

Back to the Future: An Applied History of the RAF's Approach to Risk and Implications for Modern Warfighting

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Abstract

After some 30 years flying in operations that have generally been permissive in air power terms, the RAF is now faced with the prospect of fighting for control of the air. Ukraine has demonstrated that the alternative is attritional, costly in blood and treasure, and highly destructive. During those 30 years, RAF culture around risk and safety has been gradually shifting, as it was bound to over time with changing experiences, understanding, process, regulation and technology. This paper seeks to examine the RAF's changing relationship with risk – its approach, attitude, and appetite. This is most obvious and specific to an air force in terms of its approach to air safety and airworthiness, and its tolerance of losses. However, the culture around risk and safety is influenced by the broader environment in which military flying activity takes place, and those factors also need to be considered. Analysis of changes in the recent history of the RAF over the past four decades illuminates how and why this change has occurred and highlights the tension between risk aversion and operational effectiveness. This is followed by an assessment of the implications of these changes, recommendations for further research, and some potentially useful concepts to consider in relation to risk appetite. The question for the RAF is, given its journey to an increasingly risk averse culture, what is the right balance now in the context of today's threats?

It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who neither know victory nor defeat. Shame on the man of cultivated taste who permits refinement to develop into fastidiousness that unfits him for doing the rough work of a workaday world.

Theodore Roosevelt 'Citizenship in a Republic'; Paris, 23 April 1910.¹

Introduction

In the context of Putin's full invasion of Ukraine in 2022 and the possibility of hostilities escalating beyond Ukraine's borders, whether inadvertently or due to deliberate Russian actions, governments across Europe and beyond have been reviewing their defence postures, and, in many cases, increasing defence spending.² Finland has joined NATO, with Sweden likely to follow suit soon, while Switzerland has abandoned its policy of neutrality. Meanwhile, many nations are actively contributing to Ukraine's fight supplying equipment, training, and operational capabilities. The UK's Royal Air Force (RAF) is contributing Quick Reaction Alert (QRA) in the Baltics. Intelligence, Surveillance, and Reconnaissance (ISR) aircraft are flying in NATO territory to provide support to the Ukrainian forces, amongst many other forms of assistance in their fight against Russia. The prospect of the UK, as part of NATO, having to fight Russia in the near term is front and centre in the minds of military leaders. The threat that China poses to Taiwan adds to the sense of uncertainty, as do question marks over the future foreign policy preferences of the US following the Presidential election in November 2024.

After some 30 years flying in operations that have generally been permissive in air power terms, the RAF is now faced with the prospect of fighting for control of the air. Ukraine has demonstrated that the alternative is attritional, costly in blood and treasure and highly destructive.³ During those 30 years, RAF culture around risk and safety has been gradually shifting, as it was bound to over time with changing experiences, understanding, process, regulation and technology. This paper seeks to examine the RAF's changing relationship with risk – its approach, attitude, and appetite. This is most obvious and specific to an air force in terms of its approach to flight (or air) safety and airworthiness, and its tolerance of losses (on operations and in training).⁴ However, the culture around risk and safety is influenced by the broader environment in which military flying activity takes place, and those factors also need to be considered. Analysis of changes in the recent history of the RAF over the past four decades illuminates how and why this change has occurred and highlights the tension between risk aversion and operational effectiveness. This will be followed by an assessment of the implications of these changes, recommendations for further research, and some potentially useful concepts to consider in relation to risk appetite. Whether in wartime, peacetime, or, as it seems we are now, somewhere in-between (conditional peacetime or perhaps even a pre-war footing), risk appetite and operational effectiveness are in a constant state of flux, each impacting the other as events unfold.

Why Review Risk Now?

Risk in warfare, when engaged with an adversary in a competitive struggle, includes a comparative element. If an adversary has a very high risk appetite, then they are more likely to achieve an audacious win, especially if combined with the principles of surprise and concentration of effort. UK Defence Doctrine's Principles of War include the concept of flexibility and, as a subset of that, adaptability, commending 'a willingness to take risk, the creation of innovative instinct, experimentation and the ability to field capability quickly'.⁵ There is a growing realisation that the operational risk that the force, indeed the nation, will tolerate in a war not of choice but of necessity will change; as the Chief of the Air Staff (CAS) recently outlined: 'We know that when the war starts the balance between the operating and operational risk that we are prepared to tolerate in order to deliver the mission changes.'⁶ Therefore, in preparation, the air force will need to train and operate as it will fight: 'utilising novel or experimental technologies, tactics, or concepts to their full potential and balancing the need for speed, agility, and innovation against safety, security, and compliance'.⁷ The RAF's working title for this change in mindset, which recognises the steady march of progress in safety terms over the last several decades but challenges a drift towards risk aversion, is 'High Risk Operations'.

Applied history implies that a review of the past will produce something usable in policy terms; it can be defined as 'the explicit attempt to illuminate current challenges and choices by analyzing historical precedents and analogues'.⁸ As John Tosh argued, 'Only a historical perspective can reveal the longer-term trajectories which structure so much of the world around us'.⁹ This is not history as heritage: the RAF is perfectly capable and, indeed, very fond of telling itself stories about success in the Battle of Britain and of the technological challenges it and the Ministries of Air and Aircraft Production overcame in the 1930s and during the Second World War. Instead, reviewing the RAF's changing approach to risk and safety offers context for contemporary policymakers. Jacob Forward of the Institute of Historical Research has argued that, 'government without history is like a mind without a memory; endlessly reactive ... if history could be well integrated into government ... the chaos of the unfolding present would settle into perspective'.¹⁰ With this in mind, the aim of this paper is to set the RAF's appetite for risk in historical context.

The military organisational culture of the RAF has been shaped by the past experiences of the organisation, and those of its members.¹¹ That said, British society and societal attitudes and experiences have also changed over this period, including around acceptance of risk; for example, since the 1974 Health and Safety at Work Act, fatalities in all UK workplaces have fallen by 85%.¹² The RAF's culture does not exist in a vacuum and is in dynamic interaction with the broader socio-cultural context.¹³ There is an iterative relationship between experience, culture, and learning that shapes shared understandings and values, which new members of the organisation learn through socialisation. The RAF's history, like all long-established institutions, defines its personality, which in turn, influences its behaviours and ability to learn from experiences.¹⁴ Once a culture becomes engrained it becomes hard to shift and this paper will argue that risk aversion, unintentionally and for explicable reasons, has infiltrated the RAF over the last decades. Fin Monahan has argued that, 'Organisational culture is a powerful force shown to affect efficiency and battlefield outcomes.'¹⁵ He also commended Eric Fowler's doctorate on culture and military effectiveness which concluded that, 'the fact culture makes a difference on the battlefield means that demand for relevant cultural insight will remain high among military commanders and national leaders.'¹⁶ This paper seeks to add to that insight.

