS

AAIB	CHIRP	Holman Fenwick Willan LLP (Legal Adviser)	Royal Met Society
CAA	GASCo	NATS	UK Airprox Board