What is risk appetite? There are multiple definitions across the literature but here perhaps the *Treasury Orange Book* definition can act as an anchor point. The *Book* describes risk appetite as a concept that, 'provides a framework which enables an organisation to make informed management decisions ... by defining both optimal and tolerable positions [setting out] the target and acceptable conditions in the pursuit of its strategic objectives.'¹⁷ Defining risk appetite for the RAF is one of the paper's recommendations for future work and research. Niklas Möller categorised three approaches to risk: scientist (measuring risk); psychological (perception of risk); and cultural ('how conceptions of risk ... are formed by societal contexts'); the focus here is on the latter type.¹⁸ Although risk is conventionally seen as an inherently negative property, and safety is seen to be positive, in warfare a willingness to accept risk is central to the manoeuvrist approach, as UK Defence Doctrine recognises.¹⁹

Flying on Operations

The End of the Cold War

Flight Lieutenant David Morgan, an RAF pilot on exchange with the Royal Navy flying Sea Harriers, quoted in an oral history book, *There Shall be Wings, The RAF: 1918 to the Present*, said of The Falklands Campaign and his deployment in 1982:

I'd always told Carol [David's wife], if I actually had to go off to war, not to expect me back, because in Germany we were operating so close to the front that life expectancy would be pretty short because we would be prime targets. ... I'd certainly resolved to do the best I could to stay alive but I didn't really expect to live through the campaign. There was every chance that I was going to get killed. In fact, while I was down south, Carol moved house and I came home to find all my belongings packed in boxes. But that's better than one chap I heard about whose wife said. "Okay, he's not coming back," sold their house, bought a smaller one, got rid of all his kit – and then he came back!²⁰

As the quote from Flight Lieutenant Morgan shows, even if he was making an anecdotal point, the mentality of Cold War aircrew meant that there was an expectation that during hostile operations aircraft would be lost and aircrew would die. Air Chief Marshal Sir Richard Johns recalled that at RAF Gutersloh the view was that even if aircrew did survive they would no longer have a home to return to, given the tactical nuclear threat to the station, and that if war had broken out there was 'absolute certainty of death.'²¹ As Air Commodore Al Byford later wrote: 'The force I flew with believed that in the unlikely event of being committed to combat, our fundamental purpose was to maximise weapon effects rather than put a premium on our own survival, and heavy casualties were inevitable.'²²

In the Falklands, planning assumptions suggested that of the 28 Sea Harrier aircraft deployed, after 21 days of operations force numbers could be as few as 14 aircraft given the anticipated battle for control of the air.²³ During the conflict, six Sea Harriers and four RAF Harrier GR3s crashed or were shot down, and a total of 34 British aircraft, the majority rotary wing, were lost. In total 237 members of the Armed Forces died in the conflict.²⁴ Notably, this was also the last conflict where burial in theatre was the default setting, but Britain resolved to repatriate a significant minority of the deceased. This was important in changing the general public's relationship with operational losses, particularly as the return of the 64 dead, therefore, required a coroner's inquest, when previously those buried abroad 'did not fall under the jurisdiction of domestic law.'²⁵

Related to that final point and regarding the juridification of the Armed Forces, there has been a gradual withdrawal from the concept of Crown Immunity, ie immunity for the Ministry of Defence (MOD) from prosecution for serious breaches of rules in relation to their duty of care for personnel.²⁶ Changes to the law that have impacted this protection for the MOD including, in 1987, the instigation of the right of military personnel to sue the Ministry for negligence. Later the Corporate Manslaughter and Corporate Homicide Act (2007) came into effect in 2008 which allowed the criminal prosecution of organisations, including the military, which acted in a grossly negligent manner.²⁷ Similarly the concept of combat immunity has also been altered by rulings based on the European Convention on Human Rights which 'have extended rights to service personnel ... who are now entitled to have expectations of reasonable care ... notably in relation to the provision of adequate equipment'.²⁸

Operationally, the experience of aircrew losses since the Cold War has changed significantly. In the 1991 Gulf War, the sustainable attrition rate for the Jaguar force was estimated at between 2.5 and 4 per cent.²⁹ Though the Tornado force sustained an approximate attrition rate of 4 per cent during the first three nights of the allied offensive, policy was then changed to flying at medium rather than low level – since the Iraqi air force showed no inclination to contest air superiority by flying – which drastically reduced casualties.³⁰ Air Vice-Marshal Bill Wratten stated afterwards that, 'We were all extremely relieved at the number of losses. ... We were expecting a lot more losses.'³¹ The 1991 Gulf War seemed to mark a significant change in public expectations around casualties; here was a war where 45 British military personnel died, significantly less than the losses in the Falklands.³² Later in 1998, during the Kosovo War, combat aircraft operated above 15,000 feet to avoid enemy anti-aircraft defences.³³ In the 2003 invasion of Iraq, only one British fast jet was lost (with two fatalities), shot down in error by an American Patriot missile. And with the invasion of Afghanistan, fighting against insurgents without their own air capability where NATO retained control of the air, rotary aircraft were taking the most risk from enemy fire. For Western nations, then, and in particular the US and the UK, the post-Cold War period was defined by 'wars of choice' against state and non-state actors with limited or no air power capabilities.

The Air Supremacy Era

Since the First Gulf War, no RAF fast jet aircraft have been lost to hostile action despite the numerous conflicts the UK has chosen to fight, in the Balkans, Kosovo, Afghanistan, Iraq, Libya, and Syria.³⁴ There have been losses of larger aircraft, most notably a C-130 in Iraq (XV179 in 2005) lost to hostile action with 10 crew killed, and a Nimrod in Afghanistan (XV230 in 2006) with the loss of 16 lives, which prompted a major overhaul of military air safety.³⁵ However, the RAF, and the British public, have now enjoyed three decades with significantly lower aircraft loss rates expected in conflict. It is worth noting that this has been much less the case for the Army and Royal Marines. Losses in Northern Ireland (722 lost to hostile action and a further 719 lost to other causes) were followed by casualties in the Falklands and then in protracted operations in Iraq and Afghanistan where the vast majority of the 635 killed were land forces (this is in contrast to 45 military personnel killed in the first Gulf War, 24 of them in action).³⁶

The public, of course, became familiar with the repatriation ceremonies at RAF Lyneham and latterly RAF Brize Norton. They were therefore also conversant with the risks faced by soldiers on the ground in these conflicts. Families also faced lengthy waits for inquests, as these were allocated to the coroner responsible for the airfield where the deceased were brought back to the UK.³⁷ Not long after the Falklands conflict, changes in rule 42 of the 1984 Coroners' Rules raised the profile of inquests into service deaths overseas, introducing the concept of narrative verdicts, which allowed coroners to 'to provide a more nuanced description of how a death occurred'. It also allowed, for the first time, for a coroner's finding of 'unlawfully killed on active service' and stipulated that inquests should be conducted in the district where the deceased was returned.³⁸ These changes, in the context of deaths in Iraq and Afghanistan, focused attention almost entirely on deaths of soldiers and marines and on two coroners' offices. The Wiltshire and Oxford coroners (responsible for RAF Lyneham and RAF Brize Norton respectively) gained prominence and also a confidence in their understanding of the military experience overseas, although their understanding of the realities of warfare and indeed of technological detail will continue to be debated.³⁹ These inquests gave families access to a place to contest the circumstances of their loved ones' deaths independent of the MOD, adding to government sensitivity to public scrutiny. Of note, the RAF Nimrod crew killed in 2006 were repatriated to RAF Kinloss in Scotland though this loss, as will be discussed, was to have a substantive impact on the RAF beyond the inquest process as it was subject to a separate inquiry.

In an operational context, then, there has been a gradual change over time regarding RAF losses: from the Falklands; to the First Gulf War, where casualties were significantly lower than expected; to the wars of choice during the ensuing decades, where the RAF faced a much lower level of threat in the air than the soldiers below them. In peacetime training, aircraft and aircrew losses have followed the same trend, though perhaps with a more complex background and trajectory.

Flight Safety to Air Safety

The RAF of 2023 is no longer accustomed to the shocks of losing personnel and aircraft as the peacetime RAF aircraft accident rate, as well as total losses, has plummeted over the last decade.⁴⁰ Since the loss of two Tornado GR4 aircraft in 2012 (in which three of the four aircrew were killed in a mid-air collision when both aircraft were on separate training missions), the only Category 5 loss of a combat aircraft was that of an F-35B which crashed into the Mediterranean on take-off from HMS Queen Elizabeth II in 2021, and where the pilot ejected successfully.⁴¹ A Category 5 accident is one in which the aircraft is destroyed or subsequently disposed of. From 2012–2022, the total number of aircraft lost was six, yet in the ten years between 1982 and 1992, 189 aircraft were destroyed.⁴² Of course annual flying hours across the fleet also diminished as the RAF downsized after the end of the Cold War, meaning absolute numbers were bound to come down, and the increased use of simulation has also reduced the need to practice riskier profiles in live flying training.

Improvements in air safety over the last three decades are also an important element in this major reduction over time. These efforts included confidential (ie anonymous) reporting of flight safety incidents, increased understanding and education on human factors including cockpit gradients and crew resource management, and later recognition of the importance of welcoming open reporting of air safety incidents – acknowledging that since such incidents were bound to happen, it was best to encourage their

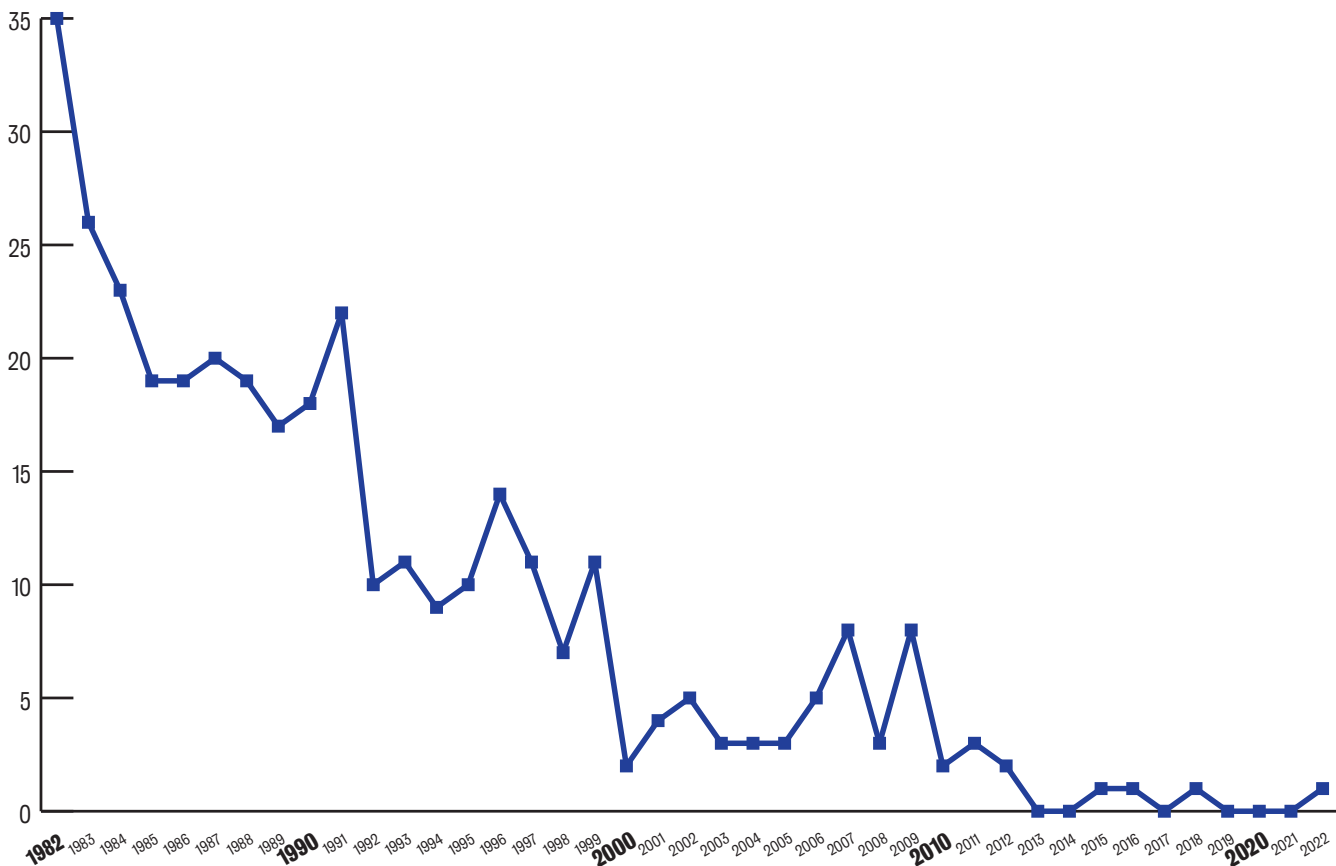
reporting: ‘The proactive reporting of air safety concerns by personnel from across the defence air environment (DAE) is fundamental in maintaining continual awareness of the risks facing our people.’⁴⁴ These changes in attitudes to flight safety, as will be further detailed, were gradual over time, with injections of energy in particular with the creation of the Inspectorate of Flight Safety in the 1970s and *The Nimrod Review’s* publication in 2009.

As recalled by Air Vice-Marshal George Black, the RAF of his junior years in the 1950s, populated as it was at senior level by aircrew who had survived flying during the Second World War, had little interest in safety. The high number of accidents:

seemed to be accepted as that price that had to [be] paid in order to satisfy the task, but, more importantly, it also ensured that pilots flew with the dash and spirit that had characterised operational activities in WW II. How many times in those early days did I come across the expression that ‘flight safety is something that stops us getting on with the job’?⁴⁵

He outlined how as aircraft numbers reduced and increasingly complex aircraft demanded a higher standard of professionalism, attention started to be paid to reducing accident rates. He stated that what he said about training applied equally to front-line squadrons and it was not until the late 1950s that it became more acceptable to abort a sortie for flight safety reasons.⁴⁶

Category 5 Losses 1982–2022⁴³



1970s and 1980s

Air Chief Marshal Johns referenced in particular the establishment of the Inspectorate of Flight Safety (IFS) in the mid 1970s, with Air Commodore Ken Hayr at its helm, as evidence of a change in attitude to the loss of aircraft and aircrew. Prior to that, he estimated that the Harrier Force lost, between 1969 and 1974, 19 aircraft, one station commander who was killed, one squadron commander self-suspended, and two squadron commanders sacked.⁴⁷ Air Vice-Marshal Black, echoed by Air Chief Marshal Johns, outlined that around this period, Commanders-in-Chief were wont to order the sackings of squadron commanders and station commanders after accidents: 'The pendulum had clearly swung too far as far as safety was concerned. Attitudes had clearly hardened ... [the removal of] senior executives from the front line could occur within days, sometimes hours, following an aircraft accident.'⁴⁸ Such a culture of blame and scapegoating unsurprisingly reinforced the message that admitting incidents or errors was career-damaging. With the establishment of the IFS, the RAF carried out a critical examination of the Service's approach to flight safety.⁴⁹ That said, as Air Commodore Rick Peacock-Edwards has recalled, substantial progress had been made in the IFS's predecessor, the Directorate of Flight Safety, reflecting on improvements made between 1946 and 1970.⁵⁰

Back in 1976, in a report discussing accident rates, views were expressed that:

Good flight safety requires frank admission of aircrew errors which, but for the grace of God, could have resulted in accidents. This is unlikely where men believe they run the risk of reprimand or disciplinary action. I certainly support the suggestion that we should press for a more open system of incident reporting.⁵¹

In 1978 a confidential reporting system, CONDOR, was introduced and proved successful at eliciting reports of incidents that would otherwise have been kept quiet. As the Inspector of Flight Safety commented, 10 years later, 'As there is still a marked reluctance amongst aircrew to report human factor incidents through the normal flight safety chain, it is important that the CONDOR system is encouraged and supported at unit level.'⁵² Yet statistics from the same period demonstrated that there was still some reticence to report, even anonymously. Although the RAF found that nearly 40% of accidents were caused by human error, only 10% of reported incidents were attributed to that cause. As the Inspector's report opined:

If one assumes that an incident is a potential accident, there should be a closer correlation between the percentage cause codings of incidents and accidents; the reason for the disparity is clear and understandable in that in the competitive environment of the Service people are reluctant to report what might, and indeed are, seen by supervisors as mistakes.⁵³

The report recommended better use of the Condor system (and the related engineering safety confidential report, the Murphy) including its expansion and better use of the data derived from it.⁵⁴

By the 1980s, with regular reporting to CAS from the one-star Inspector of Flight Safety, progress was gradually made in improving flight safety in a more level-headed and logical manner than the selective removal of squadron commanders. In the late 1980s, a post of Flight Safety Psychologist was established with a remit to 'visit flying units to gain an insight into current operational activities, attend Boards of Inquiry to advise on human factor aspects, and lecture to supervisors, authorisers' and flight safety officers' courses.'⁵⁵ The same IFS report also stressed the importance of Accident Data Recorders in aiding investigations into the causes of accidents; these were available on the Hawk and Tornado but were not fitted on all RAF aircraft. That said, rates remained stubbornly high heading into the 1990s – Air Chief Marshal Stephen Hillier recalled of the period 1986–89, looking back at his logbook, '6 pilots and navigators that I flew with in that single 3 year period ... were killed in flying accidents or on operations, either at the time or subsequently. ... It is a sad truth that we could be more of a danger to ourselves than enemies have proved to be.'⁵⁶

Given the high accident rates, he also reflected on a culture which accepted the accident rates as part of a 'risky occupation' and highlighted the approach this engendered with an example:

There was a Flight Safety poster at the time which set out to emphasise the importance of making an early decision to pull out of low-level when approaching bad weather. The poster showed an aircraft, at low-level and approaching poor weather and high ground, illustrating 3 possible decision points along its flightpath: the first was labelled on the poster as 'good decision', the second 'lucky', the third 'dead'. On a couple of occasions I had seen hand-written graffiti amendments to this poster, changing the decision point descriptions to 'wimp', 'good decision', and 'unlucky'. My interpretation of this example is that we placed greater value on those who were able to operate safely right up to the edge, rather than those who were overly risk sensitive.⁵⁷

As he put it, the challenge was knowing where the edge was and that required a sophisticated understanding of skill and experience – in essence devolving much of judgement over risk to the aircrew in the cockpit.

Throughout the 1970s and 1980s, the perceived wisdom was that it was appropriate to find aircrew negligent or grossly negligent even in the case of their own deaths (as opposed to a finding of 'aircrew error'). In a report written in 1988, the then Inspector of Flight Safety reflected that back in 1983 a Board of Inquiry (BOI) Working Party had recommended a more liberal interpretation of the term 'error of judgement', thus encouraging Boards to use that finding rather than the pejorative term of 'negligent'. He also stated that this change had had 'little or no effect and a finding of negligence still appears to be virtually inevitable; in fact over 90% of aircrew error accidents result in a finding of negligence as opposed to error of judgement'.⁵⁸ His successor, a year later, stated that 'there have been 4 instances of deceased aircrew being found negligent' and that he had 'no cavil with these findings but note that some other boards are specifically not assessing negligence when deaths have occurred'.⁵⁹

The 1980s saw both a huge appetite for risk in operational terms – in the 1982 Falklands Campaign and the potential for a hot war with the USSR – and increasing concern about the number of aircraft accidents and fatalities in the training environment. The evidence from the archives presented above shows concern about open reporting, apportioning blame, and an increased willingness to consider tackling human factors such as in the employment, for the first time, of a psychologist. However, the accident rate, while declining gradually, was still such that, on average, crashes were taking place at least every month. As Air Commodore Byford wrote: 'Bird strikes, controlled flight into terrain, mid-air collisions in uncontrolled airspace (in an environment where much larger numbers of aircraft were operating than today) and pilot error all imposed a steady toll of causation which would be unacceptable and unsustainable in today's RAF'.⁶⁰ In the immediate pre-Gulf War period he recalled that the annual peacetime attrition rate of 10–20 aircraft and crews equated to the loss of an entire squadron every year.

From the 1990s to 2006

In the early and mid-1990s several particularly high-profile incidents exposed the RAF to the scrutiny of the public, the press, and Parliament. These included the loss of a Shackleton aircraft and 10 crew in 1990; the BOI found that the aircraft was flying below a safe altitude in poor weather conditions. The investigations uncovered non-standard practices conducted on the aircraft's squadron.⁶¹ Also lost was a C130 and nine crew on 27 May 1993, which flew into terrain at low level in Scotland following a cargo drop, and the death of a soldier on 4 August 1994 at South Cerney, when he was struck and killed by a low pass of a C130 over the Drop Zone. The aircraft was operated by the Joint Air Transport Establishment based at RAF Brize Norton and led to the prosecution of the aircraft captain for manslaughter.⁶² Around the same time, the C130 force was also being investigated for the practice, contrary to every principle of flight safety, of aircraft captains parachuting from their aircraft leaving their co-pilot to land the aircraft alone. These incidents each, in their own way, illustrated levels of ill-discipline that were of course unacceptable then, but must seem like a completely different era to junior aircrew in the 2020s.

The debate over negligence findings became a matter of substantial media and public debate after the crash of a Chinook ZD576 on the Mull of Kintyre in 1994 which killed all 29 people onboard. The BOI blamed the pilots for gross negligence, which led to a lengthy and ultimately successful campaign by the families of the men and their supporters to have that finding overturned. In 2002 a cross-party House of Lords committee report concluded unanimously in their favour.⁶³ Finally, following a change of government in 2010 a further investigation was implemented by the Secretary of State, Liam Fox, and it was recommended that the finding of negligence be set aside. The Philip Inquiry cleared the aircrew of any responsibility for the crash and gave Lord Philip's view that: 'Whether correct or not, for some the impression was that senior officers were choosing to blame junior officers rather than admit to institutional and policy failures for which they were responsible'.⁶⁴ This statement stands as a lesson in itself in how to attribute blame without actually attributing blame.

From the mid 1990s onwards, the RAF gradually shifted its culture amongst aircrew to one of being willing to learn from incidents and actively using them as learning opportunities to improve future safety. This virtuous circle led to an environment, witnessed by the author, of aircrew actively wanting to open report rather than report incidents confidentially to gain recognition for admission of errors.⁶⁵ However, over the same period, as the RAF was to discover in the most tragic circumstances, there were serious problems over the oversight of the safety of the fleet and specifically airworthiness.

On 2 September 2006, Nimrod XV230 was conducting a routine operational sortie over Afghanistan when it suffered a catastrophic engine fire which led to the loss of the aircraft and the 14 crew. This was the biggest single loss of life of British service personnel in one incident in an operational theatre since the Falklands War.⁶⁶ The following year, the government appointed Charles Haddon-Cave (then QC, now Rt Hon Lord Justice) to conduct a review into the loss of the Nimrod and the broader context in which an avoidable accident had taken place. He found that from the Strategic Defence Review of 1998 onwards, the MOD suffered 'a sustained period of deep organisational trauma' due to financial pressures, reorganisation and distraction, not least with respect to the creation of the Defence Logistics Organisation.⁶⁷ The recommendations of *The Nimrod Review* were extensive and aimed to rectify 'manifold' shortcomings in the MOD's airworthiness system. These led to the creation of the Military Aviation Authority (MAA) and wide-ranging changes in approach to safety, risk, and culture. The MOD – and the RAF – prioritised the implementation of robust Safety Management Systems and the MAA introduced a series of regulatory articles which laid out the future management of airworthiness and roles and responsibilities across military aviation.⁶⁸

A central element of Haddon-Cave's assessment was around the concept of accountability. He recommended that each of the Services nominate 'clearly identified accountable Duty Holders' who would be legally responsible for safety.⁶⁹ A study into the impact of *The Nimrod Review* highlighted its 'profound and lasting impression ... unprecedented in recent MOD history'.⁷⁰ It found that as a result, some managers, not limited to Duty Holders but including others with safety responsibilities, were perceived as becoming risk averse due to a fear of scrutiny and litigation.⁷¹ As former CAS, Air Chief Marshal Sir Glenn Torpy, wrote:

it seems ... we now consider virtually every activity through the lens of the MAA's risk processes – in many cases inappropriately. I also sense that many hid behind these processes rather than using their training, experience and personal judgement. I may, of course, be completely wrong but from the outside it looks as though we've tied ourselves in a bureaucratic straitjacket that is stifling initiative, mission command and empowerment of the individual.⁷²

There is no doubt that the overhaul of air safety that took place in the aftermath of *The Nimrod Review* has addressed the many woeful failures of the preceding decades that were so uncompromisingly exposed by Haddon-Cave (he referred to the report later as 'an exercise in "tough love"').⁷³ Questions remain about second and third order consequences on culture.

*The pursuit of excellence over time became an obsession with perfection. It resulted in a stultifying culture and a spider's web of checks, approvals, and validation that slowed decision making to a crawl... I can understand the joke that was going around IBM in the early 1990s. 'Products aren't launched at IBM. They escape.'*⁷⁴

Lou Gerstner Jr CEO IBM from 2003.

Since the publication of *The Nimrod Review*, Haddon-Cave has spoken and written about risk and safety in light of his experience gained during his review of the causes of the loss of XV230. In 2013, at a conference speech, he discussed lessons from *The Nimrod Review*, including the following:

There is an increasing tendency towards what I call the 'Self-preservation' Management and Regulation. By this I mean three things in particular:

- (1) First, an increase in *Defensive engineering* (i.e. being over-cautious, being reluctant to take decisions, unnecessary outsourcing, over specifying and including a *plethora* of unnecessary checks);
- (2) Second, further *Dilution of Responsibility* (i.e. shedding, spreading and delegating responsibility far and wide so that the picture as to ultimate responsibility is unclear and diffuse); and
- (3) Third, more (of what I call) *Promiscuous Procedure* (i.e. organisations and individuals wrapping themselves in a protective blanket of more and more procedure and becoming slaves to process, box-ticking and paperwork).

These tendencies have a baleful effect on safety and must be halted and reversed.⁷⁵

Ten years on from those comments, and considering the need to innovate faster and more creatively to help Ukraine and prepare for future conflict, military leaders from the Chief of the Defence Staff (CDS) down have commented that both the first and third of the above are live problems for the armed forces. Regarding Haddon-Cave's third point, *The Haythornthwaite Review into Armed Forces Incentivisation* (HRAFI) highlighted the extent to which bureaucratic process is affecting the Services' agility and flexibility: 'Instead of having the freedom to give their best for the people working with and for them, they feel disempowered by a system that swamps them with rules and process rather than embracing their ideas and initiative.'⁷⁶

As the RAF entered the 2020s, it would be understandable if commanders looked with some satisfaction at the creation of an air safety organisation and culture, and a flying accident rate flatlining close to zero (though of course with the caveat that flying hours have diminished considerably over the decades as well). There remains the question of whether the current air safety organisation is that which Haddon-Cave intended in his recommendations of 2009. One of his criticisms was of ‘organisational complexity’ of the safety and airworthiness regime, one which has been echoed by serving personnel of the present system.⁷⁷ The RAF’s fleet has been in the final years of a complete recapitalisation programme and though the new aircraft are much fewer in number they are exquisitely capable as well as much more expensive than the platforms they replaced. Those aircraft are part of the reason for the dramatic reduction in accidents. They are easier to fly, ergonomically better designed and it is telling that the original planned purchase of 232 Typhoon aircraft included an assumption that 89 would be lost in accidents. In fact none have been lost to date and the eventual purchase reduced to 160.⁷⁸ There are also fewer aircraft, flying lower numbers of hours, fewer at low level and in less congested skies, all factors in reducing the accident rate. Additionally, it is likely that, given the much smaller number of aircrew needed to operate frontline combat fast jet aircraft, the RAF is in a position to select only the most capable pilots.⁷⁹ If anything it appears that the highest risk of accidents transferred over the last twenty years from fast jet to rotary and multi-engine aircraft, particularly given the riskier operational flying those aircraft have conducted on operations in Iraq and Afghanistan.

Efficiencies in support have led to widespread contractorisation and commitment to the ‘whole force’ concept. And defence cuts across the board led to a drastic reduction in main operating bases, quite understandably given the reduction in aircraft numbers, and the leaning of engineering support, often to single facilities, impacting resilience as well as capability. However, the experience of the Covid-19 pandemic and then the even more destabilising invasion by Russia of Ukraine have raised question marks over the relentless pursuit of efficiency. Resilience and redundancy are inherently more expensive and less attractive concepts. In CDS’s recent evidence to the House of Commons Defence Committee he commented:

Your broader point is, I think, a challenge to all Western industry on just-in-time philosophies, the need to have deeper stockpiles, and the need to have a relationship with industry which is either ‘call off quickly’, or where industry is consistently fed, so that it has the capacity to swing up. I completely agree.⁸⁰

Though the RAF’s AP 7001 definition of ‘war fighter ethos’ specifically references ‘civilians in our units’ and states that ‘wearing a uniform is not the only prerequisite to that ethos’, in practice the large scale contractorization of the RAF has implications for its culture.⁸¹

This paper has concentrated primarily on changing approaches to air safety and appetites for risk in peacetime and on operations in terms of aircraft and aircrew losses. However, there is more research to be done into how broader military, and specifically, RAF culture has transformed as personnel have gradually absorbed changes over time to their personal risk and that of their platforms. Reducing the amount of bureaucracy and increasing the general empowerment of personnel in day-to-day activities and decision-making is an area that deserves further study. The UK armed forces are now in a state of day-to-day competition with adversaries operating below the threshold of armed conflict. In the case of escalation above that threshold, they may find themselves fighting those with a greater appetite for risk, not just in relation to flight safety but across their broader military culture. The recently published HRAFI highlighted the disincentivisation that extensive process creates: ‘What is needed is a fundamental shift in the philosophy of the people system. Today’s focus is on creating rules to impose a system of “tolerable variation” where the default is to control, and permission is needed to vary or innovate.’⁸² Conversations about the extent to which this spills into broader appetites for risk and, as importantly, innovation are timely, given the geopolitical challenges of the day as outlined in the *Integrated Review Refresh 2023*.⁸³

The *Defence Command Paper Refresh 2023*, published after the *Integrated Review Refresh*, argued for a need to ‘proactively manage ... risk’ and stated that ‘the fear of failure, litigation and embarrassment has created a culture that ends up compounding operational risk, slowing the pace of delivery and eroding our strategic advantage.’⁸⁴ Additionally, culture, rituals, and collective memory have an impact on understanding the impact of failure and loss and on the attitudes of aircrew, support personnel, and their families towards operational risk.⁸⁵ As briefly discussed, the example of repatriating bodies from conflict meant that inquests must be held in the UK on those deaths, just one element of a number that have contributed to fear of the impact of litigation on actions.

This relates to the attitude of the MOD, and the RAF under the MOD's direction, to engaging publicly on difficult or reputationally damaging issues. An example of this was the 'Reaper Engagement Programme' written in 2008 for the RAF's newest acquisition at the time, the remotely piloted Reaper. The Programme was in theory supposed to outline how the MOD and the RAF would communicate to the media and the public about the capabilities of this new warfighting technology.⁸⁶ However, the MOD in practice avoided most public engagement on the topic. Some of this was understandably related to sensitivities about a British project embedded within the United States Air Force (USAF). However, much of this reticence was from defence personnel with little interest in talking publicly and distrustful of the press, but who failed to acknowledge that the alternative course was to allow the media – and the public – to devise their own narrative. As a result, the term 'drone' became the default term for the capability in the public domain, in contrast to the wishes of the RAF.⁸⁷ Similarly, the investigation into inappropriate behaviour in the Red Arrows was not briefed publicly but was instead revealed by *The Times* as being 'swept under the carpet'.⁸⁸ A more proactive approach might have been more painful in the short term but better reputationally in the long term. Simon Akam has detailed the MOD's attempts to stifle public debate, beyond reasons of operational and personnel security, around the Army's performance in Iraq and Afghanistan, 'debate that could have improved performance on the battlefield'.⁸⁹ Changing the MOD's communication culture would require strong political will in that direction; the Defence Command Paper of 2023 explicitly commented that fear of failure is a factor in eroding strategic advantage.⁹⁰

Recommendations for a Future Embracing High Risk Operations

Having identified the challenge of approaching risk appropriately for the challenges facing the modern RAF, and with read across to other areas of defence and security, this paper considers some recommendations for future thinking and research. First in relation to institutional mindset and how to define and communicate risk. This includes use of language and communication, which leads onto consideration of some concepts the RAF might want to investigate further in understanding and approaching risk. The final part of this section encourages engagement with academia on military innovation studies.

1) Institutional Mindset

The first step in considering approach to risk and potential high risk operations is to review institutional mindset and set a framework for communicating about risk and risk appetite. The RAF can best start by reassessing its purpose, culture, and the narrative it presents internally and externally, reviewed in the light of the historical evidence about how the institutional mindset of the RAF regarding risk and resilience has changed over time. This would be the first step in making the changes, it is argued, needed to provide a UK air force fit for the challenges of peer-to-peer competition in the years and decades to come. The RAF obviously will not solve the problem by making training and operations inherently riskier, which would not be an acceptable way forward legally or morally. However, the organisation does need to talk more about risk (as it has done recently) and communicate succinctly and clearly about what change is needed. As CAS stated: 'perhaps the hardest thing to do, is to develop a mindset and attitude to risk and to process that matches the operational threat we might face not our peacetime approach'.⁹¹

Haddon-Cave concluded that the ideal approach was 'Risk Sensible':

There are to my mind four states of Man: *Risk Ignorant*, *Risk Cavalier*, *Risk Averse* and (the state what I advocate in Nimrod one should aim for) *Risk Sensible*. My big message is to encourage everybody not to be *Risk Ignorant*, *Risk Cavalier*, or *Risk Averse*, but to be *Risk Sensible*. ... Being *Risk Sensible* means embracing risk, unbundling it, analysing it and taking a measured and balanced view.⁹²

In the recommendations below, particularly the first concept outlined using the Treasury Orange Book, one thread running through is the need to define risk appetite and articulate that consistently and clearly throughout the organisation. Having a conversation amongst warfighters, as well as with others in the risk management chain, about which parts of the RAF fall outside of the Risk Sensible category, perhaps tending to the Risk Averse state, will be necessary as anecdotal evidence has suggested.⁹³ The term Risk Sensible might offer the RAF a useful way of narrating a reviewed approach to risk.

Senior leaders may all agree that the RAF needs to prepare for High Risk Operations and move from 'Garrison Efficient' to 'Warfighting Effective', but each Force Commander or Duty Holder (for example) may interpret risk differently unless the organisation itself has clarity on its risk appetite. The good news is that the same open culture that revolutionised flight safety in aviation (in the civil sector as well as military) is the open culture also needed in an organisation that must understand risk, needs to be clear about being Risk Sensible, and has to prepare for High Risk Operations.⁹⁴ This should aim to make denial and neglect of problems and failures difficult. However, current practices such as over-bureaucratisation and poor media engagement over reputationally difficult subjects need overhauling to embody this in practice, which requires political commitment and buy-in to resolve. Preoccupation with communicating success (and the espousals of the superior values of the trained military aviator over their civilian counterparts) can distract from digging into failures.⁹⁵ The sensitivities in talking about some areas of High Risk Operations – due to their classification – provide the MOD with an additional challenge in terms of both communicating externally to deter and communicating internally to educate.

Simulation has an important role to play. Simulators are of course useful in allowing aircrew to practice flying in dangerous or difficult situations without facing the risks they would in live flying. However, not being exposed to risk is not the same as not feeling danger or fear. Research into the use of virtual reality tools to induce fear demonstrates that there is potential to induce a sense of risk even in simulated scenarios.⁹⁶ Additionally, further work might usefully be done into the use of air safety occurrence reporting in simulators.⁹⁷

In terms of considering the difference between organisational risk appetite and individual risk appetite, further research may usefully examine whether there are different approaches to risk in different cohorts within the RAF. The rotary force has much more operational experience of a high risk situations in non-permissive air operating environments close to (or on) the ground in places like Iraq and Afghanistan. Whether this has impacted either organisational or individual approaches to risk bears examination.⁹⁸ It should be noted that the fast jet community are well aware of lessons from Syria and Ukraine about the dangers of being captured in the modern era of social media even though recent British operations have taken place in relatively permissive air environments.⁹⁹

2) Conceptual Tools

The following are several concepts that might usefully underpin thinking about risk in a military organisation like the RAF and act as frameworks for preparing the force for High Risk Operations.

The Treasury Orange Book

The *Treasury Orange Book* contains useful guidance on risk appetite and its Annex A contains risk appetite tools developed by the Civil Service risk community.¹⁰⁰ It outlines example levels for risk: averse; minimal; cautious; open; and eager. It recommends applying this range of risk appetites against a selection of risk categories. These are defined in more detail on the second part of the annex and include, for example, strategy risks, governance risks, operations risks; legal; property; financial; commercial; people; technology; information; security; project/programme; and reputational. It then spells out example risk appetite descriptions.

High Reliability Organisations

The concept of High Reliability Organisations (coincidentally the same acronym as High Risk Operations) is recommended as useful in thinking about risk appetite in the RAF.

In their book *'Managing the Unexpected'*, Weick and Sutcliffe refer to High Reliability organisations which operate under very trying conditions all of the time, as practicing a form of organising that reduces the brutality of audits (major incidents) and speeds up the process of recovering. Their view is that the hallmark of a High Reliability organisation is not that it is error-free but that errors do not disable it, such a state of affairs being brought about by 'mindful management' i.e. good management of the unexpected.¹⁰¹

One of the earliest proponents of High Reliability Organisations, Gene Rochlin, characterised them and their leaders as guiding themselves towards troublesome perceptions and away from soothing ones:

[High Reliability Organisations] seek an ideal of perfection but never expect to achieve it. They demand complete safety but never expect it. They dread surprise but always anticipate it. They deliver reliability but never take it for granted. ... Such representational ambiguity is implicitly (and sometimes explicitly) acknowledged and accepted by the organization, not just as part of the cost of maintaining performance levels, but as an active contributor to problem solving.¹⁰²

Rochlin started his work looking at US Naval Flight Operations. When his Berkeley research team described the *USS Carl Vincent* as a High Reliability Organisation, its captain agreed that was his intent, though he had not thought to articulate it in that way. As Karl Weick and Kathleen Sutcliffe argued:

Notice what can happen when tacit, un verbalized efforts to act more reliably become explicit. Now you can do things such as distribute those practices more widely, strengthen and prioritize them, include them more clearly in training and socialization, and weave them into conversations.¹⁰³

Hence the importance of recognising and analysing the challenges of inculcating the aviator with a risk appetite concomitant with High Risk Operations, and the pivotal role of explicit communication.

Loose-tight

Tom Peters and Robert Waterman Jr summarised the concept of *Loose-Tight* in *In Search of Excellence*:

Loose-tight was a summary phrase that stood for the idea that firms should tightly couple their employees to a small number of values that must be followed (usually no more than three) but allow discretion on everything else. This produces some centralization but it is loosened when everyday decentralized practice reaches into novel locales that require novel adaptations and recoveries.¹⁰⁴

This concept recalls the Ukrainian military's decentralised approach to warfare encouraging innovations from the bottom up.¹⁰⁵

Uncertainty Avoidance

Joseph Soeters and Peter Boer looked at culture and flight safety in military aviation across 14 NATO air forces and at their countries' supranational cultural characteristics in areas such as a tendency towards either individualism or collectivism. One characteristic that might help thinking about risk and appetite is 'Uncertainty Avoidance'.

Uncertainty avoidance is the extent to which the members of a society perceive a threat in uncertain or unfamiliar situations, and the extent to which they subsequently try to avoid these situations by means of regulations and bureaucratic sanctions, among others. ... [This] is not the same as the avoidance of risk.¹⁰⁶

They went on to find that:

In countries with a low score for uncertainty avoidance, people have grown accustomed to solving problems independently; using improvisation; and, if necessary, acting outside formal rules. Furthermore, in such countries there are simply fewer rules and regulations. In these countries people are generally less nervous, and the chance of stress in such an unfamiliar situation is, on average, less.¹⁰⁷

They hypothesised in their research that uncertainty avoidance and the occurrence of military aviation losses would positively correlate. Their evidence bore this out, which had not been the case in Boeing's research into the civil sector. They argued that the link for air forces with uncertainty avoidance 'is probably a consequence of the fact that this cultural feature [is a pre-eminently typifying aspect] of the military organisational culture.'¹⁰⁸ The UK scores relatively low for Uncertainty Avoidance, but perhaps the increased focus in the RAF on safety and a potential shift to risk aversion over the last few decades, as earlier evidence suggests, means the force has in fact diverged from supranational culture.¹⁰⁹

3) Military Innovation Studies

The field of military innovation studies has been described as having 'niche status' and has until recently been viewed as having minimal influence 'outside of a very specific scholar-practitioner community working within the field itself'.¹¹⁰ Scholars of organisational culture and applied history both add value to the field, whether examining militaries in peacetime, wartime, in an immediate post-war period or when the armed forces feel themselves ill-prepared for an imminent threat. The relationship between industry and the military in the context of innovation has been extensively explored and could merit a literary review. The concept of the 'Secret Spitfire' factories seems fanciful in the twenty-first century; an F-35 could not be made in a dispersed collection of bus depots, sheds and garages tucked away in residential areas.¹¹¹

However, Ukraine has shown that much can be done that does resemble the innovation of the Second World War; either building new, small platforms or innovating to use existing platforms in new ways which can be done in less conventional settings. As CAS has said, the RAF should also consider: 'Having capability ready, on the shelf that might not have been tested and proven to a factor of 10 to the minus 8 or 6, but we know enough to say it will work, will save us time and money and could give us an operational edge in the fight.'¹¹² The Central Research Institute of the Ukrainian Armed Forces has gained, and continues to gain, a wealth of understanding on innovation and working with their academic researchers offers British air power thinkers another avenue to further military innovation studies. As the Secretary of State's Office of Net Assessment and Challenge (SONAC) concluded recently: 'As Cold War history shows, a close and intimate relationship between academia and government underpinned some of the biggest foreign policy successes and generated a vibrant marketplace of ideas to inform policy.'¹¹³ The field of military innovation studies is an area of academic research that could be further used to generate and challenge thinking on high risk operations, and the shift in risk appetite that takes place between peacetime and wartime.

Conclusion

The invasion of Ukraine by Russia constituted a level of strategic shock to Western nations and European nations in particular. It prompted changes to defence spending and postures, in countries such as Germany and Switzerland in terms of their attitude to defence, and in Sweden and Finland with their respective decisions to apply for NATO membership. In the UK, the invasion led to the revision of 2021's *Integrated Review* and the *Defence Command Paper*, both of which were refreshed and republished in 2023 to reflect the new circumstances in Europe.

However, even in mid-2022, there were signs that 'the sharp strategic shock' of the invasion had 'begun to dissipate as the full reality of Putin's miscalculation has become apparent'.¹¹⁴ While the response to the invasion in the UK continues to influence extensively government policy on defence and the three Services' thinking on future structures and warfighting, it is too early to say whether the invasion constitutes a strategic shock to military culture and innovation. It certainly has that potential, and the current circumstances offer the RAF an opportunity to make a change, not just in culture, but in structure, personnel composition, and strategy. As Farrell argued:

Scholars working on military culture uniformly identify external shock to the local normative system - in the form of wars, depressions, and revolutions - as an enabling condition of voluntary, radical cultural change. Shocks of such a profound nature are widely seen as necessary to undermine the legitimacy of existing norms, shift power within communities, and enable cultural entrepreneurs to construct a new consensus around alternative norms.¹¹⁵

The author is reminded of the salutary lessons contained in Andrew Gordon's *The Rules of the Game*, in which he contrasts the Royal Navy's experiences of the 18th and early 19th century with the period of peace that the Service enjoyed during the Victorian era. During the latter period, he argued, the Navy became increasingly hide-bound by adherence to the *Signal Book*, newly released in the year after Napoleon's final defeat, and from then on terse signals replaced the meetings of minds that Nelson's fleet enjoyed. He outlined how standardisation of dress, regulations and standing orders replaced the more innovative, if also more 'anthropologically strange' men of *HMS Victory*.¹¹⁶

In responding to the rapidly changing technology becoming available to the Navy in the decades preceding the First World War, he argued that they responded 'by marinating the material developments of the early twentieth century in the familiar professional ethos of the nineteenth; and by trying to regulate them with rules, standing orders, and comparative statistics'.¹¹⁷ As a result, his thesis concluded that the only major naval battle for the Royal Navy in the First World War, the Battle of Jutland, was entered into by a force with the wrong culture and mindset which led to 'heart-breaking disappointment and a source of prolonged acrimony'.¹¹⁸ The RAF has yet to suffer such a fate and *The Rules of the Game* offers a pertinent historical tale of process and regulation stifling innovative behaviours.

This paper started with a quote from Roosevelt with the concluding line: 'Shame on the man of cultivated taste who permits refinement to develop into fastidiousness that unfits him for doing the rough work of a workaday world.' It is concern over how far the RAF has allowed refinement to turn into fastidiousness, or, in more prosaic terms, whether ALARP (As Low As Reasonably Practicable) has turned into ALAP (As Low As Possible), that has prompted this paper reviewing the changes to attitudes to risk since the Cold War era in the RAF. Ukraine and Russia are both 'in the arena' (of warfighting), as Roosevelt put it, learning and innovating at pace.

As the *Defence Command Paper Refresh* stated, 'Risk aversion – one of the consequences of a period of relative peace and stability – makes us less agile and competitive than we need to be. ... We must proactively manage our risk, rather than allowing our activity to be restricted by existing regulation and guidelines'.¹¹⁹ This paper has outlined the RAF's journey concerning risk over the last several decades. It has demonstrated, in relation to operational risk appetite and flight safety, that the RAF has gradually moved towards the risk-averse stance that the Command Paper calls out, though not through an entirely linear process. While researching this paper, several retired senior officers who operated through the transition from the Falklands and the Cold War to the First Gulf War and into the post-Cold War period, offered provocative and salient advice. As Air Vice-Marshal Sean Bell wrote:

part of the solution appears to be to exploit and leverage the experience of veterans to discuss ways in which success was delivered on ops despite operating outside the rules. I suspect that the military will never be able to have a different risk appetite in peacetime from society; however, it does need to be well prepared for the challenge of ops, and they have a rich vein of experience upon which to draw.¹²⁰

There is certainly further advice available from veterans of that period to the contemporary RAF.

While risk appetite is an important element of military culture, risk aversion can reduce agility and warfighting capability. The opportunity to embrace the concept in a Risk Sensible manner, define and communicate it, offers the prospect of using it as an enabler rather than a barrier to transformation. Similarly, by developing the concept of High Risk Operations, the RAF will embed further the language and culture of change, risk and innovation. There will always be tension between risk avoidance and operational effectiveness. The question for the RAF is, given its journey to an increasingly risk averse culture, what is the right balance now in the context of today's threats?

Ultimately, the RAF and UK Defence need to consider carefully risk, not just in the context of peacetime health and safety regulations, but as part of a far more complex calculus of international competition in which authoritarian adversaries have less of an obligation to social media, are not answerable in the same way to an electorate and do not have to contend with an open justice system which allows prosecution of the MOD. And as Air Chief Marshal Johns reflected in 2002, presciently in the light of Russia's approach to invading and fighting Ukraine, 'there are still many parts of the world where life is cheap under totalitarian governments who exercise remorseless control of both their people and their media'.¹²¹ This is allowing them to train and operate in a different way with a different relationship with risk, while the RAF is potentially limiting itself to a much greater degree. How can the RAF change to deny our adversaries an edge?

Endnotes

- 1 Accessed via <https://www.worldfuturefund.org/Documents/maninarena.htm>.
- 2 Including Sweden, France, Poland, Germany and Finland.
- 3 'We do not want to get into an attritional fight', first strategic lesson from Ukraine, Air Marshal Sir Rich Knighton, DComCap, at RUSI Combat Air Conference, 28 March 23.
- 4 The RAF currently uses the term Air Safety while historically it used Flight Safety; the two are used interchangeably in this paper.
- 5 Joint Doctrine Publication (JDP) 0-01, *UK Defence Doctrine*, 6th Edition, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1118720/UK_Defence_Doctrine_Ed6.pdf, 22.
- 6 Chief of the Air Staff Annual Lecture, Freeman Air and Space Institute, 21 November 23, <https://www.kcl.ac.uk/news/raf-needs-to-adapt-as-world-becomes-more-unstable-says-chief-of-the-air-staff>.
- 7 Air Command, Chief of Staff Capability, working definition.
- 8 <https://www.belfercenter.org/publication/applied-history-manifesto>.
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- 11 Carl H Builder, *The Masks of War: American Military Styles in Strategy and Analysis*, A Rand Corporation Research Study (Baltimore: Johns Hopkins University Press, 1989).
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- 17 *Risk Appetite Guidance Note*, HM Treasury, August 2021, 6.
- 18 Möller, N. (2012), 'The Concepts of Risk and Safety' in Sabine Roeser, *Handbook of Risk Theory: Epistemology, Decision Theory, Ethics, and Social Implications of Risk*, Springer Reference (Dordrecht New York: Springer Science+Business Media B.V, 2012), 56–57. Risk here is considered in the context of aviation; risk in the context of financial investment might not be so inherently negative as a concept.
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- 20 Max Arthur, *There Shall Be Wings: The RAF: 1919 to the Present* (London: Coronet, 1993), 447–48.
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- 23 John Shields Unpublished PhD Thesis, 50, quoting TNA, DEFE 69/1112, 'Air Matters', and 71.
- 24 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1146159/20230330_UK_armed_forces_Operational_deaths_post_World_War_II-O.pdf.
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- 26 Forster quotes Rubin's definition for juridification: 'the colonization of the conduct of conflict by legal criteria which have drawn judges into arbitrating on issues previously based on trust', Forster, 295.
- 27 Forster, 291.
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- 38 Forster, 'British Judicial Engagement and the Juridification of the Armed Forces', 292.
- 39 William H Tench talking of civilian inquiries into air accidents in the 1970s criticised lawyers involved then: 'They acquire a smattering of technical jargon and by using it create the impression that they have a full comprehension of the subject'. William H Tench, *Safety Is No Accident* (London: Collins, 1985), 36–37.
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